UNIVERSIDADE DO VALE DO RIO DOS SINOS-UNISINOS
UNIDADE ACADÊMICA DE PESQUISA E PÓS-GRADUAÇÃO
PROGAMA DE PÓS-GRADUAÇÃO EM GEOLOGIA

JULIERME JUSTIN CARASSAI

PROVENIÊNCIA DOS MINERAIS PESADOS NA PLANÍCIE COSTEIRA DO RIO GRANDE DO SUL

SÃO LEOPOLDO
2017

JULIERME JUSTIN CARASSAI

PROVENIÊNCIA DOS MINERAIS PESADOS NA PLANÍCIE COSTEIRA DO RIO GRANDE DO SUL

Tese de doutorado apresentada como requisito parcial para obtenção do título de doutor em Geologia, pelo Programa de Pós-Graduação em Geologia da Universidade do Vale do Rio dos Sinos (UNISINOS). Área de concentração: Geologia Sedimentar. Linha de Pesquisa: Estratigrafia e Evolução de Bacias.

Orientador: Prof. Dr. Ernesto Lavina
Coorientador: Prof. Dr. Farid Chemale Junior

Banca examinadora:
Prof. Dr. Alexandre Uhlein (UFMG)
Prof. Dr. Paulo S. G. Paim (UNISINOS)
Prof. Dr. Sérgio R. Dillenburg (UFRGS)

São Leopoldo
2017

C261p Carassai, Julierme Justin.
Proveniência dos minerais pesados na planície costeira do Rio Grande do Sul / Julierme Justin Carassai. – 2017.
105 f.: il. color.; 30 cm.

Tese (doutorado) – Universidade do Vale do Rio dos Sinos, Programa de Pós-Graduação em Geologia, São Leopoldo, 2017.
“Orientador: Prof. Dr. Ernesto Lavina; coorientador: Prof. Dr. Farid Chemale Junior.”

1. Minerais pesados. 2. Planícies. 3. Barreiras arenosas. I. Título.

CDU 551.7(816.52)

Dados Internacionais de Catalogação na Publicação (CIP)
(Bibliotecária: Bruna Sant’Anna – CRB 10/2360)

Dedico esta tese à minha filha Ana Cecília!

Agradecimentos

Agradeço em primeiro lugar aos meus pais, Paulo e Eliane, pelo amor e ensinamentos a mim sempre proporcionados.

Ao meu irmão Igor pelo incentivo e apoio nesta caminhada.

A Fernanda pelo amor e companheirismo desde os tempos da graduação.

Aos professores e orientadores Ernesto Lavina e Farid Chemale Junior pelos ensinamentos, orientação e (muita) paciência nesta jornada.

Ao colega de sala e doutorado Tiago J. Girelli e aos demais discentes do Programa de Pós-Graduação em Geologia da Unisinos.

A Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) e o Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) pela concessão da bolsa de doutorado.

Por fim, um agradecimento especial ao “sistema” denominado Terra que proporciona a todos os geólogos um mundo de descobertas, discussões e interpretações.

Resumo

As barreiras arenosas quaternárias armazenam a história evolutiva dos últimos 400.000 anos de sedimentação da margem atlântica do sul do Brasil. Estudos de proveniência permitiram identificar a diversidade de minerais pesados das quatro barreiras na metade norte da Planície Costeira do Rio Grande do Sul: epidoto, turmalina, zircão, magnetita/ilmenita, polimorfos de alumínio (andaluzita, cianita e silimanita), estaurolita, rutilo, anfibólio, piroxênio, coríndon, perovskita, cromita, granada, apatita, monazita, xenotima, espinélio e titanita. A pesquisa contemplou a análise da variação dos padrões de distribuição e comportamento dos minerais presentes entre os sistemas eólico e marinho raso (*shoreface* superior-*foreshore*) de cada barreira, bem como o comportamento destes de acordo com as diferentes frações granulométricas estudadas (80-170 e 170-230 *mesh*). Estudos de proveniência desenvolvidos com grande número de grãos de zircões detríticos por datação em U-Pb, permitiram estabelecer as principais áreas-fonte dos sedimentos das barreiras. Encontram-se presentes zircões e demais minerais pesados atribuídos principalmente a uma fonte distante, relacionada ao estuário do rio de La Plata, e secundariamente às rochas das províncias ígneas e metamórficas do Escudo Sul-Rio-grandense e Bacia do Paraná drenadas pelas bacias dos rios Camaquã e Jacuí. A caracterização da proveniência das areias das barreiras litorâneas quaternárias permitiu também a formulação de uma hipótese sobre a procedência dos sedimentos acumulados no Cone de Rio Grande.

PALAVRAS-CHAVE: *barreiras arenosas; minerais pesados; planície costeira; zircão.*

Abstract

Quaternary sandy barriers store the evolutionary history of the last 400,000 years of sedimentation along the southern Brazil Atlantic coast. Studies of provenance allowed to identify the heavy minerals composition of the four barriers in the northern half of the Coastal Plain of the Rio Grande do Sul State: epidote, tourmaline, zircon, magnetite/ilmenite, Al-polymorphs (andalusite, kyanite and sillimanite), staurolite, rutile, amphibole, pyroxene, corundum, perovskite, chromite, garnet, apatite, monazite, xenotime, spinel and titanite. This research contemplated the analysis of the different distribution patterns of minerals in the aeolian and upper shoreface-foreshore systems of each barrier, as well as the behavior of these according to the various particle sizes (80-170 and 170-230 mesh). Studies of provenance developed with a large number of detrital zircon grains by U-Pb allowed to establish the primary source areas for the successive barrier systems. Zircon and other heavy minerals were mainly attributed mainly to a distant source, related to the drainage basin of the Rio de La Plata estuary, and secondary one, associated with the drainage basins of the to the Camaquã and Jacuí rivers. The characterization of the sands origin of the quaternary coastal barriers allowed also the formulation of a hypothesis about the origin of sediments accumulated in the Rio Grande Fan.

KEYWORDS: sandy barriers; heavy minerals; coastal plain; zircon.

SUMÁRIO

1.INTRODUÇÃO

O Quaternário (2.59 Ma-presente) constitui-se em cenário de significativa instabilidade climática, intercalando períodos glaciais e interglaciais e as decorrentes variações globais do nível do mar. Neste período, inúmeras regiões costeiras do planeta mantiveram-se em constantes modificações, algumas vezes expondo partes de suas plataformas continentais e, em outros momentos, recobrindo parcialmente ou totalmente suas planícies costeiras.

Planícies costeiras ocorrem adjacentes e paralelas à linha de costa, sendo caracterizadas por grande disponibilidade de sedimentos (*e.g*. Dillenburg and Hesp 2009; Dyer and Huntley 1999), estando às mesmas presentes em aproximadamente 15% das regiões costeiras do planeta (Clifton 2006). O litoral brasileiro inserido entre as latitudes 4º Norte e 32º Sul, com cerca de 9200 km de comprimento, contempla uma sequência de planícies costeiras alternando-se com falésias e costões rochosos (Villwock 1994).

Segundo Angulo *et al.* (2006), as extensas barreiras arenosas, que constitui o principal tipo de costa oceânica no litoral brasileiro (*e.g*. Planície Costeira do Rio Grande do Sul), preservam as variações climáticas quaternárias.

A Planície Costeira do Rio Grande do Sul (PCRS), parte emersa da Bacia de Pelotas é delimitada pelo embasamento cristalino e rochas vulcânicas, a oeste, e pelo oceano Atlântico a leste. Contempla o mais amplo registro sedimentar quaternário do litoral do Brasil, com o registro, na parte emersa, de pelo menos quatros barreiras costeiras essencialmente arenosas, separadas por terraços e corpos lagunares com orientação geral NE-SW (Villwock *et al.* 1986). Cada barreira corresponde a momentos de estabilização da linha de praia, logo após os máximos transgressivos associados a distintos ciclos transgressivo-regressivo ocorridos nos últimos 400.000 anos.

Ao longo do tempo, o aporte de sedimentos provenientes de áreas continentais, via sistemas fluviais vêm contribuindo de forma significativa no processo de formação das barreiras arenosas nas mais diversas plataformas continentais e regiões costeiras do planeta (*e.g*. África do Sul, Austrália, Brasil, Índia e Namíbia). Algumas apresentam considerável valor econômico (*e.g*. costa oeste da África do Sul), com uma grande variedade de depósitos de minerais pesados Cenozóicos (*e.g*. diamantes, rutilo e zircão) (Philander and Rozendaal (2015 a and b)).

A análise de minerais pesados tem possibilitado estudos de alta precisão, constituindo-se em importante ferramenta na identificação de áreas-fonte. Consistindo no método mais eficiente e preciso para determinar a proveniência de sedimentos e rochas sedimentares, tendo em vista que estes formam paragêneses, as quais oferecem informações cruciais sobre os tipos de rochas fonte. Desta forma, tais minerais são afetados por três processos durante as etapas de transporte e deposição no ciclo sedimentar: seleção física, abrasão mecânica e dissolução (*e.g.* Morton and Hallsworth 1994).

A seleção física se dá em consequência das condições hidrodinâmicas atuantes durante a etapa de transporte sobre minerais com densidades diferentes. O processo de abrasão mecânica ocorre durante o transporte ocasionando a diminuição do grão e arredondamento. A dissolução ocasiona a perda parcial ou total de minerais em uma diversidade de condições geoquímicas em diversos estágios do ciclo de sedimentação (*e.g*. Morton and Hallsworth 1994).

Estudos associados à ocorrência de minerais pesados nos sedimentos arenosos da PCRS foram realizados por inúmeros pesquisadores (*e.g.* Delaney 1965; Martins 1967; Tomazelli 1978; Martins da Silva 1979; Dillenburg *et al.* 2004; Corrêa *et al*. 2008; Barros *et al.* 2008 e 2010), em diversos setores da planície costeira e da plataforma continental do sul do Brasil.

Pesquisas contemplando a proveniência de minerais pesados presentes nos sedimentos da PCRS são relevantes para a compreender a distribuição espacial das areias das quatro barreiras, possibilitando reconhecer as áreas-fonte e respectivas rotas de transporte.

Deste modo, aproveitando-se do bom grau de preservação das quatro barreiras na parte norte da PCRS, realizou-se o estudo de geocronologia por meio de U-Pb em zircão para identificar e avaliar as prováveis áreas-fonte de acordo com as idades obtidas. Também foram realizados estudos de proveniência em minerais pesados com o intuito de identificar a variação dos padrões de distribuição e comportamento destes nas quatro barreiras. Considerou-se a variação entre as fácies eólica e *shoreface* superior-*foreshore* de cada barreira, bem como o comportamento destes de acordo com as diferentes frações granulométricas (80-170 e 170-230 *mesh*) estudadas.

2. HIPÓTESE DE TRABALHO

O trabalho está fundamentando na hipótese de que em que proporções participaram as áreas-fonte na sedimentação das quatro barreiras arenosas da Planície Costeira do Rio Grande do Sul.

3. OBJETIVOS DA TESE

- Determinar as áreas-fonte dos sedimentos presentes nas barreiras pleistocênicas (I, II e III) e holocênica (IV) da PCRS por meio da geocronologia de U-Pb em zircão;
- Identificar os diferentes tipos de minerais pesados e suas prováveis áreas-fonte.

4. LOCALIZAÇÃO DA ÁREA DE ESTUDO

A área escolhida para o desenvolvimento do estudo localiza-se na parte norte da PCRS nos arredores dos municípios de Santo Antônio da Patrulha (barreira I) e Osório (barreiras II, III e IV), litoral norte do Rio Grande do Sul (Fig. 1).

Os locais associados às barreiras I e III correspondem a áreas aflorantes em decorrência da intensa atividade minerária (jazidas do João e Transareia, respectivamente). A área da barreira I está localizada na localidade do Capim do Rincão, interior do município de Santo Antônio da Patrulha, a área da barreira III localiza-se as margens da rodovia RS 389, Km 03 (Estrada do Mar), arredores do município de Osório (RS).

O local associado à barreira II refere-se a uma área de campo próximo a borda leste da lagoa dos Barros e a área da barreira IV corresponde à um trecho da moderna linha de costa (praia de Mariápolis; litoral norte do Rio Grande do Sul).

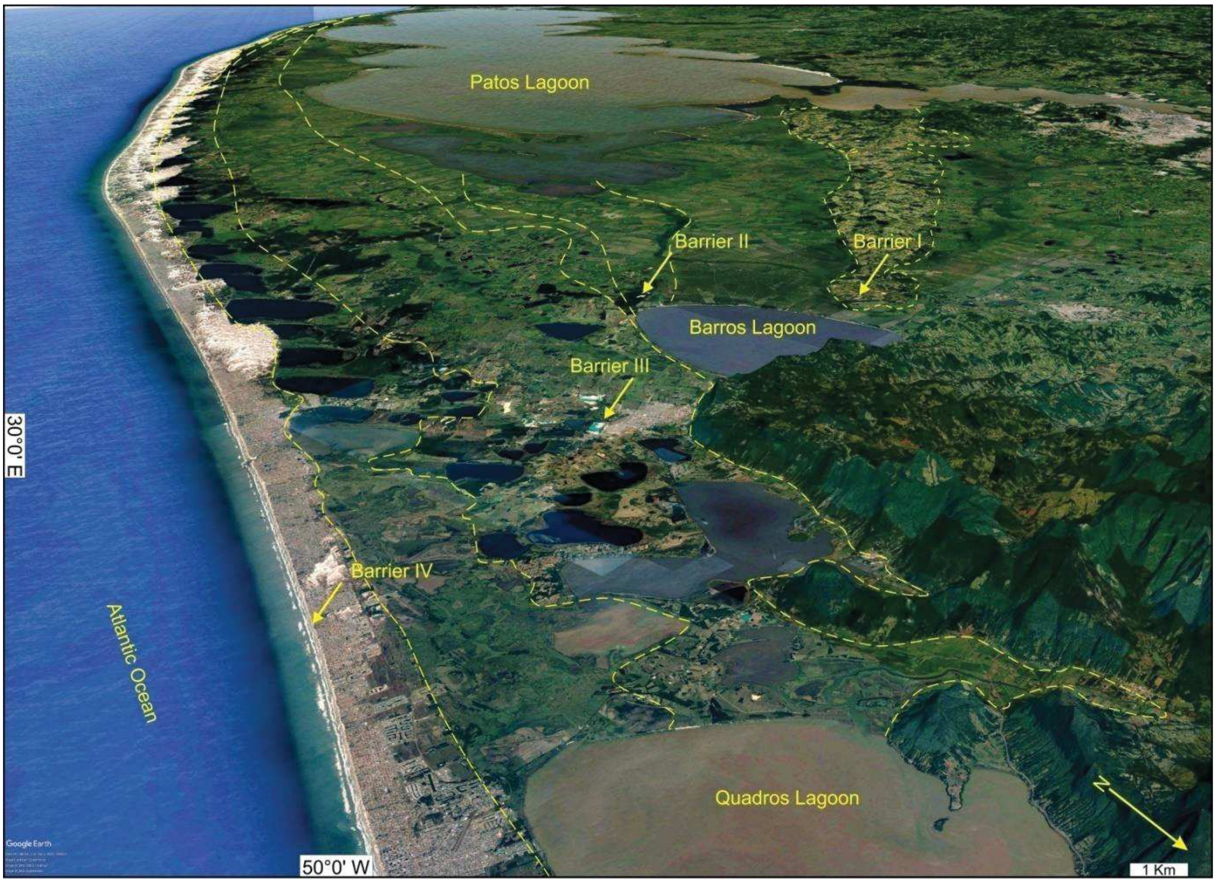


Figura 1. Localização das barreiras arenosas e sistemas lagunares associados. As setas indicam os pontos de coleta do material de estudo na parte norte da Planície Costeira do Rio Grande do Sul (Fonte: imagem Google *Earth* 2017).

5. PLANÍCIE COSTEIRA DO RIO GRANDE DO SUL

Os registros sedimentares costeiros da Planície Costeira do Rio Grande do Sul compõem uma das mais amplas províncias quaternárias da costa leste da América do Sul e margem continental brasileira (*e.g.* Delaney 1965; Villwock *et al.* 1986).

Delaney (1965), em um trabalho clássico, propôs pela primeira vez, um quadro das unidades estratigráficas aflorantes na PCRS, acompanhado de mapeamento geológico, possibilitando a primeira visão de conjunto sobre a geologia e geomorfologia da planície costeira, apresentando fundamentos para os inúmeros trabalhos desenvolvidos na sequência (*e.g*. Martins 1967; Jost 1971; Tomazelli 1977; Martins da Silva 1979; Villwock 1972, 1984, 1994; Tomazelli *et al*. 1982, 2007; Villwock *et al*. 1986; Poupeau *et al*. 1988; Dillenburg 1994; Villwock and Tomazelli 1995; Dillenburg *et al*. 2000; Tomazelli and Villwock 2000; Tomazelli and Dillenburg 2007; Corrêa *et al*. 1998; Dillenburg and Barboza 2014; Lopes *et al*. 2014).

Segundo Villwock and Tomazelli (1995) o avanço do conhecimento sobre a região costeira do Rio Grande do Sul pode ser dividido em duas fases distintas: a primeira ocorrida até o ano de 1950 e a segunda após 1950. A primeira fase é caracterizada por estudos de cunho mais descritivo (*e.g.* Backeuser 1918; Lamego 1940; Rambo 1942), enquanto a segunda fase é definida por trabalhos desenvolvidos na área das universidades, em especial a Universidade Federal do Rio Grande do Sul (UFRGS).

A PCRS (Fig. 2), corresponde a mais recente província geológica do Rio Grande do Sul desenvolvida durante o Neógeno, estende-se por aproximadamente 630 km, entre os paralelos 29º S e 34º S, desde Torres (limite norte), até a desembocadura do arroio Chuí (limite sul), divisa com o Uruguai (Tomazelli *et al*. 2007). Com aproximadamente 33.000 Km^2 e orientação geral N 32º E a planície costeira apresenta determinadas particularidades que a distinguem no cenário das demais regiões costeiras brasileiras, a qual tem sua continuidade interrompida em quatro pontos onde se localizam as desembocaduras do arroio Chuí e lagoa dos Patos (ao sul) e da lagoa de Tramandaí e do rio Mampituba (ao norte) (Tomazelli *et a*l. 2007).

A largura da planície costeira é variável, sendo mais estreita na parte norte, entre os municípios de Torres e Tramandaí, onde, devido à proximidade da escarpa da Serra Geral, alcança uma largura entre 10 e 15 km (Villwock *et al*. 1986). Este setor é caracterizado pela ocorrência de uma sequência de lagoas costeiras.

Para o sul, a planície torna-se bem mais ampla, alcançando uma largura máxima de até 100 km, aproximadamente (Tomazelli *et al*. 2007). Esta morfologia arenosa é diferenciada apenas na região de Torres, onde afloram arenitos eólicos da Formação Botucatu e rochas vulcânicas da Formação Serra Geral, ambas de idade Mesozóica (Tomazelli and Villwock 2000).

Os depósitos sedimentares da planície costeira assentam sobre um embasamento constituído, na parte central e sul, por rochas granítico-gnáissicas pré-cambrianas-cambrianas e, na parte norte, por rochas sedimentares e vulcânicas da Bacia do Paraná (Tomazelli *et al*. 2007).

O modelo evolutivo da PCRS contempla, em linhas gerais, uma sucessão de sedimentos terrígenos que se acumulou no final do Terciário, em um sistema de sistema de leques aluviais desenvolvido ao longo da margem leste de terrenos mais elevados e pela justaposição de quatro sistemas deposicionais do tipo Laguna-Barreira desenvolvidos durante o Quaternário (Villwock *et al.* 1986). Segundo Tomazelli *et al.* (2007), cada um desses sistemas teria se desenvolvido a partir de distintos ciclos transgressivos-regressivos controlados pela glacio eustasia e registrariam máximos transgressivos seguidos por regressões. Os sistemas Laguna-Barreira I, II e III foram gerados no Pleistoceno, enquanto os depósitos arenosos do sistema IV formaram-se durante o Holoceno.

Villwock *et al*. (1986) sugeriram as idades para cada um desses sistemas (400, 325, 125 e 6 mil anos ao recente, respectivamente) fazendo a correlação com os estágios isotópicos do oxigênio (picos 11, 9, 5 e 1, respectivamente). Recentemente, Lopes *et al*. (2014) atribuíram uma idade mais nova (230 mil anos) para o sistema Laguna-Barreira II.

No conjunto, as quatro barreiras apresentam direção geral NE-SW e são formadas por areias quartzosas de granulação fina a média, nas barreiras I e II e fina a muito fina, muito bem selecionadas, nas barreiras III e IV. Representam fácies de *shoreface*, *foreshore* e *backshore*, com o desenvolvimento de campos de dunas eólicas (Tomazelli 1985; Villwock *et al*. 1986; Tomazelli *et al*. 2007).

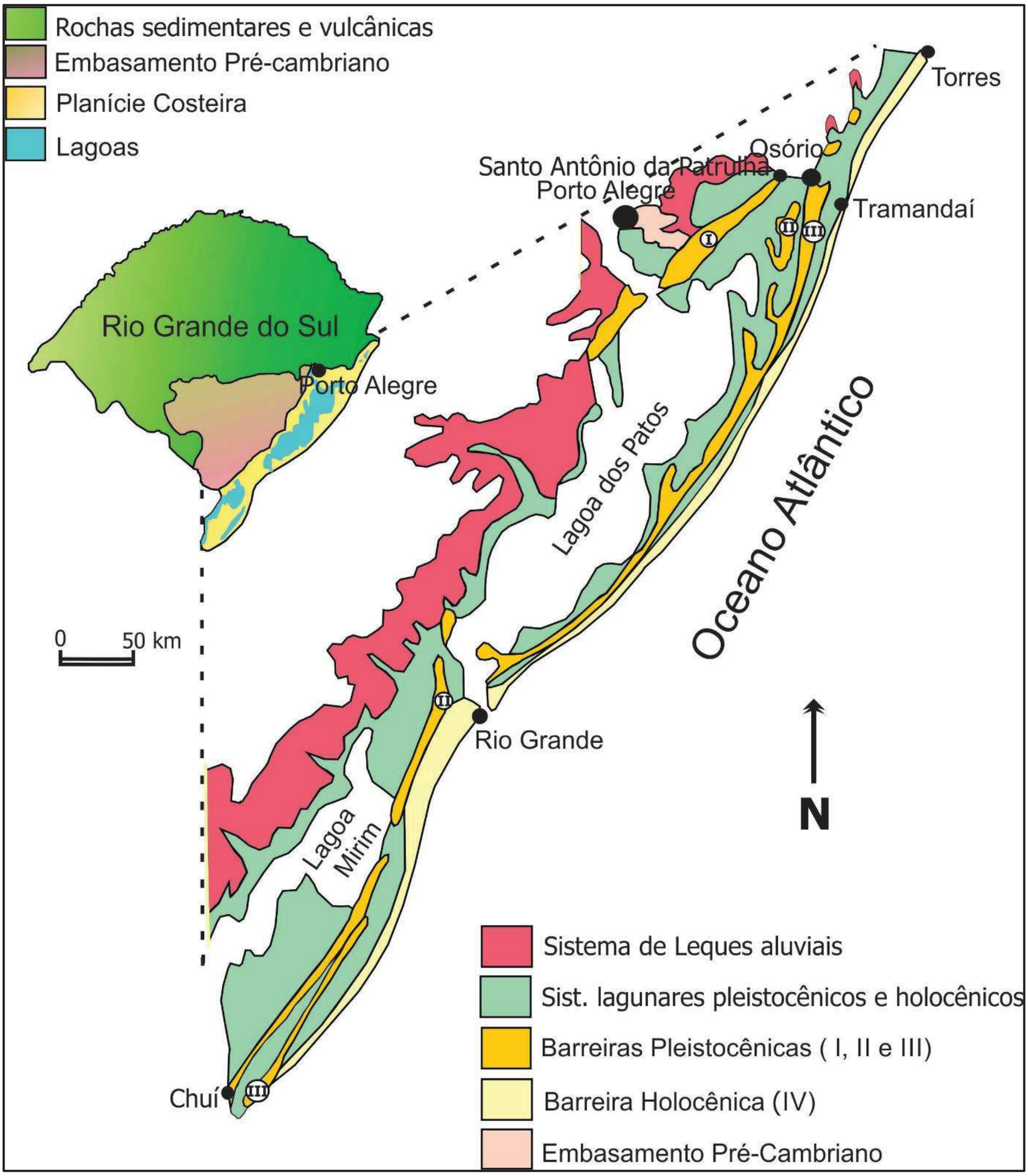


Figura 2. Mapa de localização e geológico simplificado da Planície Costeira do Rio Grande do Sul (modificado de Tomazelli and Villwock 2000 a partir de Gibert *et al.* 2006).

6. ESTRUTURAÇÃO DA TESE

A presente Tese está organizada de acordo com as normas do Programa de Pós-Graduação em Geologia da Universidade do Vale do Rio dos Sinos (UNISINOS), sendo formada por uma parte introdutória, contendo um resumo expandido e por dois artigos já submetidos à periódicos.

7. RESUMO EXPANDIDO

Foram coletadas amostras nas quatro barreiras arenosas da parte norte da planície costeira do Rio Grande do Sul, tanto na fácies eólica quanto na fácies de *shoreface* superior-*foreshore* (marinha). O estudo teve por objetivo definir as principais áreas-fonte dos sedimentos das barreiras. Na sequência, procurou-se estabelecer a proveniência do material fino que compõe a maior parte da sedimentação do Cone de Rio Grande.

A metodologia de trabalho consistiu nas seguintes etapas: coleta de oito amostras (duas por barreira arenosa) com 5 Kg cada uma (peso seco). Posteriormente, as amostras foram colocadas para secar em estufa por um período de 72 horas. Após secas, foram peneiradas para obtenção da granulometria desejada (80-170 *mesh* e 170-230 *mesh*), obtendo-se desta forma 16 subamostras. A seguir, o material foi bateado e os minerais pesados foram separados dos leves por líquido denso (bromofórmio). Posteriormente cada amostra de minerais pesados foi quarteada duas vezes.

Em seguida foram montadas lâminas das frações granulométricas selecionadas (80-170 *mesh* e 170-230 *mesh,* seções em *epoxy*) com 400 e 600 minerais, respectivamente. Os procedimentos metodológicos estão detalhados nos dois artigos.

O primeiro artigo, intitulado ***Provenance of heavy minerals in the coastal plain of southern Brazil (Quaternary, Pelotas Basin, Rio Grande do Sul state)***, submetido ao periódico ***Journal of Coastal Research***, tem como objetivo principal o estudo de proveniência dos minerais pesados ocorrentes nas fácies eólica e *shoreface* superior-*foreshore* (marinha) das quatro barreiras arenosas na parte norte da PCRS. O estudo permitiu identificar a variação na distribuição e comportamento dos minerais pesados presentes nas barreiras, bem como possibilitou estabelecer as áreas-fonte e percurso das assembleias de minerais pesados.

Identificou-se uma variedade de minerais pesados, por microscópio eletrônico de varredura (MEV), ocorrentes em cada uma das barreiras, fácies e fração granulométrica, bem como foi possível indicar as prováveis áreas-fonte (rochas contribuidoras) de tais minerais. Os minerais pesados identificados foram: magnetita/ilmenita, zircão, polimorfos de alumínio, estaurolita, rutilo, turmalina, anfibólio, epidoto piroxênio, coríndon, peroveskita, cromita, granada, apatita, monazita, xenotima, espinélio e titanita. Foram calculados os seguintes índices mineralógicos: ZTR, GZi, RZi e STi. A análise integrada dos índices, refletindo elevada maturidade e acentuado retrabalhamento, permite a inferência de uma fonte distante, associada ao estuário do rio de La Plata. A fonte local, associada aos rios Jacuí e Camaquã foi menos atuante.

O segundo artigo intitulado ***Zircon provenance of Quaternary sandy barriers and their implications for the evolution of the multiple source submarine fan (Rio Grande Fan, southern Brazil)***, submetido ao periódico ***Quaternary Science Reviews***, objetiva definir a proveniência dos zircões detríticos presentes nos sedimentos das fácies eólica e *shoreface* superior-*foreshore* (marinha) das quatro barreiras arenosas na parte norte da PCRS. Utilizou-se de um expressivo conjunto de idades de zircão por U-Pb (1625 grãos) para a definição da proveniência.

O número de grãos de zircão estudados foi representativo para todas as barreiras em ambos os ambientes (Barreira I, n= 472 (marinho 238; eólico 234), II, n = 381 (marinho 174; eólico 207), III, n= 365 (marinho 177; eólico 188) e IV, n= 407 (marinho 235; eólico 172). As análises demostraram a presença de populações de zircões de distintas idades (0.0001 - 3.3 Ga). Idades andinas jovens (22±4 Ma até 1±1 Ma, 48 zircões de um total de 1625) e populações de idade Mesozóica, Paleozóica e Mesoproterozóica (479 de 1625) sugerem que a principal alimentação se deu através do estuário do rio de La Plata. Em períodos de nível de mar baixo, os sedimentos acumulados no bay read delta foram transferidos para a plataforma, sendo retrabalhados e transportados para norte pelas correntes costeiras de deriva litorânea durante eventos transgressivos posteriores, chegando à Planície Costeira do Rio Grande do Sul. Uma fonte de alimentação secundária, vinculada as drenagens dos rios Camaquã e Jacuí (Escudo Sul-Rio-grandense e Bacia do Paraná) também pode ser aventada. Em sequência, foi discutida a hipótese de que os sedimentos finos acumulados no cone de Rio Grande também sejam provenientes do estuário do rio de La Plata. Neste caso, as plumas de material fino jogadas na plataforma e talude nos episódios de nível de mar baixo, seriam transportadas para norte pela corrente fria da *Falkland*. Durante fases frias e episódios glaciais, a confluência entre as correntes da *Falkland* e do Brasil (quente) se desloca dos 35-38° para 33-34º de latitude sul, coincidindo com a posição do Cone de Rio Grande.

8. CONSIDERAÇÕES FINAIS

O primeiro artigo permitiu identificar a variação dos padrões na distribuição e comportamento dos minerais pesados nas quatro barreiras da PCRS, em ambas as fácies (eólica e marinha-*shoreface* superior-*foreshore*). Os minerais pesados foram analisados por microscopia eletrônica de varredura (MEV), tendo sido identificados os seguintes minerais: epidoto, turmalina, zircão, magnetita/ilmenita, polimorfos de alumínio (andaluzita, cianita e silimanita), estaurolita, rutilo, anfibólio, piroxênio, coríndon, perovskita, cromita, granada, apatita, monazita, xenotima, espinélio e titanita. Em todas as barreiras, zircão, magnetita e ilmenita constituem os minerais dominantes, seguido de cromita, granada, rutilo, turmalina, estaurolita e epidoto. Em sua totalidade, os minerais pesados permitiram identificar duas fontes primárias que contribuíram para a sedimentação da Planície Costeira do Rio Grande do Sul: (1) alimentação direta através das rochas do Escudos Uruguai e Rio Grande do Sul e Bacia do Paraná, drenadas pelos rios Camaquã e Jacuí, e (2) alimentação indireta, a partir de rochas das províncias andinas, drenadas pelo rio Paraná e estuário do rio de La Plata, no norte da Argentina. Ressalta-se que durante os períodos de nível de mar baixo, os rios adentravam à plataforma, sendo seus sedimentos retrabalhados durante estágios transgressivos subsequentes. Ao longo desta região, o padrão de circulação atmosférica e costeira gera uma corrente ao longo da costa com direção norte dominante. Assim, vários pulsos transgressivos-regressivos associados aos eventos glaciais do Pleistoceno empurraram grandes volumes de sedimentos para o norte, dando origem à atual planície costeira do sul do Brasil.

As idades obtidas na análise dos zircões permitem inferir que a principal área-fonte responsável pelo fornecimento de sedimentos para as barreiras arenosas da PCRS ocorreu através do sistema de drenagem do rio de La Plata, posteriormente transportados pelas correntes de deriva litorânea de sul para norte. Fontes mais próximas, associadas ao Escudo Sul-rio-grandense e à Bacia do Paraná, drenadas pelos rios Camaquã e Jacuí, apresentam contribuição pouco significativa. A definição de uma fonte distante permitiu inferências sobre a formação do Cone de Rio Grande, onde a confluência da corrente fria (*Falkland*) com a corrente quente (do Brasil) desempenharam um papel importante. Destaca-se que o escoamento do material do estuário para o oceano Atlântico ocorreu em períodos de nível de mar baixo (episódios glaciais). Durante esses eventos, a areia foi transportada para o norte pela deriva litorânea. Os sedimentos finos foram descarregados na plataforma, sendo também transportados para o norte pela corrente da *Falkland* até a zona de convergência com a corrente quente do Brasil. Nesta zona, as argilas floculam devido as mudanças de salinidade e temperatura (encontro das duas correntes), construindo o Cone de Rio Grande.

Concluindo, o estudo de proveniência de minerais pesados e de U-Pb em zircão presentes nos sedimentos arenosos quaternários da porção emersa da Bacia de Pelotas possibilitou a identificação das principais áreas-fonte e as direções preferenciais de transporte de sedimentos por meio de sistemas de drenagens fluviais e correntes de deriva litorânea.

Os resultados possibilitam uma melhor compreensão da evolução do sistema de barreiras quaternárias da Planície Costeira do Rio Grande do Sul e permite tecer considerações sobre a proveniência da espessa cunha essencialmente pelítica do Cone de Rio Grande.

9. REFERÊNCIAS

Angulo R.J., Lessa, G.C., Souza M.C. 2006. A critical review of mid- to late-Holocene sea-level fluctuations on the eastern Brazilian coastline. *Quaternary Science Reviews*, **25**: 486-506. Doi:10.1016/j.quascirev.2005.03.008.

Barros, C.E., Nardi, L.V.S., Dillenburg, S.R., Baitelli, Ricardo., Dehnhardt, B.A., 2008. Distribuição e origem dos minerais detríticos pesados das areias praiais holocênicas do litoral norte do Rio Grande do Sul. Revista Brasileira de Geociências 38 (2), 319-335.

Barros, C.E., Nardi, L.V.S., Dillenburg, S.R., Ayup, R., Jarvis, K., Baitelli, R., 2010. Detrital Minerals of Modern Beach Sediments in Southern Brazil: A Provenance Study Based on the Chemistry of Zircon. J. Coast. Res. 261, 80–93. doi:10.2112/06-0817.1.

Backeuser E.A. 1918, *A faixa litorânea do Brasil Meridional, ontem e hoje, Rio de Janeiro.* Bernard Freres, 210 p.

Clifton H.E. 2006. A re-examination of facies models for clastic shorelines. In: Walker R.G. & Posamentier H. (eds.). Facies Models Revisited. Special Publication 84, Society of Economic Paleontologists and Mineralogists, Tulsa, p. 293-337.

Corrêa I., Ayup-Zouain, Weschenfelder, J., Tomazelli L.J., 2008. Áreas Fontes dos Minerais Pesados e sua Distribuição sobre a Plataforma Continental Sul-brasileira, Uruguaia e Norte-argentina. *Revista Pesquisas em Geociências*, **35**: 137-150.

Delaney P.J.V. 1965. Fisiografia e geologia da superfície da Planície Costeira do Rio Grande do Sul. *Publicação Especial da Escola de Geologia/UFRGS*, v.6,195 p.

Dillenburg S.R., Roy P.S., Cowell P.J., Tomazelli L.J. 2000. Influence of antecedent topography on coastal evolution as tested by the shoreface translation-barrier model (STM). *Journal Coastal Research*, **16**:71-81.

Dillenburg S.R., Tomazelli L.J., Barboza E.G., 2004. Barrier evolution and placer formation at Bujuru southern Brazil. *Marine Geology*, **203**: 43-56.

Dyer K.R., Huntley D.A. 1999. The origin, classification and modeling of sand banks and ridges. *Continental Shelf Research*, **19**:1285-1330.

Gibert J.M., Netto R.G., Tognoli F.M.W., Grangeiro M.E. 2006. Commensal worm traces and possible juvenile thalassinidean burrows associated with *Ophiomorpha nodosa*, Pleistocene, southern Brazil. *Palaeogeogrphy, Palaeoclimatology, Palaeoecogy*, **230**:70-84.

Jost H. 1971. *O Quaternário da Região Norte da Planície Costeira do Rio Grande do Sul, Brasil*. MS Dissertation, Instituto de Geociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, 80 p.

Lamengo A.R. 1940. Restingas na costa do Brasil. *Boletim do Serviço Geológico e Mineralógico do Brasil*, 96:1-63.

Martins da Silva M.A. 1979. Provenance of heavy minerals in beach sands, southeastern Brazil: from Rio Grande to Chui (Rio Grande do Sul State). *Sed. Geol.* **24**(1-2), 133-148.

Martins L.R.S. 1967. Aspectos texturais e deposicionais dos sedimentos praiais e eólicos da Planície Costeira do Rio Grande do Sul. *Publicação Especial da Escola de Geologia/UFRGS*, **13**: 1-102.

Morton A.C. & Hallsworth, C.R. 1994. Identifying provenance-specific features of detrital heavy mineral assemblages in sandstones. Sedimentary Geology, 90: 241-256.

Philander C., Rozendaal, A., 2015 a. Geology of the Cenozoic Namakwa Sands heavy mineral deposit, west coast of South Africa: a world-class resource of titaniumand zircon. Economic Geology 110, 1577–1623.

Philander, C., Rozendaal, A., 2015 b. Detrital zircon geochemistry and U–Pb geochronology as an indicator of provenance of the Namakwa Sands heavy mineral deposit, west coast of South Africa. Sedimentary Geology 328, 1-16.

Poupeau G., Soliani Jr. E., Rivera A., Loss E.L., Vasconcellos M.B.A. 1988. Datação por termoluminescência de alguns depósitos arenosos costeiros do último ciclo climático no Nordeste do RS, Brasil. *Pesquisas*, 21:25-47.

Rambo B. 1942. *A fisionomia do Rio Grande do Sul.* Porto Alegre, Oficina Graf. Imprensa Oficial. 360 p.

Tomazelli L.J. 1978. Minerais pesados da plataforma continental do Rio Grande do Sul - Brasil. *Acta Geológica Leopoldense*, **2** (5):103-159.

Tomazelli L.J. 1985. Contribuição ao conhecimento das fácies de ambiente praial a partir de elementos do pleistoceno costeiro do Rio Grande do Sul. *In*: 2º Simpósio Sul-Brasileiro de Geologia, Florianópolis, Sociedade Brasileira de Geologia, Anais, pp. 325-338

Tomazelli L.J. & Villwock J.A. 2000. O Cenozóico no Rio Grande do Sul: Geologia da Planície Costeira. *In*: Holz M. & De Ros L.F. (eds.). *Geologia do Rio Grande do Sul*. Porto Alegre, Universidade Federal do Rio Grande do Sul, p. 375-406.

Tomazelli L.J., Dillenburg S.R. 2007. Sedimentary facies & stratigraphy of a last interglacial coastal barrier in south Brazil. *Marine Geology*, 244:33-45. doi:10.1016/j.margeo.2007.06.002.

Tomazelli L.J., Villwock J.A., Loss E.L., Denhardt E.A. 1982. Caracterização de um depósito praial pleistocênico na Província Costeira do Rio Grande do Sul. In: 32º Congresso Brasileiro de Geologia, Salvador, *Anais*, p. 1514-1523.

Tomazelli L.J., Dillenburg S.R., Villwock J.A., Barboza E.G., Bachi F.A., Dehnhardt B.A., Rosa M.L.C.C. 2007. Sistemas deposicionais e evolução geológica da planície costeira do Rio Grande do Sul: uma síntese. *In*: Iannuzzi R. & Frantz J.C. (eds.) *50 anos de Geologia*. Instituto de Geociências, Porto Alegre, p. 327-339.

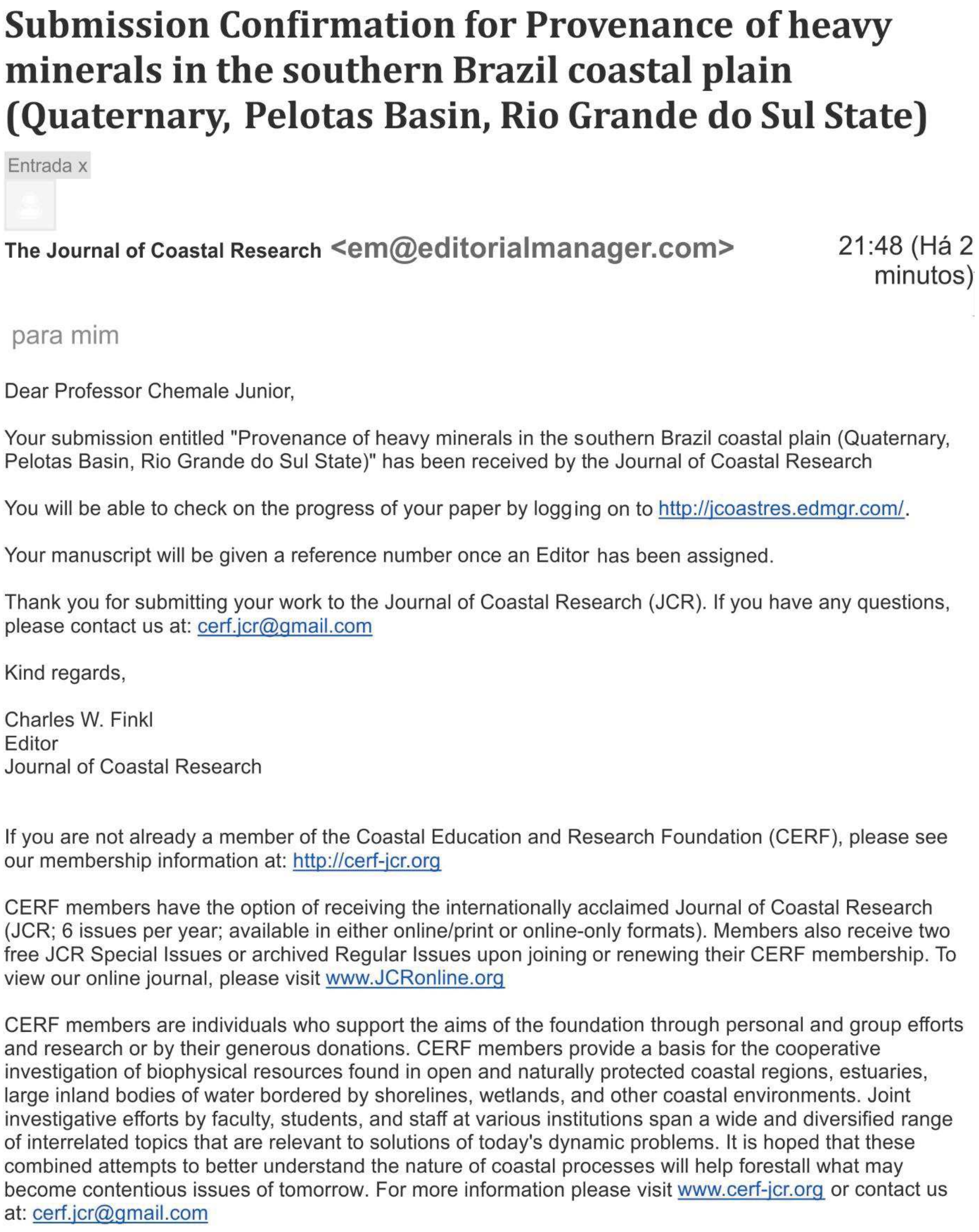
Villwock J.A. 1972. *Contribuição a Geologia do Holoceno da Província Costeira do Rio Grande do Sul.* MS Dissertation, Instituto de Geociências, Universidade Federal do Rio Grande do Sul, Porto Alegre, 133 p.

Villwock, J.A. 1984. Geology of the Coastal Province of Rio Grande do Sul, Southern Brazil. A synthesis: Pesquisas*,* v. 16, p. 5-49.

Villwock J. A. 1994. A Costa Brasileira: Geologia e evolução. Porto Alegre: UFRGS: Técnica, RS, p. 38–49.

Villwock J.A., Tomazelli L.J. 1995. Geologia costeira do Rio Grande do Sul. *Notas Técnicas,* 8, Centro de Estudos de Geologia Costeira e Oceânica, Porto Alegre, 45 p.

Villwock J A., Tomazelli L.J., Loss E.L., Dehnhardt E.A., Horn N.O., Bachi F.A., Dehnhardt B. A. 1986. Geology of the RS coastal province. In: Rabasa J. (ed.), *Quaternary of South America and Antartic Península*, v. 4, p. 79-97.



Submission Confirmation for Provenance of heavy minerals in the southern Brazil coastal plain (Quaternary, Pelotas Basin, Rio Grande do Sul State)

The Journal of Coastal Research <em@editorialmanager.com> 21:48 (Há 2 minutos)

para mim

Dear Professor Chemale Junior,

Your submission entitled "Provenance of heavy minerals in the southern Brazil coastal plain (Quaternary, Pelotas Basin, Rio Grande do Sul State)" has been received by the Journal of Coastal Research

You will be able to check on the progress of your paper by logging on to http://jcoastres.edmgr.com/.

Your manuscript will be given a reference number once an Editor has been assigned.

Thank you for submitting your work to the Journal of Coastal Research (JCR). If you have any questions, please contact us at: cerf.jcr@gmail.com

Kind regards,

Charles W. Finkl
Editor
Journal of Coastal Research

If you are not already a member of the Coastal Education and Research Foundation (CERF), please see our membership information at: http://cerf-jcr.org

CERF members have the option of receiving the internationally acclaimed Journal of Coastal Research (JCR; 6 issues per year; available in either online/print or online-only formats). Members also receive two free JCR Special Issues or archived Regular Issues upon joining or renewing their CERF membership. To view our online journal, please visit www.JCRonline.org

CERF members are individuals who support the aims of the foundation through personal and group efforts and research or by their generous donations. CERF members provide a basis for the cooperative investigation of biophysical resources found in open and naturally protected coastal regions, estuaries, large inland bodies of water bordered by shorelines, wetlands, and other coastal environments. Joint investigative efforts by faculty, students, and staff at various institutions span a wide and diversified range of interrelated topics that are relevant to solutions of today's dynamic problems. It is hoped that these combined attempts to better understand the nature of coastal processes will help forestall what may become contentious issues of tomorrow. For more information please visit www.cerf-jcr.org or contact us at: cerf.jcr@gmail.com

Provenance of heavy minerals for the Quaternary coastal plain of southernmost Brazil (Rio Grande do Sul State)

Julierme Justin Carassai[1*], Ernesto Luiz Correa Lavina[1], Farid Chemale Junior[1] and Tiago Jonatan Girelli[1]

[1] Programa de Pós-Graduação em Geologia
Universidade do Vale do Rio dos Sinos,
São Leopoldo, Rio Grande do Sul, 93022-220, Brazil.
*julierme.carassai@gmail.com

ABSTRACT

Southern Brazil and north of Uruguay, along the last 400 Ky, an extensive barriers system was developed. Our study allowed to identify the patterns of variation in the distribution and behavior of the heavy minerals present in the four barriers, including their its disposition in the aeolian and marine (upper shoreface-foreshore) facies of each barrier. Minerals were analyzed by scanning electron microscopy (SEM) and the following ores were identified: epidote, tourmaline, zircon, magnetite/ilmenite, polymorphs of aluminum (andalusite, kyanite, and sillimanite), staurolite, rutile, amphibole, pyroxene, corundum, perovskite, chromite, garnet, apatite, monazite, xenotime, spinel, and titanite. In all the barriers, zircon, magnetite, ilmenite are the most important, followed by chromite, garnet, rutile, tourmaline, staurolite, and epidote. In total, heavy minerals indicated two primary sources in the Rio Grande do Sul coastal plain: (a) direct feeding from the rocks of the Uruguay and Rio Grande do Sul Shield, and the Paraná Basin, drained by the rivers Camaquã and Jacuí, and (b) indirect feeding from rocks of the Andean provinces, drained by the Paraná River and La Plata river estuary in northern Argentina. During periods of low sea level, rivers flowed directly into the continental shelf, and their deposits were reworked during subsequent transgressive stages. Throughout this region, the atmospheric circulation pattern forms a northwest oceanic swell, generating a longshore current with dominant northward direction. Thus, several T-R pulses associated with Pleistocene glacial events pushed large volumes of sediments northward, giving rise to the present southern Brazil coastal plain.

ADDITIONAL INDEX WORDS: *Sand barriers, longshore currents, detrital minerals, sediment transport, continental shelf.*

INTRODUCION

Heavy mineral analyses in sediments and in siliciclastic rocks support studies of provenance, providing relevant information for paleogeographic and tectonic reconstructions (Morton and Hallsworth, 1999; Garzanti and Andò, 2007). In this aspect, heavy minerals allow inferences about source areas (Tsikouras *et al*., 2011); climatic evolution (Sevastjonova *et al*., 2012); sediment maturity (Andò *et al*., 2012), as well as for mining purposes (Philander and Rozendaal, 2015a and b).

The Brazilian continental margin is approximately 9,200 km long, formed by a large volume of terrigenous sediments mobilized after the opening of the South Atlantic Ocean, initiated at about 140-130 Ma (Dillenburg and Hesp, 2009). At its southern end, an extensive sandy coast makes up the Brazilian continental margin (approximately 800 km). It extends from the Chuí county, to the south (33°S, Brazil and Uruguay border) to near the vicinity of the Cape of Santa Marta, (28°S; Santa Catarina State), being primarily dominated by the continuous action of waves originated predominantly from the southeast quadrant (Villwock *et al*., 1986; Dillenburg and Barboza, 2014).

Corrêa *et al*., (2008) studied the distribution of heavy minerals along the continental shelf of the southern Brazil, Uruguay and northern Argentina. They examined 106 samples collected between 0 and 2000 meters water depth, exclusively under optical microscopy. Those authors, therefore, defined that the heavy minerals in Rio Grande do Sul coastal plain (RSCP) are associated primarily to the crystalline basement complex URSS (Uruguay Rio Grande do Sul Shield), Mesozoic volcanic sedimentary sequences of the Paraná Basin and to the Pampean/Patagonian sediments of the Argentine Basin. As secondary source, the sediments of the continental shelf of South Brazil, Uruguay and northern Argentina would be eroded, transported and redeposited in the RSCP. Dillenburg *et al*., (2004) added that during lowstand stages periods, immature sediments containing a series of heavy minerals (ilmenite, zircon, magnetite and tourmaline) are discharged on the continental shelf by the La Plata river estuary and transported northward by the longshore currents, along the shoreline of the Rio Grande do Sul State (Dillenburg *et al*., 2004).

As alternative explanation, Barros *et al*., (2010) studied the mineral chemistry of zircons collected along 400 km of the Holocene barrier in southern Brazil. The authors concluded that all zircons come from the southern Brazil rocks. The argument used is based on Th/U, Nb/Ta, and rare earth element (REE) patterns. These elements suggest that the primary source is an association of alkaline to sub-alkaline granitic rocks with contributions of mafic and metamorphic rocks (amphibolite to granulite facies). Metamorphic sources were prominent in the southern sector of the area studied by them. Thus, for those authors, the zircons would come from the eastern part of the Uruguay-Rio Grande do Sul Shield, from the Pelotas batholith, and from Paleoproterozoic and Neoproterozoic rocks of high metamorphic degree.

In this work, we investigated the heavy mineral of aeolian and marine facies sediments exposed in the Barrier I, II, III and IV using conventional microscope and scanning electron microscope (SEM) with energy-dispersive detector (EDS) to quantify the mineral assemblages with more accuracy. Our study identifies patterns of distribution and behavior in each of the four emerging Quaternary barriers, both in the aeolian and marine facies. It also seeks to recognize its source areas and transport routes. In this sense, we discussed in detail the possibility of distribution from distant sources such as the system formed by the Paraná river and La Plata Estuary.

REGIONAL GEOLOGY

The Pelotas Basin between the Florianópolis High (north boundary) and the Polônio High, between 28º-36º S and 46º-54º W, is an integral part of the South American continental shelf. Its genesis is associated with the tectonic movements that led to the rupture of Gondwana and the opening of the South Atlantic Ocean (Dias *et al*., 1994; Bueno *et al*., 2007). The mainland part of the Pelotas Basin presents two main source areas. The igneous and metamorphic rocks of the Uruguay-Rio Grande do Sul Shield (pre-Cambrian basement) in the central and southern portions, and sedimentary and volcanic rocks associated with the Paraná Basin (Paleozoic and Mesozoic), in the northern part (Villwock *et al*., 1986; Tomazelli *et al*., 2007).

The RSCP, located between parallels 29º-33ºS, has a general NE-SW orientation, from the Torres county (northern boundary) to the Chuí county (southern border). It has an extension of approximately 630 km, and its area is 33,000 km^2. It is deposited directly on the Precambrian basement (Pelotas Batolite) in the southern part and on Serra Geral Formation (Paraná volcanism) along its northern sector (Villwock *et al*., 1986).

The RSCP is formed by an alluvial fan system due to the juxtaposition, in the emergent part, of four distinct barrier-lagoon systems, being three Pleistocene barriers (I, II, and III) and are Holocene, still active barrier (IV) (Villwock *et al*., 1986; Dillenburg and Barboza, 2014). The coastal plain structure results from different transgressive-regressive cycles developed under the control of climatic variations, strong coastal dynamics and global fluctuations of the relative sea level during the Quaternary (Tomazelli et al., 2007; Dillenburg and Barboza, 2014). Each barrier-lagoon system corresponds to a high-frequency depositional sequence, followed by a regressive event (Villwock *et al*., 1986) (Figure 1).

In the southern part of the Rio Grande do Sul State, the coastal plain has a width of more than 80 km. In the northern part, the width reduces to 15 km due to the presence of the topographic high associated with the Mesozoic lava flow of the Serra Geral Formation (Paraná volcanism; Tomazelli *et al*., 2007). The presence of this high topographic influences the regional wind regime, changing the original circulation of both the Atlantic Ocean and the continent (Villwock *et al*., 1986).

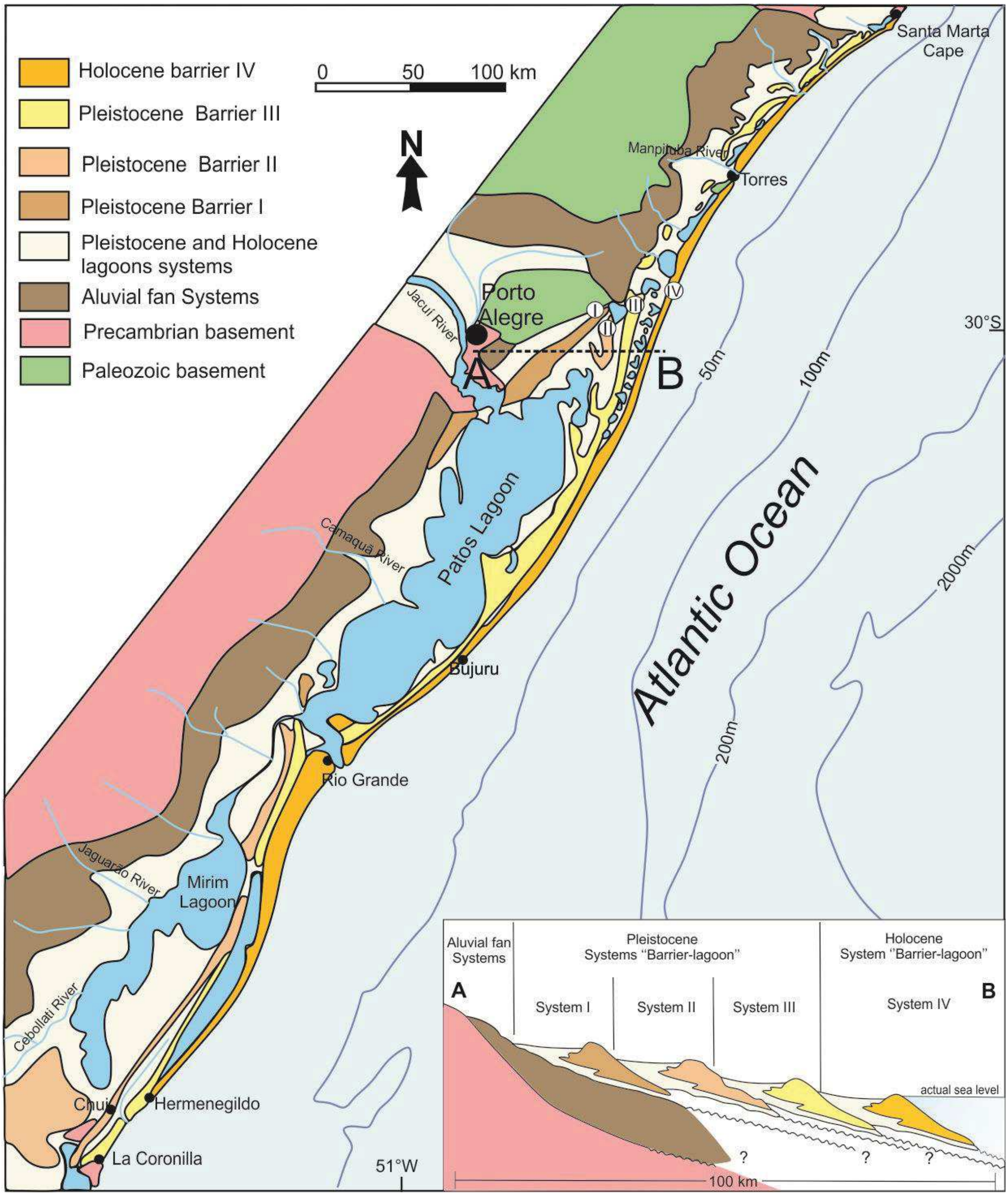


Figure 1. Geological sketch of the Rio Grande do Sul coastal plain (modified from Dillenburg and Barboza, 2014). As insert is A-B geological section showing the four Barrier-Lagoon Systems (after Tomazelli *et al.*, 2000) studied in the present work.

In the last decades, there have been several attempts to determine the age of the barriers. There is now a consensus around the ages of each of the sand barriers: 400 (Barrier I), 325 (II), 125 (III) and 6 thousands of years to the recent (IV) (Martin *et* *al*., 1982; Villwock *et al*., 1986; Lopes *et al*., 2014). For this, correlations were made with periods of high sea evidenced by the last significant peaks of the isotopic stages of O^{18} (11, 9, 5 and 1, respectively), through the correlation with paleotemperature curves of Shackleton and Opdyke (1973) and Imbrie *et al*., (1984). Data on bivalve shells collected in the southern part of RSCP assigned a younger age for barrier II (230 thousand years, Lopes *et al*., 2014).

The four barriers present fine- to medium-grained quartz sands and general NE-SW direction. They include shoreface, foreshore and backshore facies with the development of aeolian dune fields (Villwock *et al*., 1986; Tomazelli *et al*., 2007).

Barrier I, more innermost and distant from the present shoreline, is composed of slightly reddish sands (Villwock *et al*., 1986). In the northern part of the RSCP (Santo Antônio da Patrulha municipality), the barrier I have an average orientation of N 50º E, an average width of 3 km, and an extension of approximately 20 km. Cropout only due to the intense sand extraction activity used for the construction (Figure 2). As a rule, barrier I presents only the aeolian facies (Villwock *et al*., 1986). However, in a sand exploitation area in Santo Antônio da Patrulha, we found about 0.50 meters of upper shoreface sediments (at the base). Small cross-stratification, sometimes bidirectional, is related to the wave action. In addition, their light greenish color contrasts with the pink tones of the upper aeolian pack.

Barrier II is best preserved in the southern portion of the coastal plain, being formed by sands of yellow-brown (Villwock *et al*., 1986). In the Osório municipality, barrier II has orientation N 15º E, an average width of 3 km and extension of approximately 12 km. It emerges only in the form of a sandy spit situated to the east of the Barros lagoon in a field area.

Barrier III occurs almost continuously throughout the RSCP. The color of the marine sands is light gray, being more yellowish in the deposits of aeolian dunes (Tomazelli *et al*., 2007). In Osório municipality, barrier III has an N 20º E orientation, an average width of 8 km, and an extent of approximately 15 km. It only crops out due to the intense activity of sand extraction.

Barrier IV corresponds to the modern shoreline. In some places, there is a high concentration of heavy minerals in the aeolian and beach facies (placer do Bujuru, Tavares municipality; Dillenburg *et al*., 2004). Sands is light gray, both in the marine and aeolian dunes facies (Tomazelli *et al*., 2007). Due to the variation in sediment balance along the shoreline (positive and negative), the evolution of the modern barrier occurs with significant differences along its entire length (630 km). In some places, long-term coastal depositional conditions predominate, which alternate with sites where erosional long-term processes are dominant (Dillenburg *et al.*, 2005; Dillenburg and Barboza, 2014). In the Osório municipality, barrier IV has an average orientation of N 20º E and an average width of 5 km. Long-term coastal depositional conditions predominate, and the barrier is entirely covered by aeolian deposits (Dillenburg and Barboza, 2014). Several studies have discussed the occurrence of heavy mineral assemblages (magnetite, tourmaline, zircon and monazite) in different sectors of the RSCP (Tomazelli, 1978; Martins da Silva, 1979; Barros *et al.*, 2008 and 2010) and suggested different source areas for the sediments of the RSCP that include Uruguay-Rio Grande do Sul, Rio de La Plata and Pampa region.

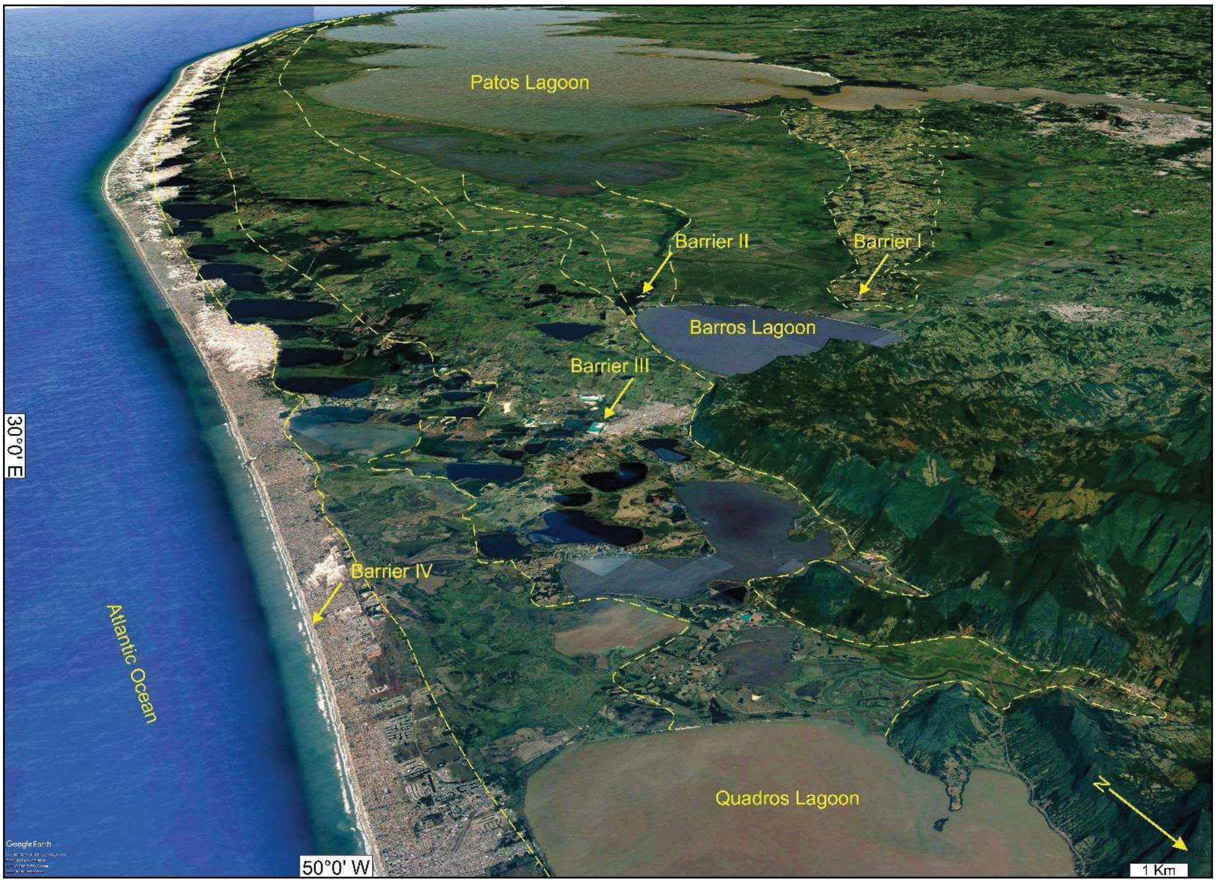


Figure 2. Northern part of the Rio Grande do Sul Coastal Plain. Location of the sand barriers and associated lagoon systems. The arrows indicate the samples location (Source: Google Earth image 2017).

METHODS

Upper shoreface-foreshore and aeolian sediments were sampled from each of the four sand barriers in the northern part of the RSCP (Figure 2 and Table 1). We collected eight samples weighting 5 kg each (dry weight). The preparation of the samples was done by means of conventional separation of heavy minerals. In the laboratory, the samples were placed in the oven to dry for 72 hours. After drying, they were sieved to obtain the desired granulometry (80-170 mesh and 170-230 mesh) resulting in sixteen subsamples. Heavy minerals were first concentrated by manual pan and afterwards separated by dense liquid (bromoform) for final mineralogical separation between light and heavy minerals. Subsequently, each sample was doubled. Heavy minerals are mounted after intervals of 80-170 mesh and 170-230 mesh (epoxy mountings) with 400 and 600 minerals, respectively. The MEV/EDS analyses were performed in the Departamento de Geologia (DEGEO)/EM/Universidade Federal de Ouro Preto (UFOP) Microanalysis Laboratory with the use of an JEOL Electronic Scanning Microscope, model JSM-6510, under voltage of 20kV, work distance of 10mm and spot size of 70. Minerals were classified after composite results presented in the form of oxides, which allowed to classify the analyzed heavy minerals (such as silicates and oxides).

Table1. Coordinates of collected samples.

Sample	**UTM 22 J**
Barrier I Aeolian	0551976 E / 6689579 N
Barrier I Marine	0551964 E / 6689564 N
Barrier II Aeolian	0561487 E / 6681634 N
Barrier II Marine	0560059 E / 6682156 N
Barrier III Aeolian	0574353 E / 6691967 N
Barrier III Marine	0573640 E / 6691651 N
Barrier IV Aeolian	0590262 E / 6696168 N
Barrier IV Marine	0590275 E / 6696159 N

RESULTS

The mineralogical constituents of the four sand barriers are diversified in both sedimentary facies (marine and aeolian) and grain size population (80-170 and 170-230 mesh) (Figure 3). 8498 grains were counted in the sixteen samples, containing mineralogical assemblages of opaque minerals (magnetite/ilmenite, chromite and spinel) and translucent (zircon, rutile, tourmaline, garnet, staurolite, epidote, polymorphs of aluminium (andalusite, kyanite and sillimanite), amphibole, pyroxene, corundum, perovskite, apatite, monazite, xenotime and titanite) minerals. Table 2 summarizes the percentage heavy minerals contents, the number of grains of each mineral in the four barriers, in both aeolian and marine sedimentary facies, and grain size fractions. Additional information on the analyzed heavy minerals is found in the supplemental material. Opaque minerals comprise the main fraction, with percentage between 45 and 88% in relation to the translucent minerals (Figure 4). The marine facies present a significantly higher amount of heavy mineral grains in relation to the aeolian facies in all the sand barriers. In general, the greatest number of heavy mineral grains is found in the marine facies of the fraction 170-230 mesh, of the except in the Barrier III. In this barrier the predominance occurs in the fraction 80-170 mesh.

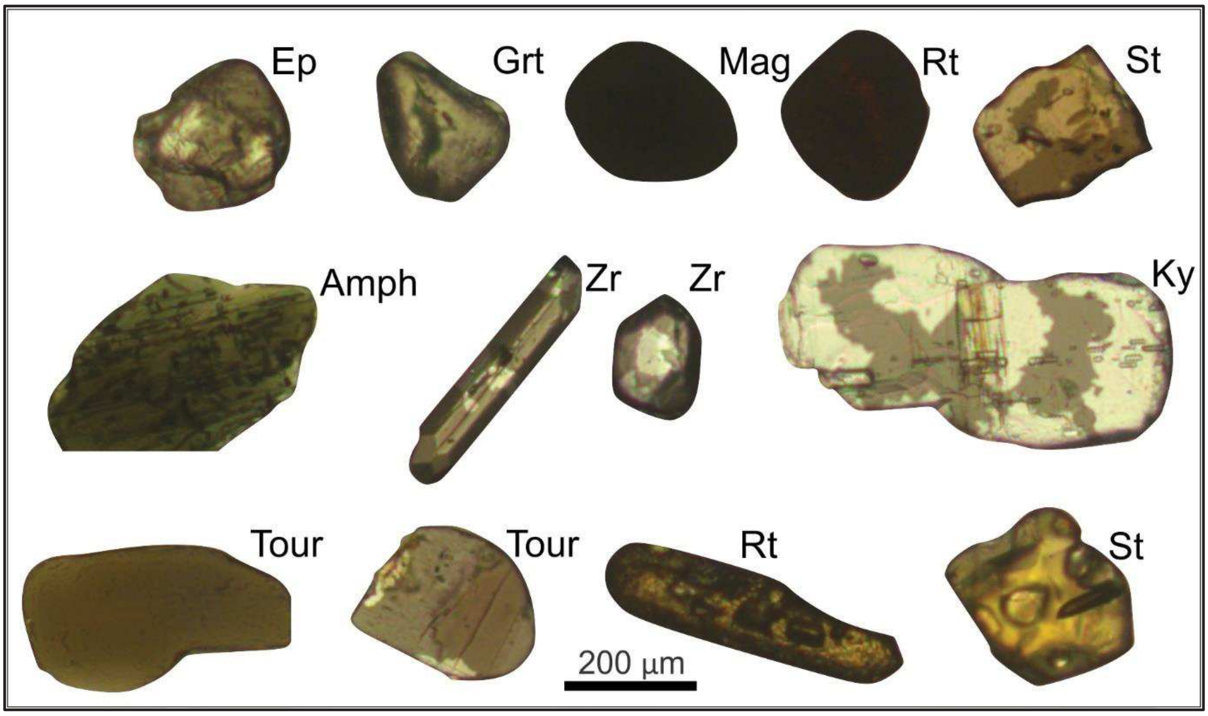


Figure 3. Main heavy minerals recognized in collected samples of the sand barriers, northern Rio Grande do Sul Coastal Plain. Ep, epidote; Mag, magnetite; Zr, zircon; St, staurolite; Rt, rutile; Grt, garnet; Ky, kyanite; Amph, amphibole; Tour, tourmaline.

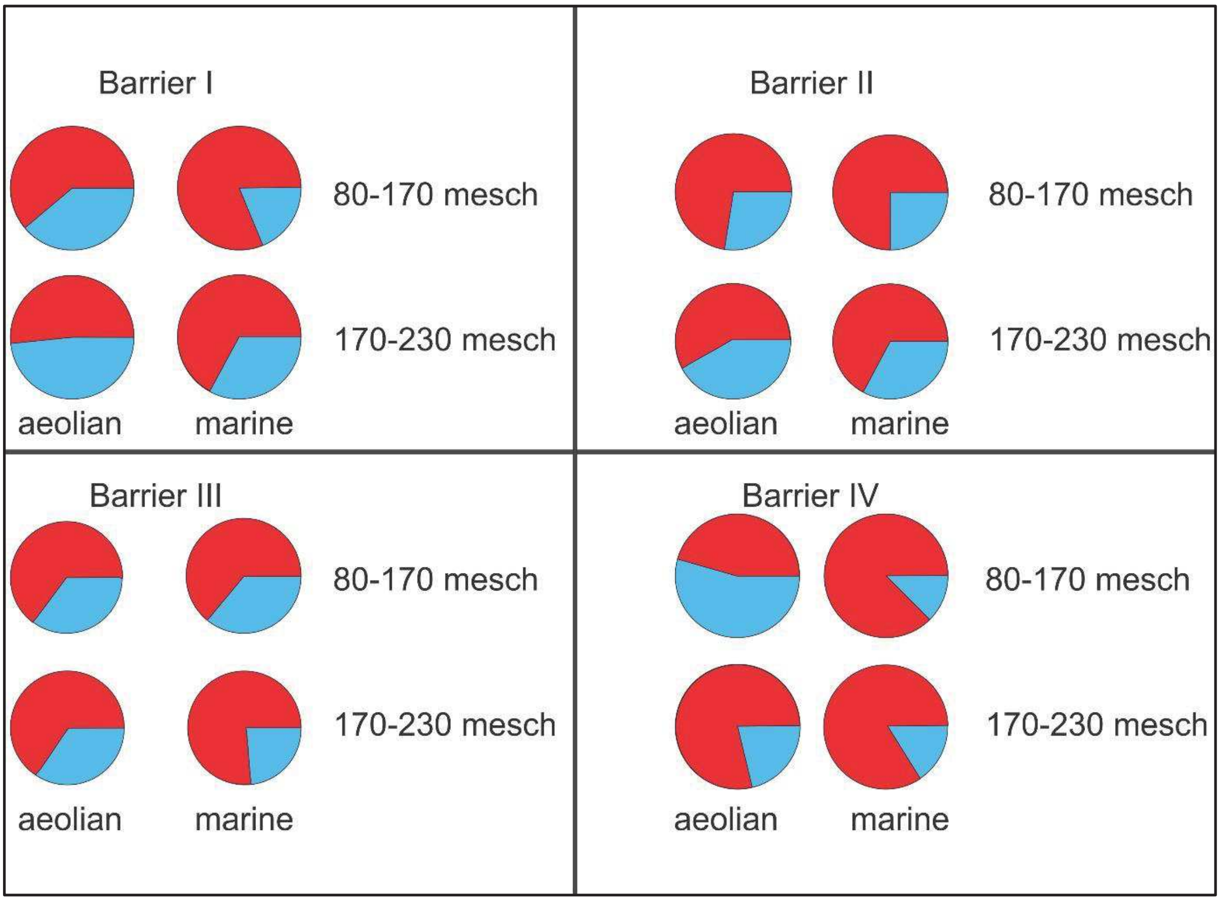


Figure 4. Distribution of opaque (red) and translucent (blue) minerals of sediment samples from the Barrier I, II, III, and IV, divided by 80-170 and 170-230 mesh fraction.

Heavy minerals denser than 4 g/cm³ (magnetite/ilmenite, zircon and rutile) predominate in the marine facies of all barriers, whereas aeolian facies contain larger proportion of minerals with a density of less than 4 g/cm³ (staurolite, tourmaline and garnet).

Magnetite and ilmenite (iron and titanium oxides, respectively) are the most common and abundant heavy minerals in the four barriers: I (n = 1411), II (n = 1416), III (n = 1397) and IV (n = 1628). The presence of chromite in the four barriers occurs, as follow: I (n = 24), II (n = 26), III (n = 9) and IV (n = 26), yet in very low amount than magnetite and ilmenite grains. The spinel is present only in the aeolian facies of barrier III (n = 2) (Table 2).

Among the translucent minerals, zircon, rutile, tourmaline, staurolite and epidote are the most common, presenting abundant concentrations in all barriers (Figure 5). Garnets are also present in all barriers, but with a higher number of grains in the deposits of Barrier II (n = 48). The three aluminium polymorphs (andalusite, kyanite and sillimanite) are present in all barriers, with the most relevant concentrations in the Barrier II (n = 76) and III (n = 73) (Table 2) sediments.

Epidote has a considerably higher number of grains in the younger barriers (III, n = 165 and IV, n = 150) with respect to the older barriers (I, n = 5 and II, n = 11). However, in Barrier III, the largest number of epidote grains is found in marine facies (n = 107) while in IV barrier it predominates in aeolian facies (n = 126) (Table 2).

More unstable minerals such as amphiboles and pyroxenes are common in IV (n = 50) and II (marine facies, n = 11), and barely expressive in barriers I and III.

Some mineral species always have a low number of grains. Xenotime was found only in Barrier I (n = 1) and titanite in Barrier II (n = 1). Apatite is present only in barriers I (n = 1) and IV (n = 2) and the corundum in barriers II (n = 1) and IV (n = 3). Monazite is present in the marine facies of barrier I (n = 8) and in both facies of barriers II (n = 3) and IV (n = 3).

Heavy mineral composition of Barrier I (2149 grains) stands out for having zircon grains (n = 353) in a considerably larger number than in the other barriers (II, n = 101); (III, n = 72) and (IV, n = 137). The number of staurolite grains decreases from the oldest to the youngest barrier (I, n = 113, II, n = 88, III, n = 71 and IV, n = 30). Also, in Barrier I the presence of large number of grains of other minerals such as rutile, tourmaline, chromite and garnet are also recognized. Xenotime occurs only in Barrier I (Table 2).

Barrier II (2090 grains) includes a variety of heavy mineral, with aluminium polymorphs (andalusite, kyanite and sillimanite), tourmaline, pyroxene and garnet, which present the highest number of grains in relation to other barriers. Titanite is present only in marine facies (n = 1). There is a significant number of pyroxene grains (n = 40) compared to the other barriers (I, n = 1); (III, n = 3) and (IV, n = 15).

Barrier III (2066 grains) constitutes the sand belt with the smallest heavy mineral diversity among the four barriers. It presents rutile grains (n= 117) and epidotes (n = 165) in greater numbers than the other barriers. It is important to note the presence of spinel, present only in the aeolian facies of this barrier (n = 2).

The mineralogical composition of heavy mineral grains in the Barrier (IV) (2193 grains) is also notable for having the largest number of magnetite and ilmenite grains (n= 1628) compared to other barriers (I, n = 1411, n = 1416 and III, n = 1397). It also includes high concentration of epidote (n = 150) and amphibole (n = 36) grains in relation to the others. It is the second barrier with the highest number of zircon grains (n=137). It presents a relevant number of grains of perovskite (n = 12) and amphibole (n = 35) compared to the other barriers. Apatite occurs only in the marine facies (n = 2) of Barrier IV.

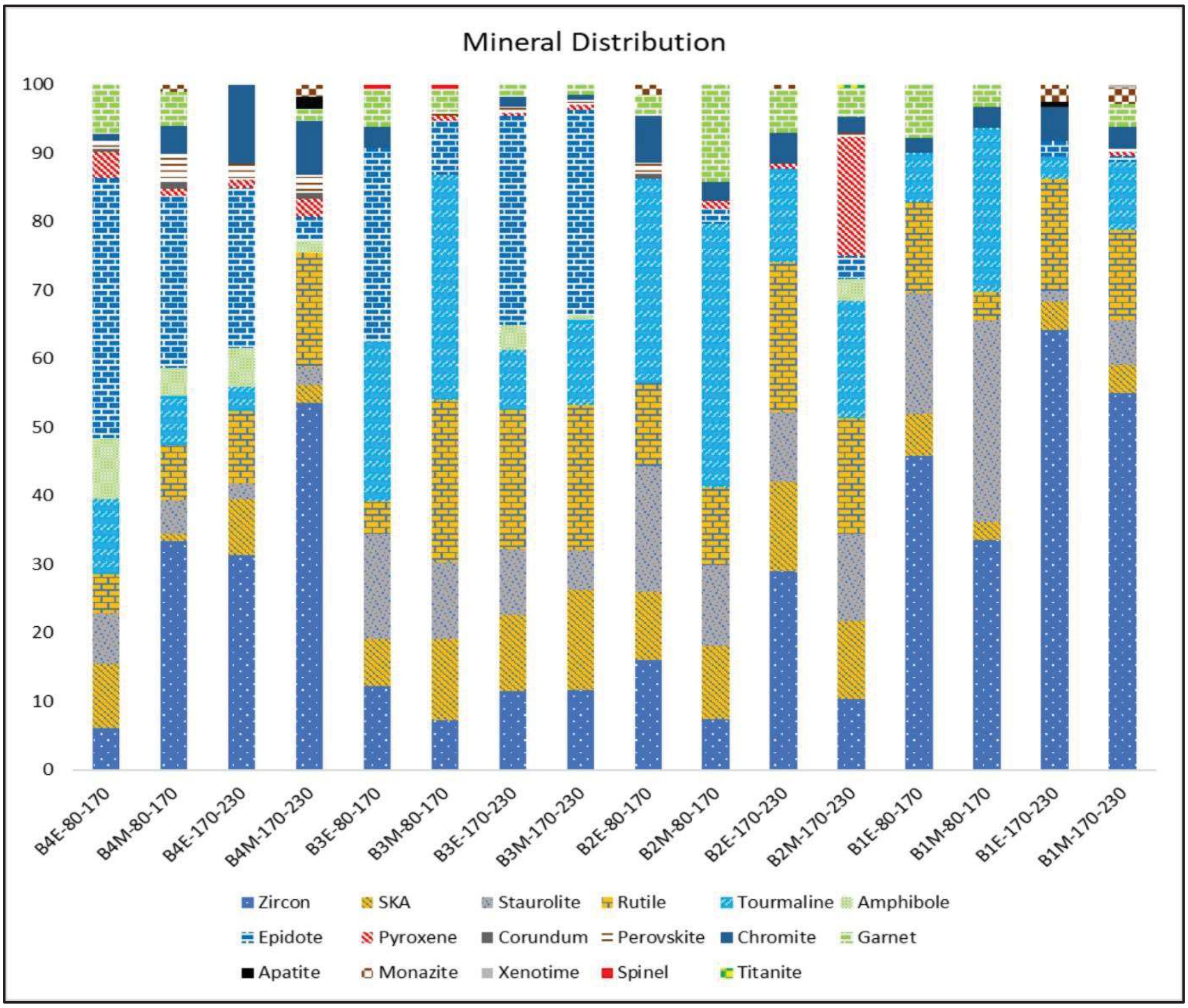


Figure 5. Mineral distribution in all samples without iron/titanium oxides (magnetite and ilmenite).

Table 2. Distribution of the heavy minerals (X Y Z) X: Total count; Y: % total minerals; Z:% excluding opaque minerals.

	Barrier	Barrier I				Barrier II				Barrier III				Barrier IV			
	Facies	Aeolian		Marine		Aeolian		Marine		Aeolian		Marine		Aeolian		Marine	
	Fraction	80-170	170-230	80-170	170-230	80-170	170-230	80-170	170-230	80-170	170-230	80-170	170-230	80-170	170-230	80-170	170-230
opaques		x y	x y	x y	x y	x y	x y	x y	x y	x y	x y	x y	x y	x y	x y	x y	x y
	Mag/Ilm	277 60	224 50	495 80	415 66	314 71	233 57	450 74	419 66	282 63	289 66	378 64	448 77	215 45	345 78	530 86	538 83
	Chromite	4 1	7 2	6 1	7 1	9 2	5 1	7 1	5 1	5 1	0 0	3 1	1 0	3 1	4 1	10 2	9 1
	Spinel	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	1 0	1 0	0 0	0 0	0 0	0 0	0 0	0 0
translucents		x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z	x y z
	Zircon	83 18 47	74 17 35	79 13 68	117 19 57	21 5 17	13 3 8	45 7 30	22 3 11	20 4 13	11 2 7	25 4 12	16 3 12	16 3 6	33 7 35	27 4 36	61 9 58
	Rutile	24 5 14	9 2 4	20 3 17	28 4 14	16 4 13	20 5 12	34 6 23	36 6 17	8 2 5	36 8 24	44 7 21	29 5 21	15 3 6	8 2 8	9 1 12	19 3 18
	Tourmaline	13 3 7	53 12 25	4 1 3	21 3 10	39 9 32	68 17 40	21 3 14	36 6 17	38 9 24	50 11 33	19 3 9	17 3 13	29 6 11	7 2 7	3 0 4	0 0 0
	Garnet	14 3 8	7 2 3	0 0 0	7 1 3	4 1 3	25 6 15	10 2 7	9 1 4	9 2 6	5 1 3	4 1 2	2 0 1	19 4 7	5 1 5	0 0 0	2 0 2
	Staurolite	32 7 18	65 15 30	2 0 2	14 2 7	24 5 20	21 5 12	16 3 11	27 4 13	25 6 16	17 4 11	21 4 10	8 1 6	20 4 8	5 1 5	2 0 3	3 0 3
	Epidote	0 0 0	0 0 0	3 0 3	2 0 1	0 0 0	4 1 2	0 0 0	7 1 3	46 10 29	12 3 8	66 11 31	41 7 30	101 21 38	25 6 26	20 3 26	4 1 4
	SKA	11 2 6	6 1 3	5 1 4	9 1 4	13 3 11	19 5 11	20 3 14	24 4 12	11 2 7	18 4 12	24 4 11	20 3 15	25 5 10	1 0 1	7 1 9	3 0 3
	Amphibole	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	7 1 3	0 0 0	0 0 0	8 1 4	1 0 1	24 5 9	4 1 4	5 1 7	2 0 2
	Pyroxene	0 0 0	0 0 0	0 0 0	1 0 0	0 0 0	2 0 1	1 0 1	37 6 18	0 0 0	1 0 1	1 0 0	1 0 1	10 2 4	1 0 1	1 0 1	3 0 3
	Corundum	0 0 0	0 0 0	0 0 0	0 0 0	1 0 1	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 0 0	1 0 1	0 0 0	1 0 1
	Perovskite	0 0 0	0 0 0	0 0 0	1 0 0	2 0 2	0 0 0	0 0 0	1 0 0	0 0 0	1 0 1	2 0 1	1 0 1	3 1 1	4 1 4	2 0 3	3 0 3
	Apatite	0 0 0	0 0 0	1 0 1	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	2 0 2
	Monazite	0 0 0	0 0 0	3 0 3	5 1 2	2 0 2	0 0 0	1 0 1	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 0 1	0 0 0	2 0 2
	Xenotime	0 0 0	0 0 0	0 0 0	1 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
	Titanite	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	1 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0	0 0 0
	Total	458	445	618	628	445	410	605	630	445	441	595	585	481	444	616	652
Index	ZTR	68	64	88	81	62	59	68	45	42	64	41	46	23	51	51	76
	Gzi	14	9	0	6	16	66	18	29	31	31	14	11	54	13	0	3
	Rzi	22	11	20	19	43	61	43	62	29	77	64	64	48	20	25	24
	Sti	71	55	33	40	38	24	43	43	40	25	53	32	41	42	40	100
	Opaque	61	52	81	67	73	58	76	67	65	66	64	77	45	79	88	84

Based on the heavy and translucent minerals found in the quaternary barriers, the mineralogical indexes ZTR, GZi, RZi and STi were calculated. Hubert (1962) and Morton and Hallsworth, (1994) described in detail these mineralogical indices to define the provenance and their alteration during the sedimentary cycle, to reduce the effects of the processes that affect the provenance signal or to characterize the source areas with more certainty.

In the quaternary barriers of the northern part of the RSCP, the ZTR indexes presented percentage between 23 and 88%. The other indexes presented the following percentage: GZi (0 and 66%), RZi (11 and 77%) and STi (24 and 100%) (Figure 6).

The ZTR (100 x zircon + tourmaline + rutile / total translucent grain) corresponds to the sum of the zircon, tourmaline, and rutile percentages, being used to classify the mineralogical maturity of the sediment. These three minerals are described as ultra-stable minerals (Hubert, 1962). The ZTR index has the higher percentage in the oldest barrier (I) compared to the other barriers. However, in barrier IV there is a clear increase of zircon + tourmaline + rutile with respect to the translucent minerals in the marine facies (>99% quartz).

The GZi (100 x garnet/garnet + zircon) is used to recognize probable changes in the characteristics of the provenance, noting that the garnet is unaffected by weathering (Morton and Hallsworth, 1994). The highest concentrations of garnet grains occur in the aeolian facies of the barrier II and IV. The lowest indexes were found in marine facies of barriers I, III and IV.

The RZi (100 x rutile / rutile + zircon) corresponds to a very reliable indicator of provenance, considering that such minerals are highly stable. However, this stability also favors recycling, so much of the signature can be inherited from previous sediments (Morton and Hallsworth, 1994). RZi presented higher percentage in intermediate barriers (II and III) compared to barrier I (older) and IV (younger). In contrast, in the barrier IV at Bujuru region, Tavares (RS), located approximately 150 km south of the study area, occur very high concentrations of various types of heavy minerals (ilmenite, rutile and zircon, Dillenburg *et al.*, 2004). The anomalous concentrations of heavy minerals in the Bujuru region suggest that the heavy minerals have been reconcentrated from barriers II and III. Dillenburg *et al.*, 2004 proposes that the accumulation of such minerals in the region occurred due to the reworking of existing deposits in the coastal plain transported by the longshore currents, with accumulation at the Bujuru region.

The STi (100 x staurolite / staurolite + tourmaline) is a good indicator of low-to medium grade metasedimentary rocks derivation (Morton and Hallsworth, 1994). The STi presented percentage practically homogeneous in all barriers, except for the percentage (33 and 71%) in the aeolian facies (fraction 80-170 mesh) of the Barrier I and marine facies (42 and 100%, fraction 170-230 mesh) of the younger barrier (IV) (Figure 6 and Table 2).

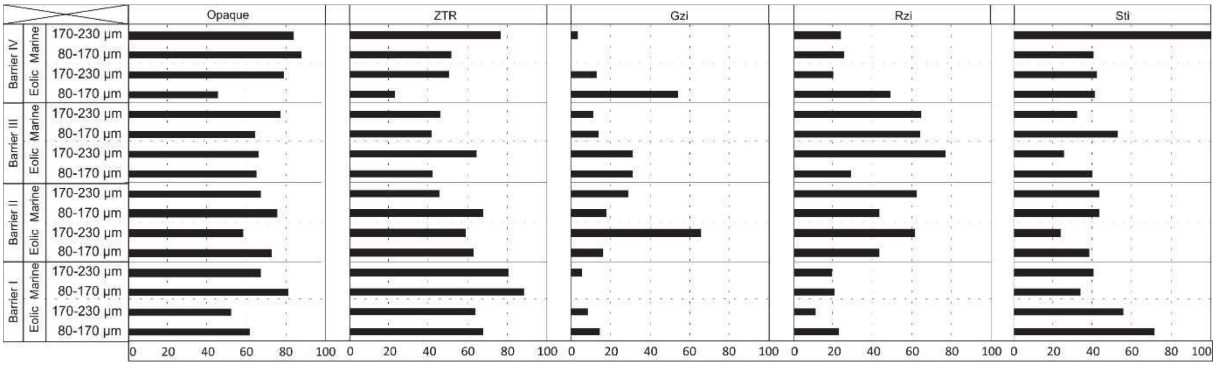


Figure 6. Calculated mineralogical indexes (see text for explanation).

DISCUSSION

The diversity and distribution of heavy minerals in all samples point out to a variety of source areas, as well as common sources for all Quaternary sand barriers.

The dominance of rounded magnetite and ilmenite in all barriers (n = 5852, 69% of the total analysed grains) indicates provenance from distinct source areas and types of rocks (granitic, metamorphic high-grade and basic volcanic), suggesting a long transport and redeposition. Garnet, amphibole and staurolite suggest source mainly from medium to high grade metamorphic rocks. Epidote grains are common in granitic and metamorphic rocks of medium and low grade. Rutile is a common mineral accessory in igneous and metamorphic rocks. The presence of zircon is very common in granitoids and metamorphic rocks. Monazite with low number of grains probably comes from the metapelites or alkaline granites.

Pyroxene (more unstable mineral) occurs frequently in mafic and ultramafic rocks. The aluminium polymorphs (andalusite, kyanite and sillimanite). The high concentration of pyroxenes (n = 37) in the finer fraction (170-230 mesh) of the marine facies of Barrier II may be associated with the volcanic rocks of the Serra Geral Formation or some mafic/ultramafic rock present in the Rio Grande do Sul Shield. This fact suggests intense reworking of the sediments before deposition in the barriers.

Our studies point to the following situation: (i) the marine and aeolian sediments of Barrier I to IV are mature with well-rounded quartz (> 99 %) (Figure 7) and also heavy minerals, suggesting long transport and redeposition (ii) based on the potential source areas, we have dominant igneous, metamorphic and sedimentary sources. The maturity analysis, by calculating the ZTR index, showed a slightly higher percentage for the oldest barriers (I and II) in relation to the youngest ones (III and IV). However, based in all indexes there are more maturity of these sediments. The STi index (with the use of staurolite) suggests strong contribution of metasediments, since staurolite occurs in considerable amounts in the studied barriers. Thus, the analysis of heavy minerals, in particular, the use of the ZTR, GZi, RZi and STi indices suggests that there should be other concentrations or deposits of heavy minerals similar to Bujuru also in the Barrier II and III, which are covered by the current sediments.

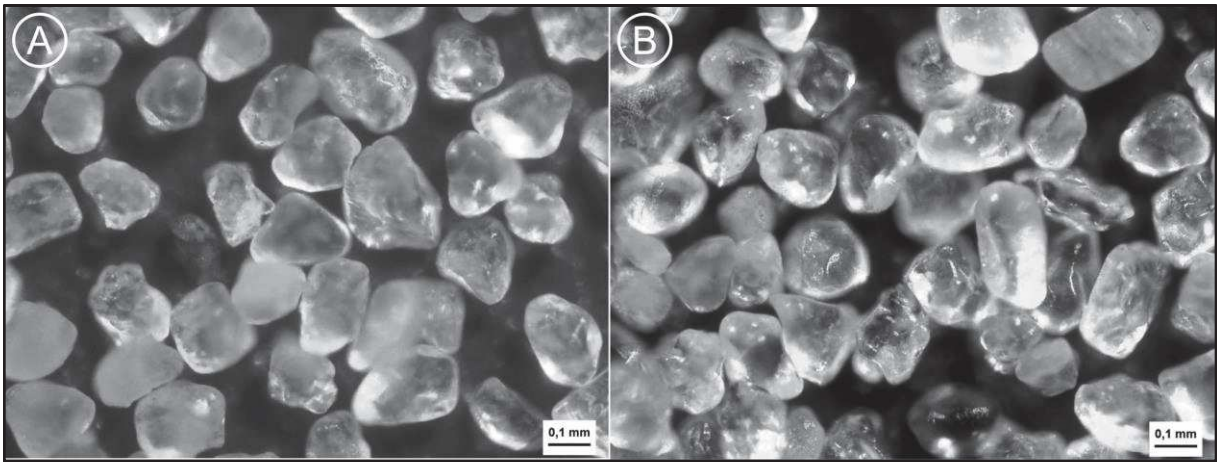


Figure 7. Aspects of sediments from Barrier I, II, III, and IV. (A) aeolian sediments barrier I and (B) aeolian sediments barrier IV. Grain size (80-170 mesh).

Minerals such as xenotime, perovskite, epidote, apatite, monazite, pyroxene and amphibole in smaller proportions suggest nearby igneous sources, especially the South Rio Grande do Sul or even the igneous rocks of the Serra Geral Formation.

An important element in the geological history of the RSCP is the La Plata River network. Drainage system or basin is one of the largest in South America, receiving contributions from important tributaries: Paraná, Uruguay, Salado, Paraguay, Bermejo and Pilcomayo. Its tributaries drain not only the northern part of the Paraná Basin but also a significant portion of the Andean region (between the parallels 24° and 34° S). Currently, sediments tend to accumulate in the delta located in the proximal part of the estuarine system. In low sea periods, the river transfers its sedimentary load to the continental shelf, being responsible for one of the most important fluvial contributions to the Atlantic Ocean (Corrêa *et al*., 2008). Thus, it provides sediments that are transported by the longshore currents to the north (Corrêa *et al*., 2008). Indeed, the material accumulated in the Rio de la Plata Estuary has all heavy mineral recognized during this study and by other authors (Corrêa *et al*., 2008), defined herein as the distal source area. On the other hand, the Cebollati (Uruguay) and Camaquã and Jacuí (Southern Brazil) rivers defined herein as proximal source areas transport sediments from Precambrian to Eopaleozoic rocks (igneous, metamorphic and sedimentary rocks of the Uruguayan-Rio Grande do Sul Shield), Paraná Basin (sedimentary rocks) and Serra Geral Formation (dominant basalt lavas). In both cases, we can have the heavy mineral assemblage here described, but the sediments of proximal areas would be immature in the mouth of rivers or even in the continental shelf, since they are transported shortly, both in time and distance. Whereas those sediments that run-off in the continental shelf in front of the La Plata Estuary are feeded by the Paraná, Uruguay and Paraguay rivers and their tributaries (Salado, Bermejo and Pilcomayo) are transported by large distance until reach the estuary. Currently, sediments tend to accumulate in the delta located in the proximal part of the estuarine system. In low sea periods, the river transfers its sedimentary load to the continental shelf, being responsible for one of the most important fluvial contributions to the Atlantic Ocean (Corrêa *et a*l., 2008). Thus, it provides sediments that are transported by the longshore currents to the north (Corrêa *et al*., 2008) and the heavy minerals of these sediments and are mature.

As consequence, the heavy minerals found in the sandy sediments of the northern part of the RSCP were and still are transported mainly through the longshore currents from the drainage of the La Plata River and to a lesser extent, the Patagonia. In opposition to Corrêa *et al*., (2008), Barros *et al*., (2010) and Dillenburg and Barboza (2014) hypotheses, the sediments carried through the drainage of the Cebollati, Jacuí and Camaquã rivers and their tributaries provide minor contribution, since they are mostly transported by the northward longshore currents when discharged in the continental shelf. Altogether, these minerals reflect the diversity of source rocks that contributed to the construction of the Quaternary barriers.

CONCLUSIONS

In the Quaternary barriers of Rio Grande do Sul, the following heavy mineral were recognized: epidote, tourmaline, zircon, magnetite/ilmenite, polymorphs of aluminium (andalusite, kyanite and sillimanite), staurolite, rutile, amphibole, pyroxene, corundum, perovskite, monazite, xenotime, spinel and titanite.

The heavy mineral indexes (ZTR, RZi, STi and GZi) indicate that the sediments of the coastal barriers underwent an extensive alteration process, and only the most resistant minerals to chemical and physical weathering remained. These indexes are also supported by the high maturity of aeolian and marine sediments of the four barriers.

Altogether, the heavy minerals of the Quaternary barriers can be related to two distinct sources. A direct feeding proximal source, whose contribution brings together the Rio Grande do Sul Shield and the Paraná Basin, associated to the drainage of the Camaquã and Jacuí rivers. A distal source from the drainage basin of the La Plata River, which lies more than 700 km from the study area and drains the entire northern half of the Paraná Basin and Andean border.

However, contrary to what has been suggested by many researchers of the RSCP, the heavy mineral indices presented and the degree of maturity of the sediments host of the heavy minerals, it is concluded that the sediments and their heavy minerals are almost exclusively from the La Plata Estuary, while the feeding of the proximal source occurred in a very subordinate way. In the low sea level periods, the fluvial sediments are distributed in the continental shelf, being later reworked by waves during transgressive events. The sediments of the La Plata River are transported northward by the longshore currents. The immature sediments discharged by the Jacuí and Camaquã rivers (proximal source) when arriving on the platform are also carried. northward by the longshore currents.

ACKNOWLEDGMENTS

We would like to thank the Microanalysis Laboratory of the Universidade Federal de Ouro Preto for SEM-EDS analyses. We are grateful to the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) of the scholarship to the first author (JJC).

LITERATURE CITED

Andò, S.; Garzanti, E.; Padoan, M., and Limonta, M., 2012. Corrosion of heavy minerals during weathering and diagenesis: A catalog for optical analysis. *Sedimentary Geology*, 280, 165-178, doi:10.1016/j.sedgeo.2012.03.023.

Bueno, G.V.; Zacharias, A.A.; Oreiro, S.G.; Cupertino, J.A.; Falkenhein, F.U.H., and Martins Neto, M.A., 2007. Bacia de Pelotas. *Boletim de Geociências da Petrobrás*, 15(2), 551-559 [in Portuguese].

Barros, C.E.; Nardi, L.V.S.; Dillenburg, S.R.; Baitelli, R., and Dehnhardt, B.A., 2008. Distribuição e origem dos minerais detríticos pesados das areias praiais holocênicas do litoral norte do Rio Grande do Sul. *Revista Brasileira de Geociências*, 38(2), 319-335 [in Portuguese].

Barros, C.E.; Nardi, L.V.S.; Dillenburg, S.R.; Ayup, R.; Jarvis, K., and Baitelli, R., 2010. Detrital Minerals of Modern Beach Sediments in Southern Brazil: A Provenance Study Based on the Chemistry of Zircon. *Journal of Coastal Research*, 261(1), 80-93, doi:10.2112/06-0817.1.

Corrêa, I.; Ayup-Zouain, R.N.; Weschenfelder, J., and Tomazelli, L.J., 2008. Áreas Fontes dos Minerais Pesados e sua Distribuição sobre a Plataforma Continental Sul-brasileira, Uruguaia e Norte-argentina. *Revista Pesquisas em Geociências*, 35, 137-150 [in Portuguese].

Dias, J.L.; Sad, A.R.E.; Fontana, R.L., and Feijó, F.J., 1994. Bacia de Pelotas: *Boletim de Geociências da Petrobrás*, 8(1), 235-245 [in Portuguese].

Dillenburg, S.R.; Tomazelli, L.J., and Barboza, E.G., 2004. Barrier evolution and placer formation at Bujuru southern Brazil. *Marine Geology*, 203, 43-56.

Dillenburg, S.R.; Tomazelli, L. J.; Martins, L.R., and Barboza, E.G., 2005. Modificações de longo período da linha de costa das barreiras costeiras do Rio Grande do Sul. *Gravel*, 3, 9-14 [in Portuguese].

Dillenburg, S.R.; Barboza, E.G.; Tomazelli, L.J.; Hesp, P.A.; Clerot, L.C.P., and Ayup-Zouain, R.N. 2009. The Holocene Coastal Barriers of Rio Grande do Sul. *In:* Dillenburg, S.R., and Hesp, P.A. (eds.), *Geology & Geomorphology of Holocene Coastal Barriers of Brazil*, Springer, 53-91.

Dillenburg, S.R. and Barboza, E.G., 2014. The strike-fed sandy coast of Southern Brazil. *Geological Society Special Publication*, 388, 333-352, doi: 10.1144/SP388.16.

Garzanti, E.; Doglioni, C.; Vezzoli, G., and Andò, S., 2007. Orogenic Belts and

Orogenic Sediment Provenance. *Journal of Geology*, 115,315-334, doi:10.1086/512755.

Hubert, J.E., 1962. A zircon-tourmaline-rutile maturity index and the interdependence of the composition of heavy mineral assemblages with the cross composition and texture of sandstones. *Journal Sedimentary Petrology*, 32, 440-450.

Imbrie, J.; Hays, J.D.; Martison, D.G.; McIntyre, A.; Mix, A.C.; Morley, J.J.; Pisias, N.G.; Prell, W.L., and Shackleton, N.J., 1984. The orbital theory of pleistocene climate: Support from a revised chronology of the marine δ18 O record. *In*: Berger, A.; Imbrie, J.; Hays, J.; Kukla, G., and Saltzmen, B. (eds.), *Milankovitch and Climate*, Part 1, Boston, pp. 269-305.

Lopes, R.P.; Dillenburg, S.R.; Schultz, C.L.; Ferigolo, J.; Ribeiro, A.M.; Pereira, J.C.; Holanda, E.C.; Pitana, V.G., and Kerber, L., 2014. The sea-level highstand correlated to marine isotope stage (MIS) 7 in the coastal plain of the state of Rio Grande do Sul, Brazil. *Anais da Academia Brasileira de Ciências*, 86(4), 1573-1595.

Martin, L.; Bittencourt, A.C.S.P., and Vilas Boas, G.S., 1982. Primeira ocorrência de corais pleistocênicos da costa brasileira: datação do máximo da penúltima transgressão. *Ciências da Terra*, 1, 16-17.

Morton, A.C. and Hallsworth, C., 1994. Identifying provenance-specific features of detrital heavy mineral assemblages in sandstones. *Sedimentary Geology*, 90, 241-256, doi:10.1016/0037-0738(94)90041-8.

Morton, A.C. and Hallsworth, C.R., 1999. Processes controlling the composition of heavy mineral assemblages in sandstones. *Sedimentary Geology*, 124, 3-29, doi:10.1016/S0037-0738(98)00118-3.

Philander, C. and Rozendaal, A., 2015a. Detrital zircon geochemistry and U-Pb geochronology as an indicator of provenance of the Namakwa Sands heavy mineral deposit, west coast of South Africa. *Sedimentary Geology*, 328,1-16, doi: 10.1016/j.sedgeo.2015.08.001.

Philander, C. and Rozendaal, A., 2015b. Geology of the Cenozoic Namakwa Sands heavy mineral deposit, west coast of South Africa: a world-class resource of titaniumand zircon. *Economic Geology*, 110, 1577-1623.

Sevastjanova, I.; Hall, R., and Alderton, D., 2012. A detrital heavy mineral viewpoint on sediment provenance and tropical weathering in SE Asia. *Sedimentary Geology*, 280, 179-194, doi: 10.1016/j.sedgeo.2012.03.007.

Shackleton, N.J. and Opdyke, N.D., 1973. Oxygen Isotope and Palaeomagnetic

Stratigraphy of Equatorial Pacific Core V28-238: Oxygen Isotope Temperatures and Ice Volumes on a 105 Year and 106 Year Scale. *Quaternary Research*, 3, 39-55, doi: 10.1016/0033-5894(73)90052-5.

Silva, Da M.A.M., 1979. Provenance of heavy minerals in beach sands, southeastern Brazil: from Rio Grande to Chuí (Rio Grande do Sul State). *Sedimentary Geology*, 24(1-2), 133-148.

Tomazelli, L.J., 1978. Minerais pesados da plataforma continental do Rio Grande do Sul-Brasil. *Acta Geológica Leopoldense*, 2(5),103-159 [in Portuguese].

Tomazelli, L.J.; Dillenburg, S.R.; and Villwock, J.A., 2000. Late quaternary geological history of Rio Grande do Sul coastal plain, Southern Brazil. *Revista Brasileira de Geociências*, 30, 470-472.

Tomazelli, L.J.; Dillenburg, S.R.; Villwock, J.A.; Barboza, E.G.; Bachi, F.A.; Dehnhardt, B.A., and Correa, M.L. da C.R., 2007. Sistemas deposicionais e evolução geológica da Planície Costeira do Rio Grande do Sul: uma síntese. *In*: Iannuzzi, R. and Frantz, J.C. (eds.). *50 Anos de Geologia: Instituto de Geociências*. Contribuições: Porto Alegre. pp. 327-340 [in Portuguese].

Tsikouras, B.; Pe-Piper, G.; Piper, D.J.W., and Schaffer, M., 2011. Varietal heavy mineral analysis of sediment provenance, Lower Cretaceous Scotian Basin, eastern Canada. *Sedimentary Geology*, 237,150-165, doi: 10.1016/j.sedgeo.2011.02.011.

Villwock, J.A.; Tomazelli, L.J.; Loss, E.L.; Dehnhardt, E.A.; Horn, N.O., Bachi, F.A., and Dehnhardt, B.A., 1986. Geology of the Rio Grande do Sul Coastal Province. *In*: Rabassa, J. (ed.). *Quaternary of South America and Antartic Península*, v. 4, Rotterdam: A.A. Balkema. pp.79-97.

18/10/2017 Homepage

QUATERNARY
SCIENCE REVIEWS

My Author Tasks

Click here to view your submissions with a final decision

My Submissions with Journal (1)

Zircon provenance of Quaternary sandy barriers and their implications for the evolution of the multiple source submarine fan (Rio Grande Fan, southern Brazil)

JQSR_2017_641

Article Type: Research Paper

Initial submission : 18/Oct/2017

Current status: With Journal (18/Oct/2017)

https://www.evise.com/evise/faces/pages/homepage/homepage.jspx?_adf.ctrl-state=8wheenydg_385 1/1

From: Quaternary Science Reviews
Sent: Wednesday, 18 October 2017 6:04 PM
To: Farid Chemale Junior
Subject: Successfully received: submission Zircon provenance of Quaternary sandy barriers and their implications for the evolution of the multiple source submarine fan (Rio Grande Fan, southern Brazil) for Quaternary Science Reviews

This message was sent automatically. Please do not reply.

Ref: JQSR_2017_641
Title: Zircon provenance of Quaternary sandy barriers and their implications for the evolution of the multiple source submarine fan (Rio Grande Fan, southern Brazil)
Journal: Quaternary Science Reviews

Dear Professor Chemale Junior,

Thank you for submitting your manuscript for consideration for publication in Quaternary Science Reviews. Your submission was received in good order.

To track the status of your manuscript, please log into EVISE® at: http://www.evise.com/evise/faces/pages/navigation/NavController.jspx?JRNL_ACR=JQSR and locate your submission under the header 'My Submissions with Journal' on your 'My Author Tasks' view.

Thank you for submitting your work to this journal.

Kind regards,

Quaternary Science Reviews

Have questions or need assistance?
For further assistance, please visit our Customer Support site. Here you can search for solutions on a range of topics, find answers to frequently asked questions, learn more about EVISE® via interactive tutorials. You can also talk 24/5 to our customer support team by phone and 24/7 by live chat and email.

Zircon provenance of Quaternary sandy barriers and their implications for the evolution of the multiple source submarine fan (Rio Grande Fan, southern Brazil)

Julierme Justin Carassai[1], Ernesto Luiz Correa Lavina[1], Farid Chemale Junior[1], Tiago Jonatan Girelli[1] and Lana C[2].

[1]*Programa de Pós Graduação em Geologia, Universidade do Vale do Rio dos Sinos, 93022-220, São Leopoldo-RS, Brazil*
[2]*Departamento de Geologia, Universidade Federal do Ouro Preto, 35400-000, Morro do Cruzeiro, Ouro Preto-MG, Brazil*

Abstract

Multiple source provenance of coastal plain and submarine fan sediments is herein investigated based on mineralogia study of Quaternary sandy barriers of the Brazilian southernmost coastal plain. LA-ICP-MS dating on 1,625 detrital zircons from marine and aeolian sands of four successive lagoon-barrier systems were analyzed. The characterization of Archean to Pleistocene zircons includes Andean (22±4 Ma to 1±1 Ma, 48 from 1,625), Mesozoic to Paleozoic and Mesoproterozoic (479 from 1,625) populations, suggests that the main feeding of sediments to the coastal plain occurred through the La Plata River drainage system. A nearby source, associated with the Uruguay/Rio Grande do Sul Shield and the Paraná Basin, drained by the Cebolati, Camaquã and Jacuí rivers, contribute as minor component. The definition of the sources of clastic sediments allows inferences about the origin of the Rio Grande Fan where both the cold Falkland and the warm Brazil currents played a major role. The rivers and estuary material runoff to the Atlantic Ocean took place in lowstand sea level periods (glacial episodes). During these events, sand was transported northward by longshore circulation (longshore currents). Fine sediments discharged on the shelf and slope were also carried to the north by the Falkland Current until the convergence zone with the warm Brazil Current. The clay particles flocculated due to salinity and temperature changes and therefore accumulated in the slope to build up the submarine Rio Grande Fan.

Keywords: U-Pb zircon; coastal plain; Andean provenance; source to sink process; Rio Grande Fan; Ocean Atlantic

Introduction

Submarine fans are deposicional systems that accumulate significant amount of sediments in several marginal basins around the world (e.g. Bengal-Nicobar, Amazonas, Indus, Mississippi, Niger, Nile and others) (Shanmugam, 2016). These areas provide important fingerprint of the tectonic and climate evolution during the Cenozoic (e.g., Zhisheng et al., 2001; Hoorn et al., 2017). Moreover, they are also related to significant fossil-fuel reservoirs (Walker, 1978; Shanmugam and Moiola, 1988). These remarkable characteristics and the importance of fan-delta systems are associated with fluvial systems, that transport unconsolidated material from the continent through shallow to deep water (e.g., Nittrouer and DeMaster, 1996; Galloway et al., 2011).

In fan deltas, the most sensitive features are the processes of sediment accumulation and the source area (Shanmugam, 2016). Currently, the main submarine fan are the Bengal-Nicobar Fan, which has the largest area (Curray et al., 2003), and the Amazon Fan, which results from the most significant sediment river supply worldwide presently (Damuth and Kumar, 1975; Hoorn et al., 2017). Another outstanding submarine fan is the Rio Grande Fan (Rio Grande Cone) which constitutes the focus of this work. It lies in the eastern margin of the South Atlantic Ocean, with intense sedimentation during the last 10 Ma and thickness of 4 km (Zerfass et al., 2014) (see Rio Grande do Sul Coastal Plain, Fig. 1).

The Bengal-Nicobar and Amazonas fan deltas developed under extraordinary sedimentation with foremost contribution from high mountains or, more precisely, the Himalayas and the Andes, respectively. Major sediment transport in those fan deltas has been done through well-known river systems, i.e. the Ganges and the Brahmaputra rivers (Miocene–present) for the Bengal-Nicobar Fan (Curray et al., 2003), and the Amazonas River for the Amazonas Fan (Hoorn et al., 2017).

The Rio Grande Fan, inserted in the southeastern Brazilian margin, represents the offshore portion of the Pelotas Basin (Bueno et al., 2007; Castillo et al., 2009). Its evolution registers a discontinuous terrigenous input from the Miocene to now (Castillo et al., 2009). The Quaternary sedimentation in the coastal environment is composed of fine-to medium-grained sands from the La Plata River system, from the highlands of Rio Grande do Sul State (Southernmost Brazil) as well as the cratonic events influenced by eustatic sea-level variations (Martins, 1984).

This work focuses on the identification and quantification of the source areas of four coastal barrier systems formed in the Rio Grande do Sul Coastal Plain by marine and aeolian sedimentation using a broad set of U-Pb zircon ages. Our main hypothesis is that the sand barriers can be used to track the sedimentary sources of the Rio Grande Fan. Furthermore, we set up the relationship between the Quaternary climatic and tectonic evolution and the development of the coastal barriers as a fingerprint to understand the source areas of the Rio Grande Fan sediments. Our main results point to an important contribution of Andean zircons, which reinforce the significance of the Rio de La Plata drainage system as a main source of sediment deposited in the Rio Grande do Sul Coastal Plain and the Rio Grande Fan.

Geological Setting

The Pelotas Basin (Ghignone, 1960) has an area of 210,000 km^2 of which 40,000 km^2 corresponds to its onshore part (Fig. 1). It is bordered by the parallels 28° to 36° South and by meridians 46^o to 54^o West, between the Florianópolis High, Brazil (to the north) and Polônio High, Uruguay (to the south). It is the southernmost basin of the Brazilian continental margin (Dias et al., 1994; Bueno et al., 2007). This basin developed in response to the tectonic efforts and rupture processes of Gondwana, which gave rise to the South Atlantic Ocean (Barboza et al., 2008). The Pelotas basin is primarily composed of terrigenous clastic sediments whose origin is attributed to the igneous-metamorphic rocks of the Uruguay/Rio Grande do Sul Shield and the volcano-sedimentary rocks of the Paraná Basin (Villwock et al., 1986). The basement of the Pelotas Basin is formed by volcanic rocks related to the rift phase of the separation between South America and Africa, with ages between 133 and 113 Ma (Fontana, 1996).

The Rio Grande Cone is located nearly 200 km off the Rio Grande do Sul coastline (latitude 31^o to 34^o S and longitude 45^o to 51^o W, Fig. 1). It has an asymmetrical, semi-rectangular form with 28,900 km^2 and encompassing a volume of 5x1,012 m^3. It is mosty composed of fine-grained sediments (mudstones and shales). It covers the shelf to the northwest, and the slope to the southeast, including the shelf break (Castillo et al., 2009). Sr isotope analyses of foraminifera shells characterizes a considerable increase in the sedimentation rate in the submarine Rio Grande Fan (RGF) compared to the underlying sedimentary units of the Pelotas Basin. Based on fossil content and Sr, C, and O isotopes, Zerfass et al. (2014) argue that earliest sedimentation of the RGF started in the Upper Miocene (< 12 Ma) and extended until now, with an estimated stratigraphic thickness of 4 km.

The Rio Grande do Sul Coastal Plain (RSCP, Fig. 1), the onshore portion of the Pelotas Basin, comprises one of the most extensive linear coastlines in the world, ranging (about 800 km) in a vastness of lowlands from Uruguay to the Santa Catarina State in the southern Brazil. The NE-SW trending RSCP covers an area of about 33,000 km^2 and comprises four lagoon-barrier systems developed during the Quaternary and related to climatically-driven transgressive-regressive events (e.g., Villwock et al., 1986; Tomazelli and Villwock, 2000). The RSCP comprises the record of at least four distinct transgressive-regressive cycles developed along the last 400 ky due to climatic variations and global fluctuations of the sea level. Barriers I, II and III, are Pleistocene, with assigned ages of 400, 325 and 125 ky, respectively. The last barrier (IV, initiated 6 ky) corresponds to the modern shoreline, is still in continuous process of formation (e.g., Villwock et al., 1986; Tomazelli et al., 2007). Barriers I, II and III developed from the limit reached at each transgressive event, being preserved due to the regression of the coastline forced by a eustatic glacial fall of the sea level.

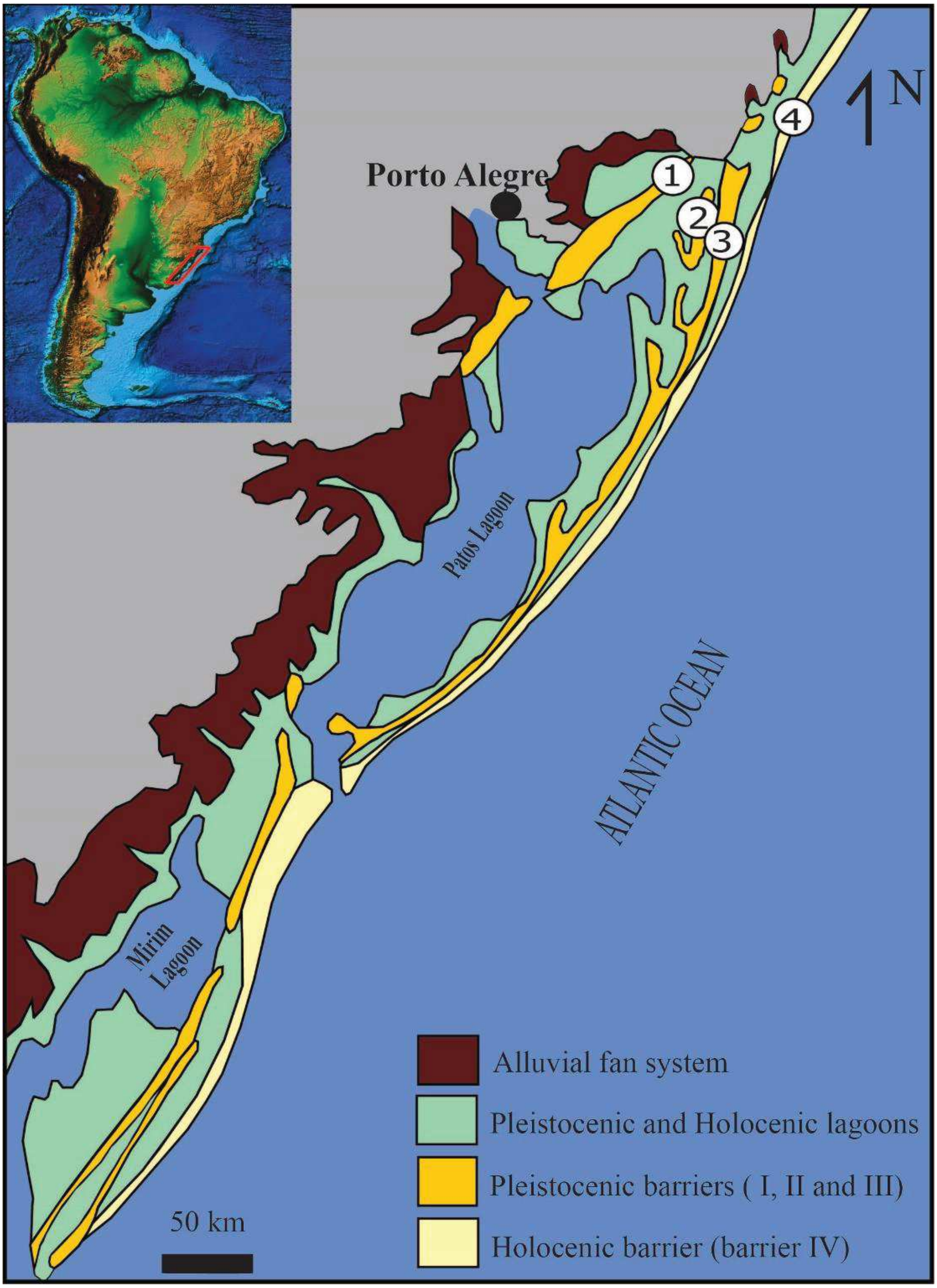


Figure 1. Simplified geological map of the (modified from Tomazelli and Villwock, 2000).

Materials and Methods

Based on the sedimentological mapping carried at the 1:100.000 scale, eight samples were collected for in situ U-Pb zircon geochronology in the northern portion of the barrier-lagoon system of the coastal plain. Unconsolidated samples of aeolian and marine facies were collected from each barrier (Fig. 1).

All samples were sieved and divided into two fractions: 80-170 mesh and 170 -230 mesh, summing up 16 subsamples. Zircons were separated from each fraction using conventional heavy liquids and magnetic procedures. Zircon grains were handpicked and mounted in epoxy discs, ground and polished until the minerals were just revealed and, subsequently, photomicrographed in transmitted and reflected light. Images were also taken in scanning electron microscope under backscattered electrons (BSE) and cathodeluminescence (CL).

All zircons were dated using a LA-SF-ICP-MS (Thermo-Finnigan Element 2) coupled to a CETAC213 ultraviolet laser system. Laser spot size of 20 μm was used and data acquired in peak jumping mode during 20 s background measurement followed by 20 s sample ablation.

Raw data were corrected for background signal and laser-induced elemental fractional, and instrumental mass discrimination corrected by the reference zircon (BB) (Santos et al., 2017). The common Pb correction was based on the Pb composition model (Stacey and Kramers, 1975). The data obtained in LA-SF-ICP-MS had their uncertainty propagation and data reporting according (Horstwood et al., 2016). Plešovice and GJ-1 zircon standards were used to evaluated the accuracy and precision, yielding concordant ages between 338.6±1.2 and 339± 1.8 (n= 213) and 601.8± 2.4 and 605± 2.2 Ma (n= 204), respectively, which are similar to suggested age of Plešovice zircon 337 ± 0.37 Ma (Sláma et al., 2008) and GJ-1 zircon 608.5 ± 1.5 Ma (Jackson et al., 2004). The external error is calculated after propagation error of the BB mean percentages and the individual sample zircon (or spot). Santos et al. (2017)

described the detailed analytical methods and data treatment. Isoplot-Ex 4.15 software (Ludwig, 2012) was used to produce histograms and relative probability plots. The U-Pb zircon data are found in the supplementary material (S1 Table U-Pb data).

Results

We analyzed 1,625 grains of zircon in all 16 subsamples by U-Pb in zircon by LA-SF-ICP-MS (data in supplementary material, S1 Table U-Pb data) concordance (100 ± 10%). These samples are representative of the four coastal barriers (I, n = 472 (marine = 238; aeolian= 234); II, n= 381 (marine = 174; aeolian = 207); III, n=365 (marine = 177; aeolian = 188) and IV, n= 407 (marine = 235; aeolian = 172). They were numbered according to the ages, from the oldest (I) to youngest (IV) barrier of the northern portion of lagoon-barrier system of the RSCP (Fig. 1). Obtained ages range from 1 ±1Ma to 3345±45 Ma, and were grouped according to the main tectonic cycles of the South America Shelf (S2 Table Tectonic Cycle Distribution).

The zircon distribution ages of all analyzed grains (1,625) are similar in the four analyzed barriers, and include the following populations: (i) Neoproterozoic (44 %), (ii) Paleoproterozoic (12%), (iii) Mesoproterozoic (10%), Early Paleozoic (8%), Neopaleozoic (8%), Triassic-Paleogene (6%), Archean (4%), Neogene-Quaternary (3 %). Figure 2, shows the most representative zircons found in the sand barriers. Figure 3, displays the overall detrital zircon record of the barriers with main described populations. The supplementary material (S2 Table Tectonic Cycle Distribution and S3 Barriers) are the individual analyses for each barrier (marine and aeolian facies).

In the barrier I, both in aeolian and marine sediments, there are few Andean zircons grains (0.4%), while the barrier II to IV the amount is significantly higher (from 3.5 to 4.5 %). On the other hand, zircons crystallized between 541 to 500 Ma

(Pampean cycle) and 541-1000 Ma (Neoproterozoic of Early Brasiliano and Brasiliano cycles) have a more significant contribution (~11-16 % and ~ 50%, respectively) compared to the barriers II to IV.

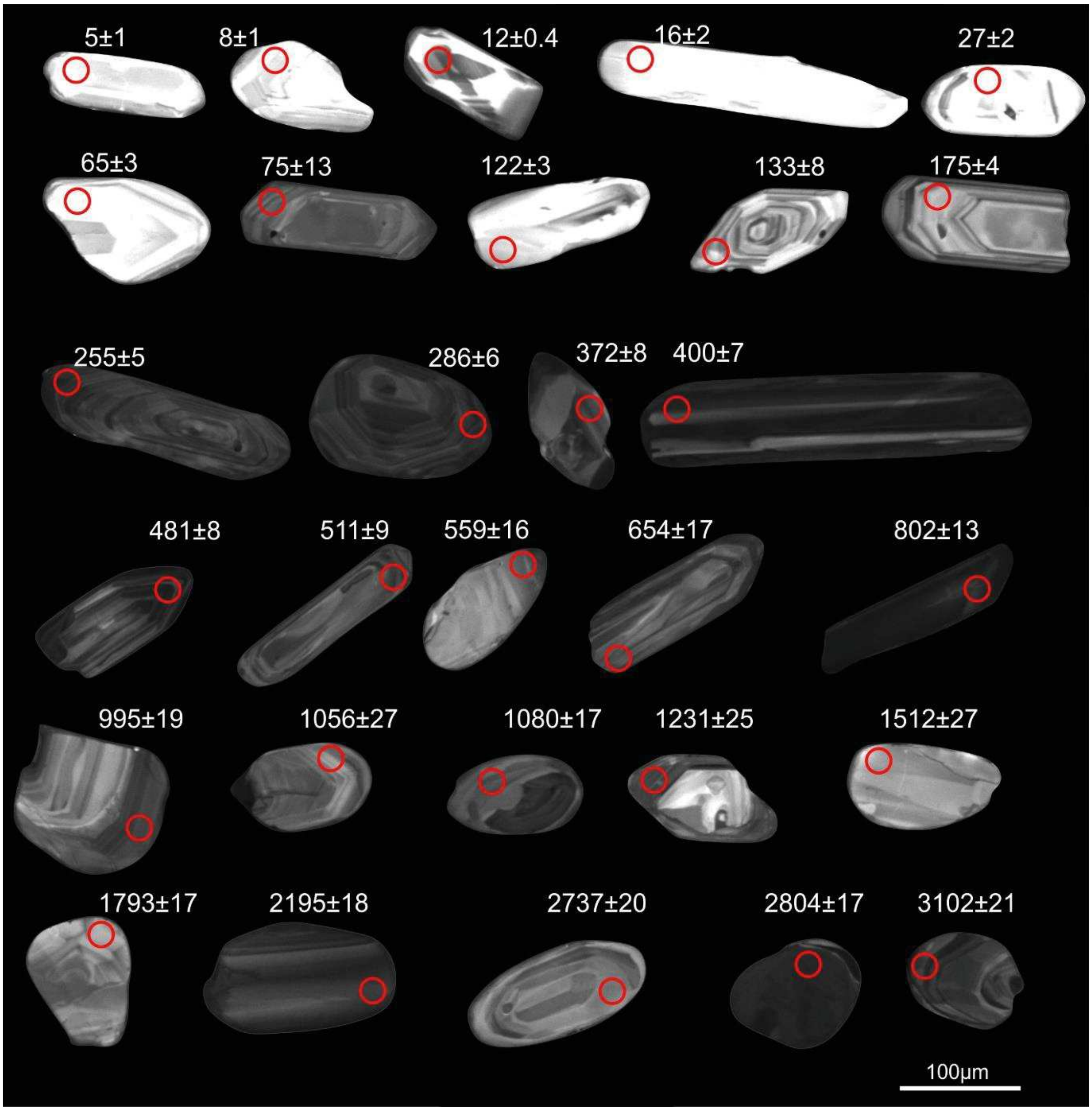


Figure 2. Representative cathode luminescence (CL) images of analysed zircons from the Quaternary barriers, with age and error in Ma (spot size 20 μm).

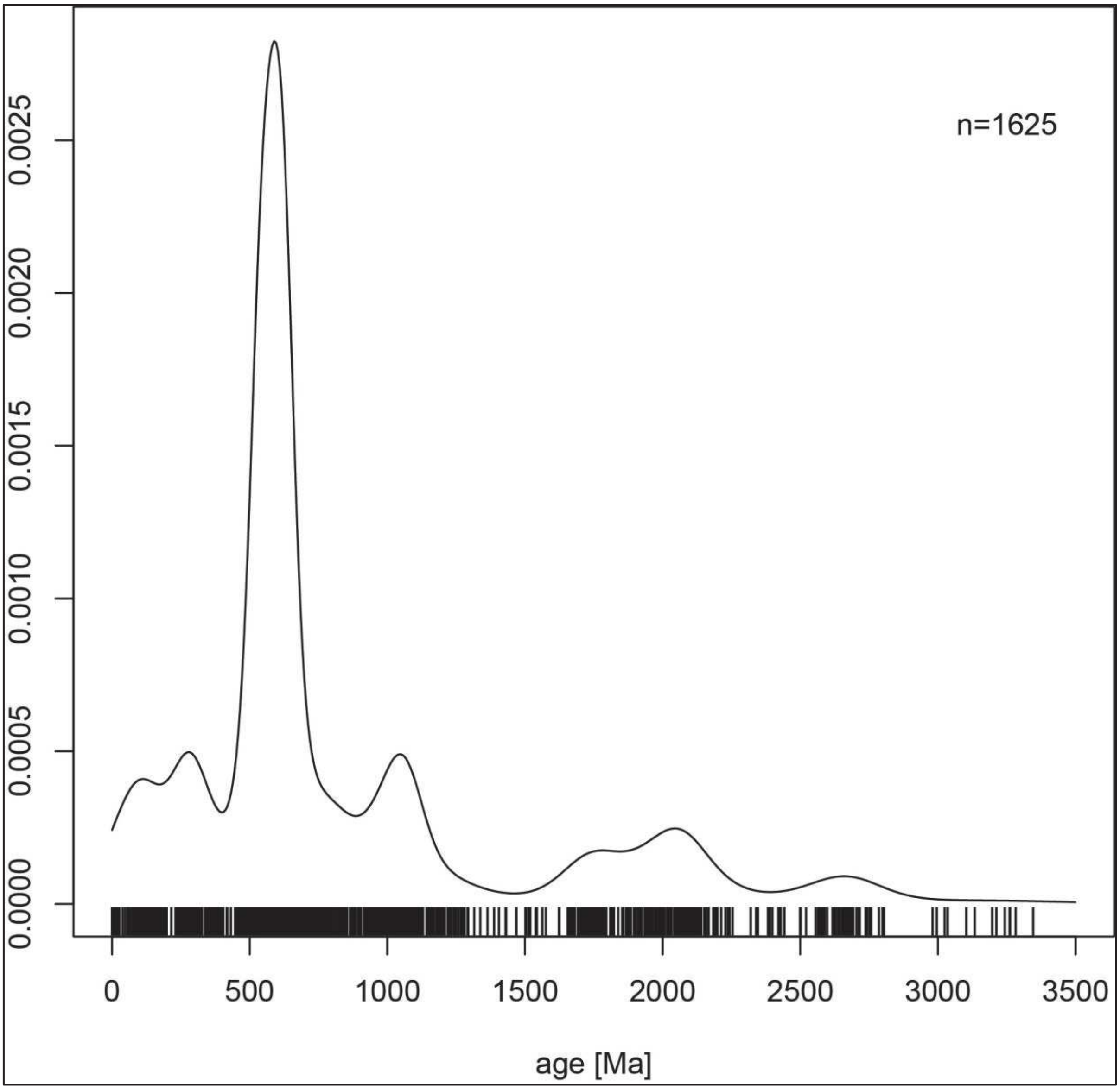


Figure 3. Normalized probability plot of detrital zircon ages from barriers I to IV, including aeolian and marine sediments and 80-170 mesh and 170-230 mesh fractions (16 subsamples). The zircon age distribution pattern comprises a dominant Neoproterozoic source and subordinate Archean, Paleoproterozoic, Mesoproterozoic, Paleozoic and Meso-Cenozoic sources.

The analyses of Phanerozoic zircons (< 500 Ma) gave a significant clue to the provenance of the sediments of the studied barriers. The zircon age distribution pattern shows five central populations corresponding to Ordovician, Silurian-Devonian, Devonian-Early Triassic, Mesozoic, and Cenozoic ones (Fig. 4).

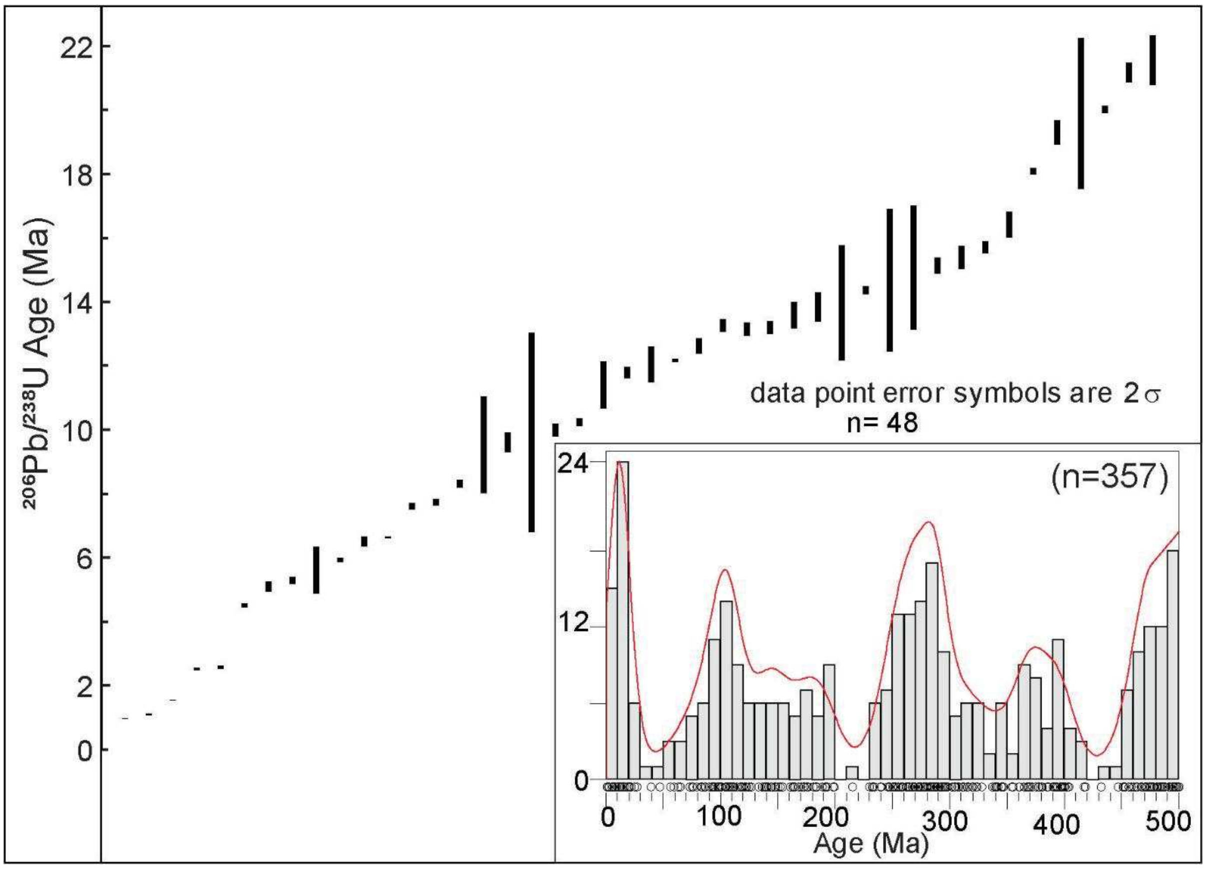


Figure 4. $^{206}Pb/^{238}U$ age diagram (with error bar) for the youngest zircons (n= 48 from 1625) from the coastal plain barrier sediments. The insert is a normalized probability plot of detrital zircon ages younger than 500 Ma (n=357 from 1625) showing 5 main populations of Early Paleozoic (Pamepean and Famatinian), Neopaleozoic (Gondwanides), Mesozoic (Andean + Paraná lava flows) and Cenozoic (Andean) eras.

Characterization of source areas

Due to the geographical proximity, we can assume that the igneous and metamorphic rocks of the Uruguay/Rio Grande do Sul Shield and volcano-sedimentary rocks of the Paraná Basin would be the first potential sources for sediments of the RSCP and the Rio Grande Fan. In this way, we would expect to find zircons with Paleoproterozoic, Neoproterozoic and Mesozoic ages (Paraná volcanism) (e.g. Chemale Jr., 2000; Hartmann et al., 2007; Basei et al., 2000; Phillip et al., 2016). The first approach is that the sediments of RSCP would be transported to the shelf by the

Jacuí and Camaquã rivers during lowstand stage (Dillenburg and Barboza, 2014 and references therein). However, the geochronological results suggest a distinct reasoning based on the fact that (1) a significant proportion of analyzed zircons yielded U-Pb ages that are not present in the transported sediments by drainage system of these rivers. Actually, Mesoproterozoic, Paleozoic and Neogene-Quaternary zircons correspond around 40% of the total analyzed grains., (2) the aeolian and marine sediments of the RSCP are composed of mature and well-classified grains, including up over 99% of rounded quartz grains; (3) the sediments feeded by the Jacuí and Camaquã rivers would be mostly immature ones since they are just very close to the source (less than 200-300 km).

Data on the interaction of atmospheric dynamics with the South Atlantic Ocean show that the dominant swell produces strong longshore current, from Argentina (south) to southern Brazil (e.g. Tomazelli and Villwock, 1992; Siegle and Asp, 2007). Thus, the extensive continental drainage network that merges into the La Plata River estuary (500 km southward the analyzed section) appears as a potential sediment collector to feed the coastal barriers system (Tomazelli, 1978; Corrêa et al., 2008). Thus, this estuary is fed with sediment material transported through the rivers that drain northern Argentina, Uruguay, Paraguay, southern Bolivia and southern central Brazil (Fig. 5A). The main rivers are Paraguay, Uruguay and Paraná that gather sediments from 40 % of South America Shelf, and also from the of Andean Mountains.

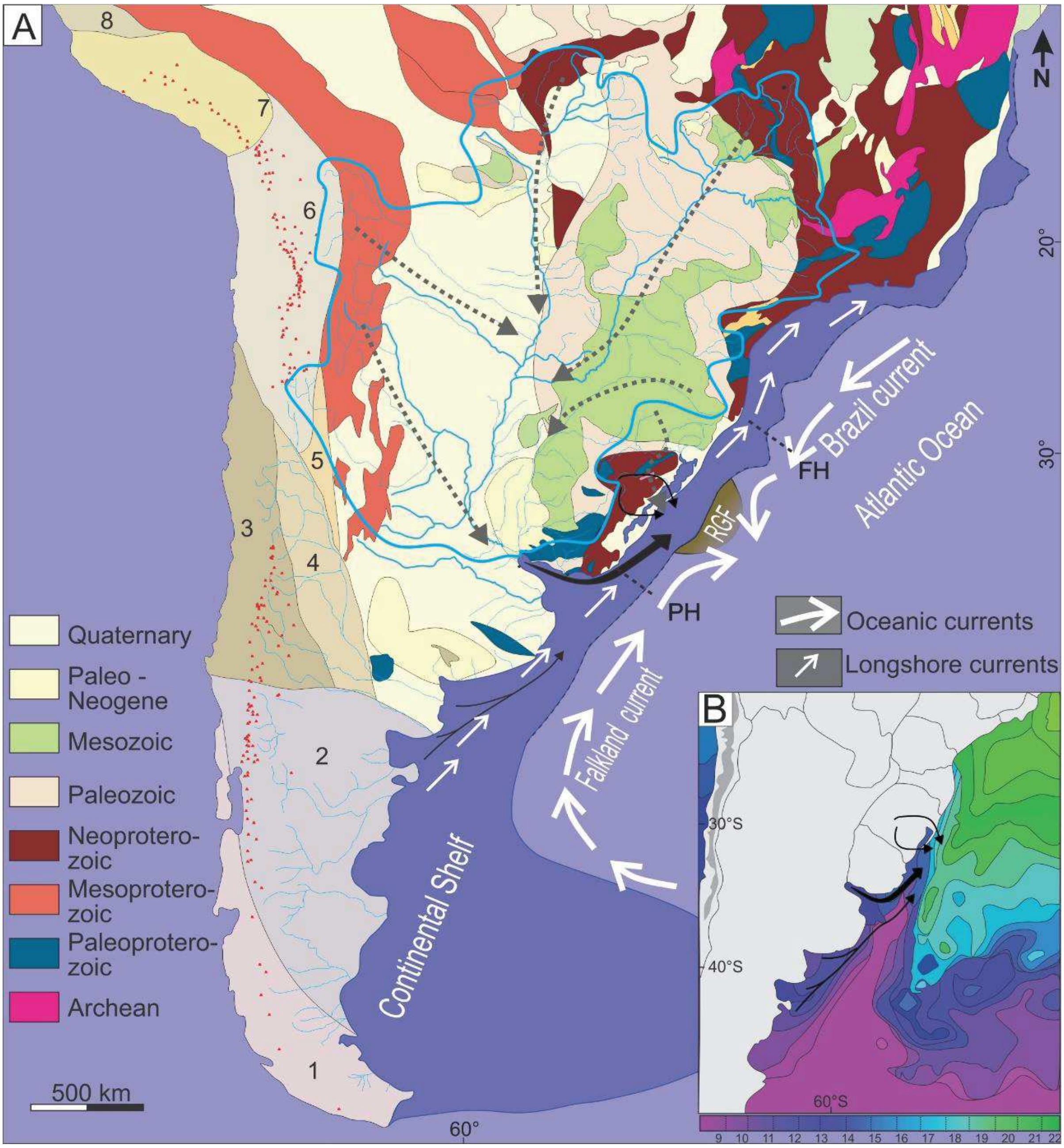


Figure 5. A) Simplified map of South America with main tectonic domains and Andean volcanism, where (1) Southern Patagonia; (2) Patagonia; (3) Chilenia; (4) Cuyania; (5) Famatina; (6) Arequipa; (7) Antofalla; (8) Paracas (compiled from Ramos, 2008; Bahlburg et al., 2009 and Cordani et al., 2016). In the Atlantic Domain are shown the cold Falkland and warm Brazil currents during the lowstand sea level periods. The Pelotas Basin is limited by the Polonio (PH) and Florianópolis highs (FH) where is located the Rio Grande Submarine Fan (RGF). The significant sediment transport is given by the thicker arrows. B) Present-day Brazil and Falkland currents confluence zone with the water temperature. Durins high stand stages (present-day situation, Fig. 5B) the bedload sediments are stocked in the drainage systems,

such as in the bay head delta on the La Plata River estuary and at the inner portion of the Patos Lagoon (deltas of Jacuí and Camaquã rivers). The confluence of Falkland cold bottom current and Brazil warm surface current takes place around 38° Latitude South (Fig. 5B). During the lowstand sea level, the estuarine and deltaic sediments are transferred to the continental shelf. In the subsequent transgressive event, the sands are transported northward by the longshore currents and deposited in the Coastal Plain. During the lowstand stages (glacial periods), the convergence zone is to the North, at 33° Latitude South (as represented in the Fig. 5A). So, the fine sediments are transported northwards up to the zone of cold and warm water transition zone, where the clay and silt particles flocculate and are, therefore, deposited, originating the Rio Grande Submarine Fan (RGF).

As a fundamental point of our analysis, the drainage associated with the La Plata estuary contains zircon grains from primary and secondary sources (igneous, sedimentary and metamorphic rocks) which are also found in the Quaternary barriers of southern Brazil (Fig. 5A). Despite the proximity between the Jacuí and Camaquã and the RSCP, these sources contribute in a small proportion (< 10 %) due to: (i) their a small drainage area compared the RLP drainage system (Fig. 5A and B), (ii) the presence of Neogene zircons (Fig. 4; 48 from 1,625 concordant zircons) are exclusive form the Andean Mountains, therefore can be transported only by the La Plata River drainage system, (iii) ca 40% of analyzed zircons have Eopaleozoic, Neopaleozoic, and Mesoproterozoic ages which are more common in the basement terranes of the Andean Mountains as described by several authors (e.g., Ramos, 2008; Balburgh et al., 2009)

So, to feed the barrier system, we can indicate a distant source, linked to the entire drainage network that supplies the La Plata River estuary, with more than $3x10^6$ km^2 of the middle part of South America and up to 59.13×10^6 ton/yr of silt and clay sediments (Ayup, 1987). Therefore, at times of high sea level, such as the current one, bay head delta stores a large volume of sediments. The most local source, linked to the Jacuí and Camaquã rivers drainage, with an area of 250,000 km^2, presents smaller sediment volume when compared to the La Plata estuary.

In low sea level phases (glacial events), the sediments stored in bay head delta and even in the deltas of the Jacuí and Camaquã rivers, inside Lagoon Patos, were transferred to the continental shelf, forming wave-influenced lowstand deltas. In the later transgressive pulse (at the end/reduction of the glacial event), the continued opepercentagen of the south-north longshore current, progressively moves the sands northwards to the RSCP (e.g., Dillenburg and Barboza, 2014). In this sense, the sediments deposited directly by the Camaquã and Jacuí rivers influenced by longshore current, would also be directed toward the north. Thus, almost all the sediments that form the Quaternary barriers in the studied region would come from the estuary of the La Plata River.

Ages younger than 40 Ma are associated only with the denudation processes that currently occur in the Andes (see Fig. 5A). In this case, the presence of 50 zircons younger than 40 Ma of a total of 1,625 analyzed is, meaningful (Fig. 4). At the same time, the zircons formed between 500 and 240 Ma are mostly derived from rocks generated in the Famatinian and Gondawanides cycles (e.g., Ramos, 2008; Bahlburg et al., 2009), while a large portion of Mesoproterozoic zircons can also have the same origin (Fig. 5A). It is essential because there is a minimal occurrence of Mesoproterozoic rocks in the U-RGS shield, as those of 1.57 Ga (Chemale et al., 2011) or 1.0-1.2 Ga (Basei et al., 2000). Besides, within the other cycles, ages common to the Uruguay/Rio Grande do Sul shield also occur associated with the Andean drainage (Pepper et al., 2016).

Role of atmospheric and oceanic circulation on transport and accumulation in the Rio Grande Fan

As we have seen, at low sea level the sediments stored in the bay head delta of the estuary are transferred to the continental shelf and redistributed northward by longshore currents. The same explanation cannot be conjectured for the fine-grained, suspended load. The river plume surpasses the breaker zone, advancing toward the distal part of the shelf and even over the slope.

The analysis of ocean currents from northern Argentina to southern Brazil shows that the confluence between the Falkland cold current and the warm Brazil current (to the south), occurs between the latitudes of 35° to 38°S (Peterson and Stramma, 1991; Stramma and England, 1999). Falkland ocean current is a bottom stream, originating from the Antarctic Circumpolar Current, with relatively low salinity (~ 33.5‰), temperatures from 4^{o} to 15^{o}C. It sweeps the outer shelf and slope as turbulent flow with velocity between 0.5 and 1 m/s. The Brazil Current runs on the ocean surface, usually confined to the upper 600 meters of the water column, with temperatures between 18^{o} and 28^{o}C and salinity around 37‰. Compared to the Falkland Current, it carries little sediment in suspension.

Studies on planktonic foraminiferal assemblages aged 120 to 300 Ky suggest that during colder phases and glacial episodes, the Falkland Current temperature, near to the estuary of the La Plata River, was 4 to 6 degrees colder than at present. Based on these data, Laprida et al., (2011) suggested that the confluence had moved further north, toward Uruguay and southern Brazil. Thus, during lowstand sea level (i.e. glacial episodes), the plume of fines on the outer shelf and slope of the La Plata River is caught by the Falkland Current and transported northwards. At the confluence of the Falkland and Brazil currents, a fast increase in temperature and salinity leads to flocculation of the fine-grained material and its deposition, as suggested by Sutherland et al., (2014) in experimental work with clay minerals.

Thus, the construction of the Rio Grande Fan seems to be related to the northward migpercentagen of the confluence zone of the Falkland and Brazil currents during cold, glacial events. In these episodes, the sediments of the La Plata River were carried north to the confluence with the Brazil Current, where they flocculate and are deposited. The sediments of the fine local plume, related to the Camaquã and Jacuí rivers, generated practically in the confluence region, can be carried directly to the Rio Grande Fan.

Conclusions

Geochronological data obtained from sediments of the RSCP provide very important clues to unravel the tectono-sedimentary evolution of the region and fit a series of processes that occurred in the southern hemisphere in the last 10-12 Ma, when deposition of the Rio Grande Fan initiated. These processes resulted in a marked increase of the Andean belt (subduction of the Nazca plate), the formation of the Antarctic Circumpolar Current (from the opening of Scotia arch), the current pattern of atmospheric and oceanic circulation in the South Atlantic and the isolation of Antarctica (polar cap formation). All together, these factors contributed to the formation of RSCP and Rio Grande Fan with a major sediment feeding through the La Plata River drainage network washing the Andean basement terranes (such as Grenvilian, Famatinian, Gondwanides), Meso-Cenozoic Andean units, and Precambrian rocks and Mesozoic and Paleozoic rocks of the South American Shelf. The sediment supply from adjacent basement rocks of Rio Grande do Sul Shield, by the Camaquã and Jacuí rivers, are minor component since most of these sediments were always transported northward by the longshore currents.

The formation of Antarctic Circumpolar Current led to the emergence of the Falkland Current where as the subtropical atmospheric circulation in the South Atlantic conditioned the development of the Brazil Current. The variation in the volume of the Antarctica ice cap led to sea level fluctuations and oceanic and atmospheric changes that allow north-south migpercentagen of the Falkland and Brazil currents convergence zone. So, the confluence of the cold and warm currents during lowstand periods at Latitude between 31°-33° and resulted, during the Late Miocene (~ 12-10 Ma), in the initial deposition of the Rio Grande Fan. The RGF is composed of clay and silt material transported by the La Plata River estuary by the Falkland Current and deposited at the confluence due to change of salinity and density induced by the mixing with warm Brazil current.

Acknowledgments

We would like to acknowledge the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) for the scholarship to the first author (JJC). We would like to thank the Microanalysis Laboratory of the Universidade Federal de Ouro Preto for SEM-EDS analyses.

References

An, Z., Kutzbach, J.E., Prell, W.L., Porter, S.C., 2001. Evolution of Asian monsoons and phased uplift of the Himalaya-Tibetan plateau since Late Miocene times. Nature 411, 62–66. doi:10.1038/35075035

Ayup, R., 1987. Intercâmbio sedimentar entre o Rio de la Plata Exterior e a Plataforma Continental Adjacente. Pesquisas em Geociências 19 (19), 105-126.

Bahlburg, H., Vervoort, J.D., Du Frane, S.A., Bock, B., Augustsson, C., Reimann, C., 2009. Timing of crust formation and recycling in accretionary orogens: Insights learned from the western margin of South America. Earth-Science Rev. 97, 215–241. doi:10.1016/j.earscirev.2009.10.006

Barboza, E.G., Rosa, M.L.C. da C., Aypup-Zouain, R.N., 2008. Cronoestratigrafia da Bacia de Pelotas: uma revisão das sequências deposicionais. Gravel 6, 125-138.

Basei, M.A.S., et al., 2000. The Dom Feliciano Belt of Brazil and Uruquay and its foreland domain, the Rio de la Plata Craton. In: Cordani, U.G., Milani, E.J., Thomaz Filho, A., Campos, D.A. (Eds.), Tectonic Evolution of South America. 311–334.

Bueno, G.V., Zacharias, A.A., Oreiro, S.G., Cupertino, J.A., Falkenhein, F.U.H., Martins-Neto, M.A., 2007. Bacia de Pelotas. Boletim de Geociências da Petrobrás. 15, 551–559, https://academic.oup.com/gji/article-lookup/doi/10.1111/j.1365-246X.2005.02726.x.

Castillo, L.L.A., Kazmierczak, T.S., Chemale, F., 2009. No Title. Earth Sci. Res. J. 13, 40–53. doi:10.15446/esrj

Chemale Jr., F., 2000. Evolução Geológica do Escudo Sul-Rio-Grandense. In: Holz, M., De Ros, L.F. (Eds.), Geologia do Rio Grande do Sul, Editora UFRGS, Porto Alegre, 13–52.

Chemale, F., Philipp, R.P., Dussin, I.A., Formoso, M.L.L., Kawashita, K., and Berttotti, A.L., 2011. Lu–Hf and U–Pb age determination of Capivarita Anorthosite in the Dom Feliciano Belt, Brazil: Precambrian Research. 186, 117–126, doi: 10.1016/j.precamres.2011.01.005.

Cordani, U.G., Ramos, V.A., Fraga, L.M., Cegarra, M., Delgado, I., Souza, K.G., Gomes, F.E.M., Schobbenhaus, C. 2016, Tectonic Map of South America.

Corrêa, I., Ayup-Zouain, Weschenfelder, J., Tomazelli, L.J., 2008. Áreas Fontes dos Minerais Pesados e sua Distribuição sobre a Plataforma Continental Sul-brasileira, Uruguaia e Norte-argentina. Rev. Pesqui. em Geociências. 35, 137-150.

Curray, J.R., Emmel, F.J., Moore, D.G., 2002. The Bengal Fan: morphology, geometry, stratigraphy, history and processes. Mar. Pet. Geol. 19, 1191–1223. doi:10.1016/S0264-8172(03)00035-7

Damuth, J.E., Kumar, N., 1975. Amazon Cone: Morphology, Sediments, Age, and Growth Pattern. Geol. Soc. Am. Bull. 86, 863. doi:10.1130/0016-7606(1975)86<863:ACMSAA>2.0.CO;2

Dias, J.L., Sad, A.R.E., Fontana, R.L., Feijó, F.J., 1994. Bacia de Pelotas: Boletim de Geociências da Petrobrás, 8, p. 1994.

Dillenburg, S.R., Barboza, E.G., 2014. The strike-fed sandy coast of Southern Brazil. Geol. Soc. London, Spec. Publ. 388, 333–352. doi:10.1144/SP388.16

Fontana, R.L., 1996. Geotectônica e Sismoestratigrafia da Bacia de Pelotas e Plataforma de Florianópolis. Tese de Doutorado. UFRGS. Porto Alegre, RS. 214p.

Galloway, W.E., Whiteaker, T.L., Ganey-Curry, P., 2011. History of Cenozoic North American drainage basin evolution, sediment yield, and accumulation in the Gulf of Mexico basin. Geosphere 7, 938–973. doi:10.1130/GES00647.1

Gaucher, C., Frei, R., Chemale, F., Frei, D., Bossi, J., Martínez, G., Chiglino, L., Cernuschi, F., 2011. Mesoproterozoic evolution of the Río de la Plata Craton in Uruguay: at the heart of Rodinia? Int. J. Earth Sci. 100, 273–288. doi:10.1007/s00531-010-0562-x

Ghignone, J.Í., 1960, Reconhecimento gravi-magnético na bacia de pelotas: Boletim Técnico da Petrobrás, v. 3, p. 73–79.

Hartmann, L.A., Chemale Jr., F., Philipp, R.P., 2007. Evolução geotectônica do Rio Grande do Sul no Pré-Cambriano. In: Iannuzzi, R., Frantz, J.C. (Eds.), 50 Anos de Geologia: Instituto de Geociências. Contribuições. Porto Alegre, Comunicação e Identidade, pp. 97–123.

Hoorn, C., Bogotá-A, G.R., Romero-Baez, M., Lammertsma, E.I., Flantua, S.G.A., Dantas, E.L., Dino, R., do Carmo, D.A., Chemale, F., 2017. The Amazon at sea: Onset and stages of the Amazon River from a marine record, with special reference to Neogene plant turnover in the drainage basin. Glob. Planet. Change 153, 51–65. doi:10.1016/j.gloplacha.2017.02.005

Horstwood, M.S.A., Košler, J., Gehrels, G., Jackson, S.E., McLean, N.M., Paton, C., Pearson, N.J., Sircombe, K., Sylvester, P., Vermeesch, P., Bowring, J.F., Condon, D.J., Schoene, B., 2016. Community-Derived Standards for LA-ICP-MS U-(Th-)Pb Geochronology - Uncertainty Propagation, Age Interpretation and Data Reporting. Geostand. Geoanalytical Res. 40, 311–332. doi:10.1111/j.1751-908X.2016.00379.x

Jackson, S.E., Pearson, N.J., Griffin, W.L., Belousova, E.A., 2004. The application of laser ablation-inductively coupled plasma-mass spectrometry to in situ U–Pb zircon geochronology. Chem. Geol. 211, 47–69. doi:10.1016/j.chemgeo.2004.06.017

Janasi, V. de A., de Freitas, V.A., Heaman, L.H., 2011. The onset of flood basalt volcanism, Northern Paraná Basin, Brazil: A precise U-Pb baddeleyite/zircon age for a Chapecó-type dacite. Earth Planet. Sci. Lett. 302, 147–153. doi:10.1016/j.epsl.2010.12.005

Laprida, C., Chapori, N. G., Chiessi, C. M., Violante, R. A., Watanabe, S., Totah, V., 2011. Middle Pleistocene sea surface temperature in the Brazil-Malvinas Confluence Zone: Paleoceanographic implications based on planktonic foraminifera, Micropaleontology. 57 (2),183-195.

Ludwig, K.R., 2012. User’s Manual for Isoplot 3.75, a geochronological toolkit for Microsoft Excel: Berkeley Geochronology Center Special Publication, 5, p. 1-72.

Martins, I. da R., 1984. Modelo sedimentar do Cone de Rio Grande. Pesquisas em Geociências, 16, 91–189.

Nittrouer, C. a., DeMaster, D.J., 1996. The Amazon shelf setting: tropical, energetic, and influenced by a large river. Cont. Shelf Res. 16, 553–573. doi:10.1016/0278-4343(95)00069-0

Pepper, M., Gehrels, G., Pullen, A., Ibanez-Mejia, M., Ward, K.M., Kapp, P., 2016. Magmatic history and crustal genesis of western South America: Constraints from U-Pb ages and Hf isotopes of detrital zircons in modern rivers. Geosphere. 12, 1532–1555. doi:10.1130/GES01315.1

Peterson, R. G., Stramma, L., 1991. Upper-level circulation in the South Atlantic Oceano Progr Oceanogr. 26 (1), 1-73.

Philipp, R.P., Pimentel, M.M., and Chemale Jr, F., 2016. Tectonic evolution of the Dom Feliciano Belt in Southern Brazil: Geological relationships and U-Pb geochronology. Brazilian Journal of Geology. 46, 83-104, doi: 10.1590/2317-4889201620150016.

Ramos, V.A., 2008. The Basement of the Central Andes: The Arequipa and Related Terranes. Annu. Rev. Earth Planet. Sci. 36, 289–324. doi:10.1146/annurev.earth.36.031207.124304

Santos, M.M., Lana, C., Scholz, R., Buick, I., Schmitz, M.D., Kamo, S.L., Gerdes, A., Corfu, F., Tapster, S., Lancaster, P., Storey, C.D., Basei, M.A.S., Tohver, E., Alkmim, A., et al., 2017. A New Appraisal of Sri Lankan BB Zircon as a Reference Material for LA-ICP-MS U-Pb Geochronology and Lu-Hf Isotope Tracing: Geostandards and Geoanalytical Research, 1–24, doi: 10.1111/ggr.12167.

Shanmugam, G., 2016. Glossary: A supplement to “Submarine fans: A critical retrospective (1950–2015)” in the Journal of Palaeogeography (2016, 5[2]). J. Palaeogeogr. 5, 258–277. doi:10.1016/j.jop.2016.05.007

Shanmugam, G., Moiola, R.J., 1988. Submarine fans: Characteristics, models, classification, and reservoir potential. Earth-Science Rev. 24, 383–428. doi:10.1016/0012-8252(88)90064-5

Siegle, E., and Asp, N.E., 2007. Wave Refraction and Longshore Transport Patterns along the Southern Santa Catarina Coast. Braz. J. Oceanogr. 55(2), 109-120.

Sláma, J., Košler, J., Condon, D.J., Crowley, J.L., Gerdes, A., Hanchar, J.M., Horstwood, M.S.A., Morris, G.A., Nasdala, L., Norberg, N., Schaltegger, U., Schoene, B., Tubrett, M.N., Whitehouse, M.J., 2008. Plešovice zircon — A new natural reference material for U–Pb and Hf isotopic microanalysis. Chem. Geol. 249, 1–35. doi:10.1016/j.chemgeo.2007.11.005

Stacey, J.S., Kramers, J.D., 1975. Approximation of terrestrial lead isotope evolution by a two-stage model. Earth Planet. Sci. Lett. 26, 207–221. doi:10.1016/0012-821X(75)90088-6

Stramma, L., England, M., 1999. On the water masses and mean circulation of the South Atlantic Ocean. J. Geophys. Res. Ocean. 104, 20863–20883. doi:10.1029/1999JC900139

Sutherland, B.R., Barrett, K.J., Gingras, M.K., 2014. Clay settling in fresh and salt water. Environ. Fluid Mech. 15, 147–160. doi:10.1007/s10652-014-9365-0

Tomazelli, L.J., 1978. Minerais pesados da plataforma continental do Rio Grande do Sul- Brasil. Acta Geológica Leopoldense. 2 (5),103-159.

Tomazelli, L. J., and Villwock, J.A., 1992, Considerações sobre a ambiente praial e a deriva litorânea de sedimentos ao longo do litoral norte do Rio Grande do Sul, Brasil. Pesquisas. 19, 3-12.

Tomazelli, L.J., and Villwock, J.A., 2000. Late quaternary geological history of Rio Grande do Sul coastal plain, Southern Brazil. Revista Brasileira de Geociências. 30, 470-472.

Tomazelli, L.J., Dillenburg, S.R., Villwock, J.A., Barboza, E.G., Bachi, F.A., Dehnhardt, B.A., Correa, M.L. da C.R., 2007. Sistemas deposicionais e evolução geológica da Planície Costeira do Rio Grande do Sul: uma síntese, in Iannuzzi, R. and Frantz, J.C. eds., 50 Anos de Geologia: Instituto de Geociências. Contribuições, Porto Alegre, p. 327–340.

Villwock, J.A., Tomazelli, L.J., Loss, E.L., Dehnhardt, E.A., Horn N.O., Bachi, F.A., Dehnhardt, B. A., 1986. Geology of the RS coastal province. Quaternary of South America and AntarticPenínsula. 4, 79-97.

Zerfass, G. de S. dos A., Chemale Jr., F., Moura, C.A.V., Costa, K.B., Kawashita, K., 2014. Strontium isotope stratigraphy of the Pelotas Basin. Brazilian J. Geol. 44, 23–38. doi:10.5327/Z2317-488920140001000

Material Suplementar

S1 – U-Pb Data

Sample: Marine Barrier 1, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 045	48228	2408	0	0	237	2	0.0499	1.3419	0.1986	1.7410	0.0289	1.1092	0.64	192	31	183	2	184	3	100
Sample 022	21598	1081	0	0	101	3	0.0500	1.8185	0.2081	2.1753	0.0302	1.1936	0.55	197	42	192	2	192	4	100
Sample 079	8306	422	0	0	32	3	0.0509	5.5654	0.2591	6.6133	0.0370	3.5724	0.54	234	128	234	8	234	14	100
Sample 119	64583	3301	0	0	241	1	0.0511	1.1933	0.2676	1.5242	0.0380	0.9484	0.62	246	27	240	2	241	3	100
Sample 128	58069	2990	0	0	208	1	0.0515	1.3983	0.2816	1.8168	0.0397	1.1599	0.64	263	32	251	3	252	4	100
Sample 102	61798	3180	0	0	219	2	0.0515	1.2245	0.2843	1.6118	0.0401	1.0482	0.65	261	28	253	3	254	4	100
Sample 012	108901	5492	117	2	367	1	0.0504	9.1327	0.2916	14.2339	0.0419	10.9178	0.77	215	212	265	28	260	33	102
Sample 018	91327	4955	0	0	219	1	0.0543	1.1058	0.4425	1.4557	0.0592	0.9467	0.65	382	25	370	3	372	5	100
Sample 058	49064	2693	0	0	109	1	0.0549	1.6764	0.4813	2.1735	0.0636	1.3834	0.64	407	38	398	5	399	7	100
Sample 122	218004	12492	0	0	379	0	0.0573	1.1169	0.6451	1.4231	0.0817	0.8818	0.62	503	25	506	4	505	6	100
Sample 052	109381	6243	429	1	188	0	0.0571	2.5252	0.6463	3.1631	0.0821	1.9049	0.60	494	56	509	9	506	13	101
Sample 084	21157	1217	0	0	36	1	0.0575	1.8248	0.6563	2.3161	0.0827	1.4263	0.62	512	40	512	7	512	9	100
Sample 053	74950	4348	0	0	128	2	0.0580	1.0860	0.6620	1.4538	0.0828	0.9665	0.66	530	24	513	5	516	6	99
Sample 042	67401	3896	0	0	115	2	0.0578	1.1417	0.6606	1.5107	0.0829	0.9894	0.65	523	25	513	5	515	6	100
Sample 126	146611	8471	1031	0	251	1	0.0578	1.4748	0.6604	1.9658	0.0829	1.2997	0.66	521	32	513	6	515	8	100
Sample 009	32400	1867	0	1	55	0	0.0576	3.7387	0.6599	4.5769	0.0831	2.6401	0.58	515	82	514	13	515	19	100
Sample 106	101936	5848	343	1	173	0	0.0574	3.0049	0.6598	3.6947	0.0834	2.1497	0.58	506	66	516	11	514	15	100
Sample 038	43818	2586	0	0	74	1	0.0590	1.3388	0.6795	1.7490	0.0835	1.1255	0.64	567	29	517	6	526	7	98
Sample 121	131162	7660	0	0	222	1	0.0584	1.0788	0.6737	1.4258	0.0837	0.9322	0.65	545	24	518	5	523	6	99
Sample 063	54472	3177	626	0	92	1	0.0583	1.9226	0.6758	2.4204	0.0841	1.4704	0.61	542	42	520	7	524	10	99
Sample 036	70165	4118	0	0	118	1	0.0587	1.1246	0.6804	1.4731	0.0841	0.9515	0.65	556	25	520	5	527	6	99
Sample 057	13501	780	0	0	23	1	0.0578	4.0650	0.6703	5.2247	0.0841	3.2822	0.63	523	89	520	16	521	22	100
Sample 095	221863	12819	0	0	372	1	0.0578	1.0557	0.6737	1.3865	0.0846	0.8988	0.65	521	23	523	5	523	6	100
Sample 036	117714	6891	0	0	197	0	0.0585	1.1104	0.6832	1.5374	0.0846	1.0633	0.69	550	24	524	5	529	6	99
Sample 016	41111	2402	0	0	68	1	0.0584	1.3523	0.6824	1.7052	0.0847	1.0387	0.61	546	30	524	5	528	7	99
Sample 032	51497	3004	0	0	86	1	0.0583	1.2001	0.6816	1.5869	0.0848	1.0383	0.65	542	26	524	5	528	7	99
Sample 038	58445	3377	0	0	98	1	0.0578	1.2807	0.6765	1.6775	0.0849	1.0834	0.65	521	28	525	5	525	7	100
Sample 099	47809	2807	0	1	80	2	0.0587	3.6747	0.6899	4.5408	0.0852	2.6675	0.59	557	80	527	14	533	19	99
Sample 130	105758	6173	0	0	176	1	0.0584	1.6447	0.6871	2.1942	0.0854	1.4525	0.66	544	36	528	7	531	9	99
Sample 044	73472	4249	766	0	121	1	0.0578	1.6994	0.6824	2.1413	0.0856	1.3028	0.61	523	37	529	7	528	9	100
Sample 058	70269	4087	0	0	116	4	0.0582	1.1692	0.6864	1.5881	0.0856	1.0748	0.68	536	26	529	5	531	7	100
Sample 040	55553	3230	0	0	91	1	0.0581	1.4104	0.6925	1.8847	0.0864	1.2501	0.66	535	31	534	6	534	8	100
Sample 063	169482	9908	640	0	275	1	0.0585	1.8191	0.7014	2.2789	0.0870	1.3727	0.60	547	40	538	7	540	10	100
Sample 104	69888	4098	0	0	114	1	0.0586	1.1255	0.7040	1.4974	0.0871	0.9877	0.66	554	25	538	5	541	6	99

Sample 062	132157	7703	3147	0	214	0	0.0583	1.1373	0.7006	1.4748	0.0872	0.9389	0.64	541	25	539	5	539	6	100
Sample 064	117209	6999	0	0	190	0	0.0597	1.0886	0.7221	1.4499	0.0877	0.9577	0.66	593	24	542	5	552	6	98
Sample 077	249812	14691	0	0	402	2	0.0588	1.0372	0.7152	1.4236	0.0882	0.9751	0.68	560	23	545	5	548	6	99
Sample 103	89554	5226	0	0	144	1	0.0584	1.1995	0.7120	1.6480	0.0885	1.1302	0.69	543	26	547	6	546	7	100
Sample 105	75888	4434	0	0	121	1	0.0584	1.1124	0.7149	1.4903	0.0887	0.9917	0.67	546	24	548	5	548	6	100
Sample 098	66360	3950	0	0	106	1	0.0595	1.1927	0.7323	1.6063	0.0892	1.0760	0.67	587	26	551	6	558	7	99
Sample 124	256253	15219	0	0	407	1	0.0594	1.1618	0.7307	1.6457	0.0892	1.1655	0.71	581	25	551	6	557	7	99
Sample 120	28148	1679	0	0	45	2	0.0596	1.8612	0.7351	2.4325	0.0894	1.5662	0.64	591	40	552	8	560	11	99
Sample 015	37131	2220	0	0	59	0	0.0598	1.3880	0.7385	1.7953	0.0896	1.1388	0.63	596	30	553	6	562	8	98
Sample 044	742587	43693	7407	0	1174	0	0.0588	1.0780	0.7278	1.4598	0.0897	0.9844	0.67	561	23	554	5	555	6	100
Sample 031	48013	2823	0	0	75	1	0.0588	1.2245	0.7293	1.5673	0.0900	0.9782	0.62	560	27	555	5	556	7	100
Sample 078	41199	2412	346	1	65	0	0.0586	2.9609	0.7265	3.5999	0.0900	2.0476	0.57	551	65	555	11	554	15	100
Sample 023	148640	8743	0	1	231	0	0.0588	3.5755	0.7356	4.3015	0.0907	2.3914	0.56	560	78	560	13	560	19	100
Sample 017	74593	4393	0	0	116	1	0.0589	1.1207	0.7408	1.4930	0.0912	0.9864	0.66	563	24	563	5	563	6	100
Sample 082	38072	2197	104	3	59	1	0.0577	9.1814	0.7262	10.8863	0.0913	5.8491	0.54	518	202	563	32	554	48	102
Sample 037	16613	988	0	0	26	1	0.0595	1.8163	0.7498	2.2407	0.0915	1.3120	0.59	584	39	564	7	568	10	99
Sample 065	128092	7620	0	0	197	0	0.0595	1.1094	0.7516	1.4963	0.0916	1.0040	0.67	585	24	565	5	569	7	99
Sample 057	63320	3725	0	0	97	2	0.0588	1.1729	0.7471	1.5265	0.0921	0.9771	0.64	561	26	568	5	567	7	100
Sample 075	58896	3433	129	2	90	1	0.0583	7.3422	0.7431	8.7061	0.0925	4.6785	0.54	541	161	570	26	564	38	101
Sample 034	206156	12211	0	1	316	1	0.0592	3.5302	0.7562	4.2414	0.0926	2.3510	0.55	576	77	571	13	572	19	100
Sample 042	89813	5379	0	0	136	0	0.0599	1.1187	0.7701	1.4774	0.0933	0.9650	0.65	600	24	575	5	580	7	99
Sample 054	76520	4577	0	0	116	5	0.0598	1.2874	0.7702	1.6608	0.0934	1.0493	0.63	597	28	576	6	580	7	99
Sample 086	40172	2403	0	0	61	2	0.0598	1.2707	0.7763	1.6978	0.0941	1.1260	0.66	597	28	580	6	583	8	99
Sample 107	26856	1620	0	0	40	1	0.0603	1.3926	0.7832	1.8040	0.0942	1.1469	0.64	615	30	580	6	587	8	99
Sample 123	90686	5431	0	0	137	4	0.0599	1.1187	0.7778	1.4851	0.0942	0.9767	0.66	600	24	580	5	584	7	99
Sample 040	153199	9157	0	1	228	4	0.0598	3.5132	0.7816	4.2013	0.0948	2.3039	0.55	595	76	584	13	586	19	100
Sample 014	23141	1379	0	0	35	2	0.0596	1.9124	0.7805	2.4939	0.0950	1.6007	0.64	589	41	585	9	586	11	100
Sample 033	2925	174	0	0	4	0	0.0594	7.6158	0.7823	8.8343	0.0956	4.4770	0.51	580	165	589	25	587	40	100
Sample 062	22400	1370	0	0	33	3	0.0612	1.7332	0.8094	2.3198	0.0960	1.5420	0.66	645	37	591	9	602	11	98
Sample 131	35003	2122	0	0	51	1	0.0606	1.3527	0.8076	1.7548	0.0966	1.1178	0.64	626	29	595	6	601	8	99
Sample 061	116915	7114	0	0	170	2	0.0609	1.1832	0.8145	1.5961	0.0971	1.0713	0.67	634	25	597	6	605	7	99
Sample 015	79364	4794	0	0	116	1	0.0604	1.2417	0.8103	1.6519	0.0973	1.0894	0.66	618	27	599	6	603	8	99
Sample 017	43848	2640	0	0	64	1	0.0602	1.2290	0.8087	1.5754	0.0974	0.9855	0.63	611	27	599	6	602	7	100
Sample 043	248323	14907	0	0	359	0	0.0600	1.0661	0.8078	1.3963	0.0976	0.9016	0.65	605	23	600	5	601	6	100
Sample 043	239335	14401	9001	0	346	1	0.0602	1.0519	0.8137	1.3972	0.0981	0.9197	0.66	610	23	603	5	605	6	100
Sample 041	103898	6297	0	0	150	1	0.0606	1.0889	0.8225	1.4619	0.0984	0.9754	0.67	625	23	605	6	609	7	99
Sample 041	71287	4267	316	1	102	1	0.0599	3.1339	0.8168	3.7497	0.0990	2.0590	0.55	598	68	608	12	606	17	100
Sample 101	109585	6635	0	0	157	1	0.0606	1.0900	0.8281	1.4444	0.0992	0.9477	0.66	623	24	610	6	613	7	100
Sample 046	44986	2537	241	1	64	2	0.0564	4.8321	0.7784	5.7723	0.1001	3.1575	0.55	468	107	615	19	585	26	105
Sample 030	100304	6065	1378	0	141	1	0.0605	1.4769	0.8353	1.9301	0.1002	1.2426	0.64	620	32	616	7	617	9	100
Sample 022	45691	2781	0	0	65	1	0.0609	1.6100	0.8432	2.1034	0.1005	1.3536	0.64	635	35	617	8	621	10	99
Sample 118	152474	9174	638	0	215	0	0.0602	1.7980	0.8335	2.2164	0.1005	1.2959	0.58	610	39	617	8	616	10	100
Sample 066	423177	25632	0	0	594	1	0.0606	1.0566	0.8436	1.4212	0.1010	0.9504	0.67	624	23	620	6	621	7	100
Sample 010	37833	2325	0	0	53	2	0.0615	1.2368	0.8561	1.5965	0.1010	1.0095	0.63	655	27	621	6	628	8	99
Sample 039	77839	4676	201	1	109	3	0.0601	4.6875	0.8369	5.4953	0.1011	2.8680	0.52	606	101	621	17	617	26	101
Sample 096	61523	3683	230	1	86	1	0.0599	4.1697	0.8351	4.9267	0.1012	2.6241	0.53	599	90	621	16	616	23	101

Sample 021	101230	6209	0	0	141	1	0.0613	1.1249	0.8563	1.4969	0.1013	0.9877	0.66	651	24	622	6	628	7	99
Sample 097	22355	1363	0	0	31	2	0.0610	1.4265	0.8620	1.8577	0.1025	1.1901	0.64	639	31	629	7	631	9	100
Sample 019	53868	3348	0	0	73	2	0.0622	1.1907	0.8888	1.5321	0.1037	0.9641	0.63	679	25	636	6	646	7	99
Sample 024	11232	697	0	1	15	1	0.0620	3.9166	0.8942	4.7010	0.1045	2.5999	0.55	676	84	641	16	649	23	99
Sample 021	60493	3706	0	0	82	0	0.0613	1.1263	0.8840	1.5020	0.1047	0.9937	0.66	648	24	642	6	643	7	100
Sample 083	48217	3012	0	0	65	1	0.0625	1.6491	0.9105	2.2002	0.1057	1.4565	0.66	690	35	648	9	657	11	99
Sample 053	223881	13860	0	0	298	0	0.0619	1.0661	0.9058	1.3982	0.1061	0.9047	0.65	671	23	650	6	655	7	99
Sample 076	46291	2871	0	1	61	2	0.0620	3.4379	0.9138	4.0475	0.1069	2.1362	0.53	675	74	654	13	659	20	99
Sample 059	150850	9302	761	0	197	1	0.0617	1.5967	0.9177	1.9634	0.1079	1.1425	0.58	663	34	661	7	661	10	100
Sample 020	10688	649	148	2	14	2	0.0607	6.7663	0.9113	7.9244	0.1088	4.1248	0.52	630	146	666	26	658	39	101
Sample 025	114112	7045	2123	0	145	1	0.0617	1.1635	0.9500	1.5198	0.1116	0.9778	0.64	665	25	682	6	678	8	101
Sample 051	84935	5354	0	0	106	1	0.0630	1.1580	0.9842	1.5229	0.1132	0.9891	0.65	710	25	691	6	696	8	99
Sample 064	33914	2186	292	1	42	1	0.0645	4.0426	1.0116	5.0486	0.1138	3.0242	0.60	757	85	695	20	710	26	98
Sample 011	67582	4253	0	0	80	2	0.0629	1.4461	1.0454	1.9300	0.1205	1.2782	0.66	706	31	733	9	727	10	101
Sample 019	476548	30490	0	0	551	0	0.0640	1.0785	1.0825	1.4668	0.1227	0.9942	0.68	741	23	746	7	745	8	100
Sample 020	81428	5350	0	0	93	0	0.0657	1.5068	1.1200	2.1522	0.1236	1.5367	0.71	797	32	751	11	763	12	98
Sample 088	37882	2521	0	0	40	1	0.0666	1.5026	1.2349	2.0018	0.1346	1.3226	0.66	824	31	814	10	817	11	100
Sample 033	96689	6644	487	1	93	1	0.0687	2.1037	1.3924	2.5694	0.1470	1.4752	0.57	890	43	884	12	886	15	100
Sample 059	76970	5431	0	0	73	1	0.0706	1.1054	1.4567	1.4829	0.1497	0.9884	0.67	945	23	899	8	913	9	99
Sample 055	405725	28401	0	0	370	1	0.0700	1.0286	1.5023	1.3749	0.1557	0.9123	0.66	928	21	933	8	931	8	100
Sample 055	437623	31490	4761	0	392	0	0.0720	1.0551	1.5615	1.3820	0.1574	0.8927	0.65	985	21	942	8	955	9	99
Sample 012	141469	10033	0	0	127	0	0.0709	1.0716	1.5445	1.4403	0.1580	0.9623	0.67	955	22	945	8	948	9	100
Sample 109	165851	11812	0	0	148	1	0.0712	1.0250	1.5626	1.3841	0.1591	0.9301	0.67	964	21	952	8	956	9	100
Sample 013	71507	5146	0	0	63	1	0.0720	1.0978	1.5821	1.4622	0.1595	0.9658	0.66	985	22	954	9	963	9	99
Sample 061	78162	5490	165	2	69	1	0.0702	4.9835	1.5540	5.5115	0.1605	2.3541	0.43	935	102	959	21	952	35	101
Sample 016	204358	14814	0	0	176	1	0.0725	1.1174	1.6439	1.4896	0.1645	0.9850	0.66	1000	23	982	9	987	9	99
Sample 018	70096	5119	0	0	59	1	0.0730	1.2598	1.6864	1.7440	0.1675	1.2061	0.69	1015	26	998	11	1003	11	99
Sample 054	181009	13164	1662	0	152	1	0.0727	1.1319	1.6924	1.4825	0.1688	0.9575	0.65	1006	23	1005	9	1006	10	100
Sample 117	133191	9701	808	0	110	2	0.0728	1.4376	1.7258	1.7665	0.1719	1.0266	0.58	1009	29	1022	10	1018	11	100
Sample 108	489238	35954	0	0	401	0	0.0735	1.0342	1.7522	1.3648	0.1729	0.8906	0.65	1027	21	1028	8	1028	9	100
Sample 065	512927	38495	0	0	412	1	0.0751	1.0260	1.8260	1.3543	0.1765	0.8841	0.65	1070	21	1048	9	1055	9	99
Sample 037	95034	7168	0	0	75	1	0.0754	1.0871	1.8646	1.4798	0.1793	1.0040	0.68	1080	22	1063	10	1069	10	99
Sample 060	415427	31083	5447	0	326	1	0.0748	1.0650	1.8566	1.4101	0.1800	0.9242	0.66	1064	21	1067	9	1066	9	100
Sample 011	237884	18119	20509	0	182	1	0.0762	1.0378	1.9422	1.3512	0.1849	0.8653	0.64	1100	21	1094	9	1096	9	100
Sample 087	98416	7549	0	0	75	1	0.0767	1.0691	1.9610	1.4368	0.1854	0.9599	0.67	1113	21	1097	10	1102	10	99
Sample 056	1114189	84975	1626	0	845	1	0.0763	1.0142	1.9681	1.5005	0.1872	1.1059	0.74	1102	20	1106	11	1105	10	100
Sample 013	261566	19835	1698	0	194	1	0.0758	1.1683	2.0035	1.5491	0.1916	1.0172	0.66	1091	23	1130	11	1117	11	101
Sample 074	60659	5354	0	0	36	2	0.0883	1.1102	2.8823	1.5555	0.2368	1.0894	0.70	1388	21	1370	13	1377	12	99
Sample 032	728217	71019	0	1	376	1	0.0975	2.2928	3.6796	2.5715	0.2736	1.1643	0.45	1577	43	1559	16	1567	21	100
Sample 035	164356	16699	0	0	83	1	0.1016	1.0630	3.8927	1.4647	0.2779	1.0076	0.69	1654	20	1581	14	1612	12	98
Sample 056	157599	16564	0	0	73	1	0.1051	1.1227	4.4153	1.5876	0.3047	1.1225	0.71	1716	21	1715	17	1715	13	100
Sample 081	94559	10132	411	1	43	1	0.1072	1.7363	4.6441	2.0684	0.3143	1.1241	0.54	1752	32	1762	17	1757	17	100
Sample 100	130613	14916	0	0	55	2	0.1142	1.0508	5.2722	1.4366	0.3348	0.9796	0.68	1867	19	1862	16	1864	12	100
Sample 014	275466	33334	0	0	108	1	0.1210	1.0743	5.9857	1.6137	0.3588	1.2042	0.75	1971	19	1976	21	1974	14	100
Sample 060	200615	27422	0	0	70	1	0.1367	1.0315	7.6090	1.4031	0.4037	0.9511	0.68	2186	18	2186	18	2186	13	100
Sample 129	618337	97473	562	1	197	0	0.1576	1.2680	9.6856	1.9488	0.4456	1.4799	0.76	2430	21	2376	29	2405	18	99

Sample 085	674634	120611	0	0	192	1	0.1788	0.9789	12.3009	1.4532	0.4990	1.0741	0.74	2642	16	2610	23	2628	14	99
Sample 125	359149	66137	0	1	99	1	0.1841	1.4832	13.0091	1.7891	0.5124	1.0005	0.56	2691	25	2667	22	2680	17	99
Sample 039	350008	64293	0	0	96	1	0.1837	1.0071	13.0952	1.3750	0.5170	0.9361	0.68	2686	17	2687	21	2687	13	100
Sample 023	1287377	240339	5342	0	351	1	0.1867	1.0037	13.4119	1.3522	0.5210	0.9062	0.67	2713	17	2704	20	2709	13	100
Sample 067	1035434	201991	314626	0	273	1	0.1951	1.0509	14.4729	1.3594	0.5381	0.8623	0.63	2785	17	2775	19	2781	13	100
Sample 080	141279	36615	0	0	31	1	0.2592	1.0225	23.1995	1.4506	0.6492	1.0289	0.71	3242	16	3225	26	3235	14	100

Sample: Eolic Barrier 1, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	^{207*}Pb/^{206*}Pb	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	^{207*}Pb/^{206*}Pb	*2σ*	^{206*}Pb/^{238}U	*2σ*	^{207*}Pb/^{235}U	*2σ*	*Conc. %*
Sample 020	701	34	0	0	52	1	0.0482	12.9956	0.0953	14.4910	0.0144	6.4111	0.44	108	307	92	6	92	13	99
Sample 040	1032	50	0	0	64	1	0.0484	8.5537	0.1142	9.8048	0.0171	4.7925	0.49	119	202	109	5	110	10	100
Sample 165	484	24	0	0	23	2	0.0493	24.1030	0.1487	27.7815	0.0219	13.8152	0.50	164	563	139	19	141	37	99
Sample 119	7760	382	0	0	361	2	0.0493	5.0152	0.1541	6.4492	0.0227	4.0546	0.63	160	117	145	6	146	9	99
Sample 096	5412	269	0	0	222	1	0.0497	6.8827	0.1762	8.6793	0.0257	5.2877	0.61	181	160	164	9	165	13	99
Sample 163	5151	263	0	0	144	1	0.0511	3.7806	0.2654	4.9081	0.0377	3.1300	0.64	243	87	239	7	239	11	100
Sample 079	5666	292	0	0	159	1	0.0515	3.6533	0.2676	4.8443	0.0377	3.1813	0.66	261	84	239	7	241	10	99
Sample 127	3001	154	0	0	81	1	0.0512	3.9672	0.2754	4.9570	0.0390	2.9721	0.60	248	91	247	7	247	11	100
Sample 059	17684	903	482	1	478	1	0.0511	2.7645	0.2751	4.4524	0.0391	3.4901	0.78	244	64	247	8	247	10	100
Sample 065	6439	330	0	0	170	1	0.0513	3.9361	0.2822	5.1752	0.0399	3.3601	0.65	255	90	252	8	252	12	100
Sample 123	2854	149	0	0	75	1	0.0521	6.8946	0.2875	8.6930	0.0400	5.2947	0.61	288	158	253	13	257	20	99
Sample 078	6000	309	0	0	154	1	0.0514	3.1700	0.2908	4.2485	0.0410	2.8286	0.67	260	73	259	7	259	10	100
Sample 126	1926	100	0	0	49	2	0.0517	7.7548	0.2957	9.5052	0.0415	5.4966	0.58	273	178	262	14	263	22	100
Sample 063	6876	357	0	0	171	1	0.0519	2.2732	0.3043	3.2376	0.0425	2.3053	0.71	281	52	268	6	270	8	99
Sample 146	2530	131	0	0	62	1	0.0517	3.5230	0.3049	4.4162	0.0428	2.6629	0.60	270	81	270	7	270	11	100
Sample 062	5996	310	0	0	146	1	0.0518	2.4725	0.3090	3.3837	0.0433	2.3100	0.68	275	57	273	6	273	8	100
Sample 162	11147	580	0	1	262	1	0.0520	4.3087	0.3218	6.5721	0.0449	4.9626	0.76	285	99	283	14	283	16	100
Sample 161	5099	267	0	0	118	1	0.0523	5.0890	0.3294	6.5714	0.0457	4.1575	0.63	297	116	288	12	289	17	100
Sample 035	6619	354	0	0	128	1	0.0535	3.1788	0.4021	4.3509	0.0545	2.9708	0.68	349	72	342	10	343	13	100
Sample 122	10992	627	0	0	185	1	0.0571	1.9457	0.4948	2.8851	0.0629	2.1304	0.74	493	43	393	8	408	10	96
Sample 100	1538	84	0	0	25	1	0.0546	7.5641	0.4804	9.3619	0.0638	5.5164	0.59	396	170	399	21	398	31	100
Sample 084	21409	1194	0	1	338	1	0.0558	4.2274	0.5142	5.7310	0.0668	3.8696	0.68	444	94	417	16	421	20	99
Sample 117	16894	955	380	1	243	1	0.0565	3.4592	0.5713	4.7081	0.0733	3.1937	0.68	472	77	456	14	459	18	99
Sample 142	6867	392	0	0	93	1	0.0570	2.4904	0.6121	3.4511	0.0779	2.3892	0.69	492	55	483	11	485	13	100
Sample 021	7924	442	97	3	105	1	0.0558	10.5413	0.6150	13.0302	0.0799	7.6594	0.59	446	234	495	37	487	52	102
Sample 043	47314	2735	0	0	615	1	0.0578	1.6952	0.6474	2.7707	0.0812	2.1916	0.79	523	37	503	11	507	11	99
Sample 076	6871	397	0	0	89	1	0.0577	1.9224	0.6479	2.8570	0.0814	2.1135	0.74	520	42	504	10	507	11	99
Sample 109	13894	803	0	0	180	1	0.0578	2.2480	0.6512	3.3605	0.0817	2.4979	0.74	523	49	506	12	509	14	99
Sample 171	8430	490	0	0	108	1	0.0581	2.6860	0.6587	3.8248	0.0823	2.7231	0.71	533	59	510	13	514	16	99
Sample 011	3654	210	0	0	46	1	0.0576	4.5147	0.6622	5.9252	0.0834	3.8374	0.65	514	99	516	19	516	24	100
Sample 046	9302	539	0	0	117	1	0.0580	2.0010	0.6686	2.9560	0.0837	2.1757	0.74	529	44	518	11	520	12	100
Sample 064	10563	618	0	0	132	1	0.0585	2.7878	0.6794	3.9853	0.0843	2.8480	0.71	547	61	522	14	526	17	99
Sample 148	8616	507	0	0	107	1	0.0589	4.3818	0.6903	5.8223	0.0850	3.8339	0.66	563	95	526	19	533	24	99
Sample 082	6224	360	0	0	77	1	0.0579	2.2967	0.6808	3.3164	0.0853	2.3924	0.72	526	50	528	12	527	14	100
Sample 075	11450	670	0	0	141	1	0.0585	1.6234	0.6926	2.6152	0.0858	2.0503	0.78	549	35	531	10	534	11	99
Sample 118	6450	380	0	0	79	1	0.0589	3.8540	0.7001	5.1616	0.0862	3.4335	0.67	563	84	533	18	539	22	99
Sample 168	7702	438	133	2	94	1	0.0569	7.4528	0.6762	9.0880	0.0862	5.2006	0.57	487	164	533	27	524	38	102

Sample 169	22588	1330	0	0	276	0	0.0589	1.4771	0.7020	2.3862	0.0864	1.8741	0.79	563	32	534	10	540	10	99
Sample 054	17001	998	0	0	207	0	0.0587	1.5678	0.7000	2.5866	0.0865	2.0573	0.80	555	34	535	11	539	11	99
Sample 099	6253	366	0	0	76	1	0.0585	2.8191	0.6995	4.0331	0.0867	2.8842	0.72	550	62	536	15	539	17	100
Sample 105	6912	403	0	0	84	1	0.0583	2.1944	0.6985	3.1977	0.0869	2.3258	0.73	542	48	537	12	538	13	100
Sample 057	14019	809	321	1	170	1	0.0577	3.5358	0.6925	4.5873	0.0871	2.9225	0.64	518	78	538	15	534	19	101
Sample 129	6820	402	0	0	83	2	0.0590	2.2561	0.7080	3.3357	0.0871	2.4569	0.74	565	49	538	13	544	14	99
Sample 108	4110	241	0	0	50	1	0.0586	2.3041	0.7061	3.2636	0.0874	2.3112	0.71	552	50	540	12	542	14	100
Sample 013	5380	314	0	0	65	1	0.0583	3.7742	0.7057	5.0911	0.0878	3.4169	0.67	541	83	543	18	542	22	100
Sample 170	25509	1481	176	2	306	0	0.0581	5.4831	0.7038	6.7725	0.0879	3.9753	0.59	532	120	543	21	541	29	100
Sample 145	14411	848	0	1	172	1	0.0588	3.7857	0.7158	4.9097	0.0882	3.1263	0.64	561	83	545	16	548	21	99
Sample 016	3235	190	0	0	39	1	0.0588	5.7794	0.7164	7.4843	0.0883	4.7554	0.64	561	126	546	25	549	32	99
Sample 012	3109	183	0	0	37	2	0.0588	3.7270	0.7164	4.9349	0.0884	3.2346	0.66	558	81	546	17	549	21	100
Sample 045	10410	611	0	0	124	1	0.0587	3.6974	0.7165	5.0611	0.0885	3.4561	0.68	556	81	547	18	549	22	100
Sample 080	23429	1380	0	0	279	1	0.0589	1.5620	0.7212	2.4532	0.0888	1.8917	0.77	563	34	548	10	551	10	99
Sample 121	4502	266	0	0	53	3	0.0591	4.0088	0.7326	5.4213	0.0899	3.6497	0.67	572	87	555	19	558	24	99
Sample 081	12580	744	0	0	147	0	0.0591	1.9614	0.7376	2.9888	0.0905	2.2551	0.75	572	43	558	12	561	13	100
Sample 149	8912	530	0	0	104	0	0.0595	2.7745	0.7454	3.7998	0.0909	2.5963	0.68	584	60	561	14	566	17	99
Sample 067	5644	337	0	0	65	1	0.0597	2.4292	0.7496	3.5040	0.0911	2.5253	0.72	592	53	562	14	568	15	99
Sample 095	5763	341	0	0	67	1	0.0591	3.1472	0.7436	4.3802	0.0913	3.0466	0.70	571	68	563	16	564	19	100
Sample 130	10747	640	0	0	122	0	0.0595	1.6294	0.7642	2.5779	0.0931	1.9976	0.77	587	35	574	11	576	11	100
Sample 166	8085	482	0	0	91	1	0.0596	2.6356	0.7666	3.6970	0.0933	2.5927	0.70	588	57	575	14	578	16	100
Sample 125	7658	459	0	0	85	2	0.0599	2.2193	0.7886	3.2607	0.0954	2.3889	0.73	601	48	588	13	590	15	100
Sample 138	3806	235	0	0	42	1	0.0616	7.1707	0.8128	9.5001	0.0956	6.2317	0.66	662	154	589	35	604	44	97
Sample 124	13429	793	249	1	148	1	0.0590	4.0782	0.7809	5.1363	0.0960	3.1225	0.61	568	89	591	18	586	23	101
Sample 017	9054	561	0	1	100	3	0.0620	3.6142	0.8209	4.6437	0.0960	2.9157	0.63	674	77	591	16	609	21	97
Sample 025	17317	1034	0	0	190	1	0.0597	1.5410	0.7936	2.5510	0.0964	2.0330	0.80	593	33	593	12	593	12	100
Sample 147	3668	221	0	0	40	1	0.0603	3.0519	0.8022	4.1264	0.0965	2.7772	0.67	614	66	594	16	598	19	99
Sample 103	3181	190	0	0	35	2	0.0599	4.3268	0.8006	5.7545	0.0970	3.7938	0.66	599	94	597	22	597	26	100
Sample 104	16056	974	0	0	175	1	0.0607	1.7474	0.8123	2.8123	0.0971	2.2035	0.78	627	38	598	13	604	13	99
Sample 086	6992	444	0	1	75	2	0.0634	4.2520	0.8566	5.5804	0.0979	3.6141	0.65	723	90	602	21	628	26	96
Sample 032	5229	317	0	0	56	1	0.0606	2.8873	0.8192	4.0186	0.0980	2.7951	0.70	625	62	603	16	608	19	99
Sample 097	11391	693	0	0	122	1	0.0609	2.2182	0.8248	3.3596	0.0983	2.5231	0.75	634	48	604	15	611	16	99
Sample 053	11383	688	0	0	121	1	0.0605	1.5713	0.8252	2.5595	0.0990	2.0204	0.79	620	34	608	12	611	12	100
Sample 042	8821	534	0	0	93	2	0.0606	2.3275	0.8401	3.4052	0.1006	2.4856	0.73	624	50	618	15	619	16	100
Sample 041	11985	743	0	1	125	1	0.0620	4.0405	0.8671	5.1858	0.1014	3.2506	0.63	675	86	623	19	634	25	98
Sample 014	14342	870	0	0	149	1	0.0607	1.6974	0.8531	2.6087	0.1020	1.9810	0.76	628	37	626	12	626	12	100
Sample 060	16149	954	78	4	166	1	0.0591	12.0538	0.8378	14.0033	0.1029	7.1273	0.51	569	262	631	43	618	67	102
Sample 101	8307	507	0	0	85	1	0.0610	1.6396	0.8678	2.6133	0.1032	2.0349	0.78	639	35	633	12	634	12	100
Sample 022	55372	3386	0	0	561	0	0.0612	1.2265	0.8787	2.2132	0.1042	1.8423	0.83	645	26	639	11	640	11	100
Sample 074	11298	693	0	0	113	3	0.0614	2.2983	0.8902	3.3328	0.1052	2.4135	0.72	652	49	645	15	646	16	100
Sample 159	9082	569	0	0	91	1	0.0627	2.3289	0.9099	3.4504	0.1053	2.5458	0.74	698	50	645	16	657	17	98
Sample 143	6580	375	36	8	66	1	0.0570	26.7178	0.8330	30.4646	0.1059	14.6374	0.48	493	589	649	91	615	151	105
Sample 106	15063	928	0	0	148	1	0.0616	2.2085	0.9130	3.3720	0.1075	2.5481	0.76	660	47	658	16	659	16	100
Sample 141	5369	332	0	0	53	1	0.0618	2.2996	0.9164	3.3758	0.1076	2.4714	0.73	665	49	659	15	660	17	100
Sample 139	8956	557	0	0	87	1	0.0622	2.2019	0.9283	3.3001	0.1082	2.4582	0.74	682	47	662	15	667	16	99
Sample 019	15982	989	0	0	155	1	0.0619	1.7122	0.9323	2.7713	0.1092	2.1791	0.79	671	37	668	14	669	14	100

Sample 137	36405	2293	0	0	334	0	0.0630	1.3494	1.0003	2.3958	0.1152	1.9797	0.83	708	29	703	13	704	12	100
Sample 023	6040	382	114	2	52	1	0.0632	7.9221	1.0682	9.1466	0.1225	4.5717	0.50	716	168	745	32	738	49	101
Sample 140	9566	619	0	0	82	1	0.0647	2.3033	1.1039	3.4267	0.1238	2.5372	0.74	764	49	752	18	755	18	100
Sample 018	10228	680	0	0	84	1	0.0665	2.1049	1.1853	3.0992	0.1293	2.2747	0.73	822	44	784	17	794	17	99
Sample 024	25779	1720	0	0	202	1	0.0667	1.3941	1.2386	2.4056	0.1347	1.9605	0.81	829	29	814	15	818	14	100
Sample 061	9803	680	0	0	68	1	0.0694	2.0902	1.4647	3.1068	0.1531	2.2986	0.74	910	43	919	20	916	19	100
Sample 151	11912	799	57	5	82	1	0.0671	14.7832	1.4161	16.3078	0.1532	6.8849	0.42	840	308	919	59	896	102	103
Sample 107	21738	1574	0	0	144	1	0.0724	1.6570	1.5916	2.8012	0.1594	2.2586	0.81	998	34	953	20	967	18	99
Sample 087	18484	1321	0	0	122	1	0.0715	1.3294	1.5794	2.3160	0.1603	1.8964	0.82	971	27	958	17	962	15	100
Sample 098	9884	714	0	0	64	1	0.0722	2.4796	1.6340	3.8060	0.1642	2.8874	0.76	991	50	980	26	983	24	100
Sample 160	28120	2173	0	0	176	0	0.0773	2.4065	1.7964	3.4216	0.1686	2.4322	0.71	1129	48	1004	23	1044	23	96
Sample 085	38335	2833	0	0	238	1	0.0739	1.2855	1.7340	2.2488	0.1702	1.8451	0.82	1039	26	1013	17	1021	15	99
Sample 033	17633	1301	433	1	108	0	0.0738	2.3142	1.7516	3.1063	0.1722	2.0722	0.67	1036	47	1024	20	1028	20	100
Sample 116	14215	1064	0	0	87	1	0.0749	1.8429	1.7912	2.8099	0.1735	2.1212	0.75	1065	37	1031	20	1042	18	99
Sample 172	9336	690	0	0	56	1	0.0739	1.8265	1.7892	2.8061	0.1756	2.1302	0.76	1039	37	1043	21	1042	18	100
Sample 038	17012	1283	1869	0	101	1	0.0754	1.3479	1.8578	2.3287	0.1787	1.8989	0.82	1079	27	1060	19	1066	15	99
Sample 150	1796	136	0	0	10	1	0.0760	5.1461	1.8955	7.1878	0.1809	5.0182	0.70	1095	103	1072	50	1080	49	99
Sample 102	9291	716	0	0	52	2	0.0770	1.5061	1.9929	2.5580	0.1877	2.0676	0.81	1122	30	1109	21	1113	17	100
Sample 158	5161	417	0	0	29	1	0.0809	2.9921	2.0930	4.3709	0.1877	3.1863	0.73	1219	59	1109	33	1146	30	97
Sample 039	42803	4463	0	0	151	0	0.1043	1.1028	4.3018	2.1208	0.2992	1.8116	0.85	1702	20	1687	27	1694	18	100
Sample 164	10772	1171	0	0	37	1	0.1087	1.4073	4.6181	2.5146	0.3081	2.0839	0.83	1778	26	1731	32	1753	21	99
Sample 058	49689	5782	0	0	155	1	0.1164	1.5211	5.4435	2.8308	0.3393	2.3873	0.84	1901	27	1883	39	1892	25	100
Sample 056	84007	9670	673	0	258	1	0.1151	1.3372	5.4484	2.2162	0.3433	1.7673	0.80	1882	24	1902	29	1892	19	101
Sample 077	10023	1197	0	0	30	1	0.1194	1.4905	5.8117	2.6188	0.3530	2.1532	0.82	1948	27	1949	36	1948	23	100
Sample 044	28860	3975	0	0	75	2	0.1377	1.1473	7.6722	2.1738	0.4040	1.8464	0.85	2199	20	2188	34	2193	20	100
Sample 120	41964	6581	0	0	98	1	0.1568	1.2561	9.7400	2.4244	0.4504	2.0736	0.86	2422	21	2397	42	2410	23	99
Sample 036	18575	3403	0	0	38	2	0.1832	2.1835	12.9042	4.3329	0.5109	3.7425	0.86	2682	36	2660	82	2673	42	100
Sample 167	73797	13354	0	0	152	1	0.1810	1.8733	12.7918	3.2126	0.5127	2.6098	0.81	2662	31	2668	57	2664	31	100
Sample 015	47746	8739	409	1	97	1	0.1830	1.3993	13.0651	2.3392	0.5177	1.8746	0.80	2681	23	2689	41	2684	22	100
Sample 055	91026	20211	0	0	163	1	0.2220	1.4142	18.0147	2.5746	0.5884	2.1515	0.84	2996	23	2983	52	2991	25	100
Sample 088	40809	10388	0	0	67	1	0.2546	1.3750	22.5946	2.5624	0.6438	2.1623	0.84	3213	22	3204	55	3210	25	100
Sample 066	23397	6222	0	0	37	1	0.2659	1.5794	24.2752	3.0973	0.6621	2.6643	0.86	3282	25	3275	69	3280	31	100

Sample: Marine Barrier 1, 170-230 µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 087	4773	218	214	1	1338	1	0.0457	7.3529	0.0093	165.6291	0.0015	165.4658	1.00	-19	178	10	16	9	16	101
Sample 055	4299	220	0	0	46	2	0.0513	6.4170	0.2758	7.9633	0.0390	4.7155	0.59	253	148	247	11	247	18	100
Sample 053	14919	762	0	0	157	1	0.0511	2.7419	0.2779	3.8023	0.0395	2.6342	0.69	244	63	250	6	249	8	100
Sample 017	8563	440	0	0	87	1	0.0514	4.2243	0.2898	5.4365	0.0409	3.4221	0.63	257	97	258	9	258	12	100
Sample 021	28301	1450	631	0	281	1	0.0512	2.7381	0.2947	4.1364	0.0417	3.1004	0.75	251	63	263	8	262	10	100
Sample 140	13542	698	0	0	132	1	0.0515	2.3098	0.3022	3.1965	0.0425	2.2097	0.69	264	53	269	6	268	8	100
Sample 119	31480	1633	0	0	287	1	0.0519	2.1789	0.3250	3.2240	0.0455	2.3762	0.74	279	50	287	7	286	8	100
Sample 054	16877	878	0	0	154	1	0.0521	2.7281	0.3263	3.7657	0.0455	2.5957	0.69	288	62	287	7	287	9	100
Sample 102	3103	161	0	0	28	1	0.0519	8.3044	0.3260	10.0268	0.0456	5.6190	0.56	281	190	287	16	287	25	100
Sample 011	53197	2734	166	2	477	1	0.0514	6.7169	0.3282	9.9876	0.0463	7.3916	0.74	258	154	292	21	288	25	101
Sample 127	14849	790	0	0	115	1	0.0532	3.2895	0.3936	4.4649	0.0537	3.0190	0.68	337	75	337	10	337	13	100

Sample 120	13510	764	0	0	77	1	0.0565	3.8393	0.5659	5.1020	0.0726	3.3600	0.66	473	85	452	15	455	19	99
Sample 142	4437	252	0	0	24	3	0.0567	7.4793	0.5882	9.5595	0.0753	5.9535	0.62	479	165	468	27	470	37	100
Sample 059	15976	910	0	0	87	1	0.0570	2.1590	0.5990	3.2377	0.0763	2.4128	0.75	490	48	474	11	477	12	99
Sample 063	26078	1478	0	0	141	1	0.0567	2.5410	0.6014	3.6905	0.0770	2.6764	0.73	479	56	478	12	478	14	100
Sample 141	13778	774	120	2	73	1	0.0562	8.3881	0.6047	10.4509	0.0780	6.2339	0.60	461	186	484	29	480	41	101
Sample 139	15633	867	89	3	81	1	0.0555	11.5910	0.6149	14.2590	0.0804	8.3046	0.58	432	258	498	40	487	57	102
Sample 081	11827	650	55	5	59	1	0.0550	18.2763	0.6284	22.0006	0.0829	12.2475	0.56	412	409	513	61	495	90	104
Sample 010	52145	3011	0	0	259	1	0.0577	1.2123	0.6639	2.2494	0.0834	1.8947	0.84	520	27	516	9	517	9	100
Sample 018	15032	867	0	0	75	1	0.0577	4.7173	0.6634	6.2804	0.0835	4.1462	0.66	517	104	517	21	517	26	100
Sample 137	33655	1949	0	0	166	1	0.0579	1.3985	0.6716	2.3612	0.0841	1.9025	0.81	527	31	521	10	522	10	100
Sample 094	11865	683	401	1	58	1	0.0576	3.6430	0.6702	4.8233	0.0845	3.1611	0.66	513	80	523	16	521	20	100
Sample 149	34894	1947	74	4	170	1	0.0558	13.3888	0.6553	16.1227	0.0852	8.9822	0.56	444	298	527	46	512	67	103
Sample 096	18434	1048	82	3	89	1	0.0568	12.1877	0.6717	14.7767	0.0857	8.3552	0.57	485	269	530	43	522	62	102
Sample 148	18833	1096	0	1	91	1	0.0582	4.6717	0.6886	6.0470	0.0859	3.8394	0.63	536	102	531	20	532	25	100
Sample 034	22189	1304	0	0	106	1	0.0588	1.7526	0.7009	2.7384	0.0865	2.1040	0.77	559	38	535	11	539	12	99
Sample 056	51815	2980	199	1	247	1	0.0575	4.9860	0.6891	6.2498	0.0869	3.7683	0.60	511	110	537	19	532	26	101
Sample 022	14703	845	298	1	70	1	0.0575	3.5307	0.6919	4.5506	0.0873	2.8710	0.63	510	78	540	15	534	19	101
Sample 080	17889	1042	0	0	85	1	0.0582	2.6447	0.7016	3.7313	0.0874	2.6322	0.71	538	58	540	14	540	16	100
Sample 161	31399	1847	0	0	148	1	0.0588	1.5811	0.7120	2.5892	0.0878	2.0503	0.79	560	34	542	11	546	11	99
Sample 077	40558	2390	0	0	190	1	0.0589	1.5612	0.7201	2.5262	0.0886	1.9860	0.79	565	34	547	10	551	11	99
Sample 163	16101	945	0	0	75	2	0.0587	2.7096	0.7179	3.8767	0.0887	2.7725	0.72	555	59	548	15	549	17	100
Sample 019	12079	708	0	0	56	1	0.0586	2.5925	0.7261	3.5973	0.0898	2.4939	0.69	553	57	554	13	554	15	100
Sample 168	32256	1911	0	0	149	1	0.0592	1.2829	0.7337	2.3050	0.0898	1.9149	0.83	576	28	554	10	559	10	99
Sample 057	3136	185	0	0	14	1	0.0589	4.2289	0.7320	5.3671	0.0902	3.3049	0.62	563	92	557	18	558	23	100
Sample 136	25697	1496	0	0	118	2	0.0582	2.6619	0.7240	3.7956	0.0902	2.7057	0.71	538	58	557	14	553	16	101
Sample 146	5158	316	0	1	24	2	0.0612	6.5823	0.7639	8.5417	0.0905	5.4438	0.64	648	141	558	29	576	38	97
Sample 144	41239	2420	26846	0	189	2	0.0587	1.3807	0.7320	2.2788	0.0905	1.8129	0.80	555	30	558	10	558	10	100
Sample 098	14643	861	0	0	67	1	0.0588	2.3137	0.7337	3.2607	0.0905	2.2976	0.70	559	50	559	12	559	14	100
Sample 060	13237	777	0	0	61	1	0.0587	2.5886	0.7344	3.6389	0.0907	2.5576	0.70	557	56	560	14	559	16	100
Sample 074	8718	520	0	0	40	1	0.0597	2.2956	0.7495	3.2848	0.0911	2.3496	0.72	592	50	562	13	568	14	99
Sample 129	62053	3664	0	0	279	1	0.0591	1.3548	0.7502	2.3774	0.0921	1.9535	0.82	569	29	568	11	568	10	100
Sample 150	13963	832	0	0	63	3	0.0596	2.5172	0.7572	3.6690	0.0922	2.6693	0.73	589	55	568	15	572	16	99
Sample 024	36787	2199	0	0	165	1	0.0598	1.8069	0.7632	2.8491	0.0926	2.2028	0.77	595	39	571	12	576	13	99
Sample 014	8312	509	0	0	37	1	0.0612	3.9542	0.7967	5.2774	0.0944	3.4950	0.66	646	85	582	19	595	24	98
Sample 116	36345	2157	0	0	158	1	0.0593	1.2471	0.7800	2.2453	0.0953	1.8672	0.83	580	27	587	10	585	10	100
Sample 143	36730	2202	0	0	160	1	0.0600	1.3845	0.7890	2.4419	0.0955	2.0115	0.82	602	30	588	11	591	11	100
Sample 126	17247	1038	0	0	74	2	0.0602	1.4953	0.7974	2.4792	0.0961	1.9775	0.80	610	32	591	11	595	11	99
Sample 147	21979	1321	0	0	95	2	0.0601	1.3309	0.7966	2.3316	0.0961	1.9145	0.82	608	29	592	11	595	11	99
Sample 097	5369	324	0	0	23	2	0.0603	2.6870	0.8048	3.6698	0.0968	2.4995	0.68	614	58	596	14	600	17	99
Sample 042	31094	1861	0	0	133	0	0.0598	1.2366	0.8021	2.2608	0.0972	1.8926	0.84	598	27	598	11	598	10	100
Sample 033	48322	2912	348	1	205	1	0.0603	2.8624	0.8125	3.7535	0.0978	2.4280	0.65	613	62	602	14	604	17	100
Sample 118	68019	4112	0	0	287	1	0.0605	1.2572	0.8191	2.3405	0.0983	1.9742	0.84	620	27	604	11	608	11	99
Sample 066	22930	1380	0	0	97	0	0.0602	1.5124	0.8169	2.5160	0.0985	2.0108	0.80	610	33	605	12	606	12	100
Sample 106	6038	365	0	0	25	0	0.0605	3.1581	0.8255	4.3077	0.0990	2.9296	0.68	621	68	608	17	611	20	100
Sample 031	20062	1232	0	0	84	2	0.0614	1.5465	0.8433	2.5671	0.0996	2.0490	0.80	654	33	612	12	621	12	99
Sample 159	6553	399	0	1	27	1	0.0608	6.2600	0.8350	8.0584	0.0996	5.0745	0.63	633	135	612	30	616	38	99

Sample 064	15766	898	41	7	65	1	0.0570	23.7707	0.7847	27.5587	0.0999	13.9439	0.51	490	524	614	82	588	131	104
Sample 023	30752	1850	0	0	127	1	0.0602	1.4127	0.8315	2.4612	0.1002	2.0154	0.82	610	31	616	12	614	11	100
Sample 164	132603	8092	0	1	532	0	0.0610	3.5422	0.8702	4.4834	0.1034	2.7483	0.61	640	76	634	17	636	21	100
Sample 038	75041	4620	0	0	301	0	0.0616	1.1858	0.8792	2.2824	0.1036	1.9502	0.85	659	25	635	12	641	11	99
Sample 084	87872	5383	0	0	352	1	0.0613	1.1753	0.8757	2.2921	0.1037	1.9678	0.86	648	25	636	12	639	11	100
Sample 062	23268	1418	2145	0	93	2	0.0609	1.8853	0.8716	2.9354	0.1037	2.2499	0.77	637	41	636	14	636	14	100
Sample 016	34073	2071	449	1	136	1	0.0608	2.3659	0.8719	3.2324	0.1041	2.2025	0.68	631	51	638	13	637	15	100
Sample 103	103205	6369	1839	0	411	0	0.0617	1.3229	0.8857	2.3344	0.1041	1.9234	0.82	664	28	638	12	644	11	99
Sample 125	14249	875	0	0	57	1	0.0614	2.2157	0.8848	3.2181	0.1046	2.3338	0.73	653	48	641	14	644	15	100
Sample 169	35038	2158	0	0	136	1	0.0616	1.8509	0.9047	2.7593	0.1065	2.0464	0.74	660	40	653	13	654	13	100
Sample 179	17931	1109	0	0	69	3	0.0618	2.1669	0.9194	3.2556	0.1078	2.4298	0.75	669	46	660	15	662	16	100
Sample 036	12870	792	0	0	49	0	0.0616	3.6718	0.9173	5.0326	0.1081	3.4416	0.68	659	79	662	22	661	25	100
Sample 044	6307	395	0	0	24	1	0.0627	6.6699	0.9513	8.8597	0.1101	5.8316	0.66	697	142	673	37	679	45	99
Sample 015	75941	4730	648	0	282	1	0.0623	1.7765	0.9613	2.6555	0.1119	1.9738	0.74	684	38	684	13	684	13	100
Sample 058	17810	1108	0	0	65	1	0.0622	1.3663	0.9686	2.3652	0.1129	1.9306	0.82	681	29	690	13	688	12	100
Sample 167	18417	1171	0	0	67	1	0.0636	2.1551	0.9944	3.1846	0.1135	2.3446	0.74	727	46	693	15	701	16	99
Sample 128	24832	1566	0	0	89	1	0.0631	2.0926	1.0040	3.2297	0.1154	2.4602	0.76	711	44	704	16	706	17	100
Sample 037	11556	742	0	0	39	1	0.0642	1.6358	1.0960	2.5984	0.1238	2.0189	0.78	748	35	753	14	751	14	100
Sample 076	62219	4003	0	0	206	0	0.0643	1.6630	1.1140	2.6805	0.1256	2.1022	0.78	753	35	763	15	760	14	100
Sample 073	60963	3972	413	1	197	0	0.0651	2.3531	1.1542	3.1447	0.1285	2.0862	0.66	779	49	779	15	779	17	100
Sample 075	44552	2948	0	0	139	3	0.0662	2.1910	1.2101	3.3725	0.1326	2.5639	0.76	812	46	803	19	805	19	100
Sample 165	49799	3364	0	0	148	1	0.0676	1.2285	1.3033	2.2516	0.1399	1.8869	0.84	855	26	844	15	847	13	100
Sample 107	58062	4079	0	0	156	1	0.0703	1.1244	1.4921	2.1376	0.1540	1.8179	0.85	936	23	923	16	927	13	100
Sample 162	46319	3359	0	0	113	1	0.0725	1.2962	1.7067	2.2408	0.1707	1.8279	0.82	1001	26	1016	17	1011	14	100
Sample 082	74240	5389	0	0	180	0	0.0726	1.1021	1.7115	2.1316	0.1710	1.8246	0.86	1003	22	1018	17	1013	14	100
Sample 086	56244	4223	7702	0	136	0	0.0751	1.1759	1.7740	2.1485	0.1713	1.7981	0.84	1071	24	1019	17	1036	14	98
Sample 170	134791	9753	1850	0	318	1	0.0724	1.1450	1.7551	2.1564	0.1759	1.8273	0.85	996	23	1045	18	1029	14	102
Sample 020	41534	3116	0	0	96	1	0.0750	1.4796	1.8503	2.5797	0.1789	2.1131	0.82	1069	30	1061	21	1064	17	100
Sample 041	91455	6904	0	0	212	1	0.0755	1.3114	1.8641	2.4849	0.1791	2.1107	0.85	1082	26	1062	21	1068	17	99
Sample 121	16496	1249	0	0	38	1	0.0757	1.7301	1.8717	2.7188	0.1793	2.0973	0.77	1088	35	1063	21	1071	18	99
Sample 157	69402	5199	0	0	160	1	0.0749	1.2014	1.8534	2.2814	0.1794	1.9394	0.85	1066	24	1064	19	1065	15	100
Sample 138	56446	4293	0	0	128	1	0.0761	1.1570	1.9212	2.1963	0.1832	1.8668	0.85	1097	23	1084	19	1089	15	100
Sample 035	70304	5321	0	0	158	1	0.0757	1.0967	1.9229	2.1370	0.1843	1.8342	0.86	1087	22	1090	18	1089	14	100
Sample 032	36768	2802	442	1	83	1	0.0762	2.0511	1.9398	2.8643	0.1846	1.9993	0.70	1101	41	1092	20	1095	19	100
Sample 160	84280	6408	0	0	188	0	0.0760	1.1048	1.9492	2.1272	0.1859	1.8178	0.85	1096	22	1099	18	1098	14	100
Sample 117	36942	3008	3068	0	76	1	0.0814	1.2130	2.2643	2.2097	0.2017	1.8470	0.84	1232	24	1184	20	1201	16	99
Sample 083	19153	1594	0	0	39	0	0.0832	1.9228	2.3513	3.0303	0.2049	2.3421	0.77	1274	38	1202	26	1228	22	98
Sample 123	44146	3706	0	0	87	2	0.0840	1.8580	2.4427	3.0261	0.2110	2.3885	0.79	1292	36	1234	27	1255	22	98
Sample 122	5795	609	0	0	8	1	0.1051	3.6526	4.3477	5.7449	0.2999	4.4342	0.77	1717	67	1691	66	1702	49	99
Sample 158	48030	6101	0	0	66	2	0.1270	1.1021	5.3182	2.1712	0.3036	1.8706	0.86	2057	19	1709	28	1872	19	91
Sample 104	32565	3517	0	0	43	1	0.1080	1.3148	4.6630	2.3661	0.3131	1.9672	0.83	1766	24	1756	30	1761	20	100
Sample 061	51613	5661	352	1	67	2	0.1097	1.8957	4.8179	2.7080	0.3186	1.9339	0.71	1794	35	1783	30	1788	23	100
Sample 045	30004	3636	0	0	36	2	0.1212	2.6244	5.8093	4.3861	0.3477	3.5143	0.80	1974	47	1924	59	1948	39	99
Sample 052	68707	8841	0	0	78	1	0.1287	1.0491	6.5150	2.1236	0.3672	1.8464	0.87	2080	18	2016	32	2048	19	98
Sample 079	26954	3621	0	0	29	1	0.1344	1.4142	7.0970	2.5004	0.3831	2.0620	0.82	2156	25	2091	37	2124	23	98
Sample 115	92521	13156	0	0	91	1	0.1422	1.0619	8.2271	2.1160	0.4196	1.8303	0.86	2254	18	2259	35	2256	19	100

Sample 124	50705	8943	0	0	42	2	0.1764	1.4231	12.1089	2.6855	0.4979	2.2774	0.85	2619	24	2605	49	2613	26	100
Sample 078	22932	5221	0	1	16	0	0.2277	1.6649	18.7601	2.9397	0.5976	2.4227	0.82	3036	27	3020	59	3030	29	100
Sample 166	31727	8326	0	0	20	1	0.2624	3.0256	23.9888	5.1635	0.6630	4.1842	0.81	3261	48	3279	108	3268	52	100

Sample: Eolic Barrier 1, 170-230µm. Age accepted: (±5 % of discordance)

File Name	207.0	206.0	206/204	f206c	U	Th/U	$^{207*}Pb/^{206*}Pb$	2σ	207*Pb/235U	2σ	206Pb/238Pb	2σ	RHO	$^{207*}Pb/^{206*}Pb$	2σ	$^{206*}Pb/^{238}U$	2σ	$^{207*}Pb/^{235}U$	2σ	Conc. %
Sample 100	1426	67	0	0	142	1	0.0473	21.7217	0.0134	24.2051	0.0021	10.6796	0.44	63	517	13	1	14	3	98
Sample 028	9007	437	0	0	161	2	0.0485	6.8276	0.0766	8.3961	0.0115	4.8866	0.58	123	161	73	4	75	6	98
Sample 165	36916	1782	143	2	320	1	0.0483	8.0295	0.1571	17.7348	0.0236	15.8130	0.89	113	189	150	24	148	25	101
Sample 071	30446	1466	123	2	247	1	0.0482	9.0537	0.1676	19.3904	0.0253	17.1470	0.88	107	214	161	27	157	29	102
Sample 184	32717	1602	232	1	253	1	0.0490	4.9513	0.1786	10.1749	0.0265	8.8889	0.87	147	116	168	15	167	16	101
Sample 062	14337	692	82	3	98	1	0.0483	13.6844	0.1986	25.6573	0.0298	21.7033	0.85	114	323	189	41	184	44	103
Sample 168	125073	6337	0	0	705	1	0.0507	1.7762	0.2537	2.9600	0.0363	2.3678	0.80	226	41	230	5	230	6	100
Sample 037	25289	1263	140	2	141	1	0.0499	8.5784	0.2527	13.8195	0.0367	10.8347	0.78	192	200	232	25	229	29	102
Sample 061	6775	350	0	1	34	4	0.0517	5.7535	0.2896	8.3385	0.0406	6.0355	0.72	271	132	257	15	258	19	99
Sample 084	14627	753	0	0	71	1	0.0515	2.5457	0.3001	3.3795	0.0423	2.2227	0.66	261	58	267	6	266	8	100
Sample 189	19558	983	124	2	94	1	0.0503	8.8064	0.2945	13.6362	0.0425	10.4112	0.76	208	204	268	27	262	32	102
Sample 101	16017	816	169	2	76	2	0.0509	6.4289	0.3042	9.9250	0.0433	7.5614	0.76	237	148	273	20	270	24	101
Sample 019	41222	2157	0	1	184	2	0.0523	4.0123	0.3303	6.2362	0.0458	4.7740	0.77	300	92	288	13	290	16	100
Sample 067	29406	1518	214	1	128	1	0.0516	5.1066	0.3356	7.6751	0.0472	5.7297	0.75	268	117	297	17	294	20	101
Sample 166	34867	1785	87	3	149	1	0.0512	12.0410	0.3390	17.6548	0.0480	12.9115	0.73	250	277	302	38	296	46	102
Sample 070	64874	3424	0	1	268	1	0.0528	3.9846	0.3609	5.9646	0.0496	4.4384	0.74	319	91	312	14	313	16	100
Sample 040	110960	6035	228	1	339	1	0.0544	4.5201	0.5024	6.1046	0.0670	4.1031	0.67	387	102	418	17	413	21	101
Sample 026	45772	2556	0	0	135	1	0.0559	1.2892	0.5337	2.4697	0.0693	2.1065	0.85	446	29	432	9	434	9	99
Sample 129	17180	972	0	0	46	1	0.0566	2.6325	0.5922	3.6150	0.0759	2.4776	0.69	476	58	471	11	472	14	100
Sample 122	70942	4111	0	0	179	1	0.0580	1.6911	0.6483	2.7699	0.0811	2.1937	0.79	528	37	503	11	507	11	99
Sample 131	72663	4187	0	1	180	1	0.0576	3.6494	0.6564	4.7789	0.0826	3.0853	0.65	516	80	512	15	512	19	100
Sample 042	42484	2451	0	0	105	1	0.0577	1.1958	0.6592	2.2508	0.0829	1.9068	0.85	518	26	513	9	514	9	100
Sample 103	33996	1850	51	5	84	0	0.0544	19.8455	0.6239	23.7622	0.0832	13.0689	0.55	388	446	515	65	492	97	105
Sample 153	36261	2121	0	0	89	0	0.0585	2.7697	0.6746	3.7867	0.0837	2.5822	0.68	548	60	518	13	524	16	99
Sample 163	58813	3496	0	0	142	1	0.0594	1.2113	0.6966	2.1018	0.0850	1.7176	0.82	583	26	526	9	537	9	98
Sample 150	36076	2067	183	1	85	1	0.0573	5.3222	0.6888	6.5970	0.0872	3.8980	0.59	503	117	539	20	532	28	101
Sample 120	25189	1443	150	2	59	1	0.0573	6.4653	0.6957	7.8995	0.0881	4.5389	0.57	503	142	544	24	536	33	101
Sample 029	51573	3037	0	0	119	1	0.0589	1.1887	0.7193	2.1810	0.0886	1.8286	0.84	563	26	547	10	550	9	99
Sample 130	36707	2156	0	0	83	0	0.0587	1.2257	0.7289	2.2517	0.0900	1.8889	0.84	557	27	556	10	556	10	100
Sample 090	24397	1421	366	1	55	1	0.0582	2.9017	0.7235	3.8800	0.0901	2.5758	0.66	539	63	556	14	553	17	101
Sample 104	40648	2325	108	3	92	1	0.0572	8.8939	0.7112	10.6710	0.0902	5.8964	0.55	499	196	557	32	545	46	102
Sample 025	76691	4498	680	0	173	0	0.0587	1.7693	0.7335	2.7094	0.0907	2.0520	0.76	554	39	560	11	559	12	100
Sample 036	51549	3062	0	1	116	2	0.0594	3.5567	0.7449	4.5892	0.0910	2.9000	0.63	582	77	561	16	565	20	99
Sample 190	38013	2255	0	0	85	1	0.0593	1.5846	0.7526	2.7785	0.0920	2.2824	0.82	579	34	567	12	570	12	100
Sample 092	84335	5098	2573	0	185	1	0.0604	1.1625	0.7783	2.2078	0.0934	1.8769	0.85	620	25	576	10	585	10	98
Sample 126	64768	3810	325	1	141	1	0.0588	3.0694	0.7605	4.0180	0.0938	2.5930	0.65	561	67	578	14	574	18	101
Sample 022	35818	2130	0	1	78	1	0.0595	3.5795	0.7693	4.6140	0.0938	2.9114	0.63	585	78	578	16	579	21	100
Sample 043	48361	2862	0	0	106	1	0.0592	1.1659	0.7655	2.2633	0.0938	1.9399	0.86	574	25	578	11	577	10	100
Sample 085	40910	2425	0	0	89	1	0.0593	1.1810	0.7670	2.2343	0.0939	1.8966	0.85	577	26	578	10	578	10	100
Sample 038	53872	3216	0	0	117	0	0.0597	1.2565	0.7754	2.4303	0.0942	2.0802	0.86	592	27	580	12	583	11	100

Sample 107	56625	3373	0	0	123	1	0.0596	1.2254	0.7770	2.3709	0.0946	2.0296	0.86	588	27	583	11	584	11	100
Sample 162	48474	2846	205	1	105	1	0.0587	4.9243	0.7659	6.1237	0.0946	3.6401	0.59	557	107	583	20	577	27	101
Sample 124	89932	5390	0	1	194	1	0.0599	3.5414	0.7824	4.5950	0.0947	2.9279	0.64	601	77	583	16	587	21	99
Sample 079	67881	4030	0	1	146	1	0.0594	3.5472	0.7773	4.5314	0.0950	2.8198	0.62	581	77	585	16	584	20	100
Sample 089	64274	3835	0	0	138	1	0.0597	1.1228	0.7837	2.1802	0.0953	1.8688	0.86	592	24	587	10	588	10	100
Sample 021	62077	3691	0	0	132	1	0.0595	1.1100	0.7911	2.2244	0.0965	1.9277	0.87	584	24	594	11	592	10	100
Sample 175	115184	6943	1249	0	242	0	0.0603	1.3273	0.8098	2.3845	0.0974	1.9809	0.83	614	29	599	11	602	11	100
Sample 027	80242	4836	0	1	168	1	0.0603	3.5052	0.8101	4.4872	0.0975	2.8015	0.62	613	76	600	16	603	21	100
Sample 133	62786	3881	0	1	131	1	0.0618	3.6624	0.8361	4.8123	0.0981	3.1218	0.65	667	78	603	18	617	22	98
Sample 154	54860	3346	0	0	114	1	0.0610	1.2787	0.8257	2.4226	0.0982	2.0577	0.85	639	28	604	12	611	11	99
Sample 147	41813	2492	271	1	86	1	0.0596	3.6036	0.8165	4.5493	0.0994	2.7767	0.61	589	78	611	16	606	21	101
Sample 106	30897	1876	0	0	63	1	0.0607	1.2683	0.8438	2.3215	0.1008	1.9444	0.84	629	27	619	11	621	11	100
Sample 082	47806	2889	3900	0	97	0	0.0604	1.2464	0.8408	2.3620	0.1009	2.0064	0.85	619	27	620	12	620	11	100
Sample 057	148263	8936	0	0	300	0	0.0603	1.1946	0.8402	1.9513	0.1011	1.5429	0.79	613	26	621	9	619	9	100
Sample 167	81620	4949	0	0	163	1	0.0606	1.1379	0.8575	2.2578	0.1026	1.9501	0.86	626	25	629	12	629	11	100
Sample 143	43256	2594	245	1	86	1	0.0600	3.9143	0.8490	4.8595	0.1027	2.8797	0.59	603	85	630	17	624	23	101
Sample 080	40586	2432	149	2	81	1	0.0599	6.2806	0.8493	7.4748	0.1028	4.0528	0.54	600	136	631	24	624	35	101
Sample 020	113848	6900	0	0	226	1	0.0606	1.0559	0.8611	2.1756	0.1030	1.9022	0.87	625	23	632	11	631	10	100
Sample 142	40289	2523	0	0	80	2	0.0626	1.9639	0.8936	3.1436	0.1035	2.4546	0.78	696	42	635	15	648	15	98
Sample 187	16468	1007	0	0	32	3	0.0611	1.5052	0.8838	2.5204	0.1049	2.0216	0.80	643	32	643	12	643	12	100
Sample 064	11623	709	0	0	23	1	0.0610	2.2634	0.8833	3.4387	0.1051	2.5888	0.75	638	49	644	16	643	17	100
Sample 058	23121	1419	0	0	45	1	0.0614	1.3520	0.8904	2.4111	0.1052	1.9964	0.83	653	29	645	12	647	12	100
Sample 015	75189	4612	898	0	146	1	0.0613	1.6020	0.8931	2.7500	0.1056	2.2352	0.81	651	34	647	14	648	13	100
Sample 174	139205	8572	0	0	267	2	0.0616	1.1205	0.9056	2.1844	0.1067	1.8751	0.86	660	24	653	12	655	11	100
Sample 048	16980	1044	0	0	32	1	0.0615	1.8865	0.9140	3.0037	0.1078	2.3374	0.78	656	40	660	15	659	15	100
Sample 123	32509	2011	0	0	62	2	0.0619	1.3577	0.9217	2.4012	0.1081	1.9806	0.82	670	29	661	12	663	12	100
Sample 023	147481	9103	0	0	277	2	0.0617	1.0531	0.9259	2.1988	0.1088	1.9301	0.88	664	23	666	12	665	11	100
Sample 105	97491	6037	0	0	183	1	0.0619	1.5019	0.9320	2.6626	0.1092	2.1986	0.83	671	32	668	14	669	13	100
Sample 017	36262	2260	402	1	68	1	0.0623	2.7071	0.9448	3.7475	0.1099	2.5914	0.69	685	58	672	17	675	19	100
Sample 169	49078	3074	0	0	91	1	0.0626	1.2133	0.9514	2.2904	0.1102	1.9426	0.85	696	26	674	12	679	11	99
Sample 151	35778	2218	0	0	66	1	0.0620	1.5484	0.9455	2.7399	0.1106	2.2604	0.83	674	33	676	15	676	14	100
Sample 050	118295	7372	0	0	216	1	0.0623	1.0591	0.9631	2.1834	0.1121	1.9094	0.87	685	23	685	12	685	11	100
Sample 060	27160	1686	0	0	50	1	0.0621	1.4824	0.9599	2.6618	0.1122	2.2107	0.83	676	32	685	14	683	13	100
Sample 024	98471	6140	554	0	179	1	0.0623	1.9309	0.9698	2.8583	0.1128	2.1075	0.74	686	41	689	14	688	14	100
Sample 125	22861	1413	177	2	40	2	0.0618	5.2644	0.9846	6.2822	0.1156	3.4281	0.55	667	113	705	23	696	32	101
Sample 078	156574	10028	548	1	272	0	0.0640	1.9503	1.0421	2.9675	0.1180	2.2366	0.75	743	41	719	15	725	15	99
Sample 066	37598	2412	0	0	65	1	0.0642	2.0421	1.0482	3.2132	0.1185	2.4808	0.77	747	43	722	17	728	17	99
Sample 087	64609	4104	0	1	111	2	0.0635	3.3413	1.0408	4.1891	0.1189	2.5267	0.60	726	71	724	17	724	22	100
Sample 173	98672	6316	817	0	162	2	0.0640	1.5214	1.0991	2.4418	0.1245	1.9099	0.78	742	32	757	14	753	13	100
Sample 134	9615	621	0	0	16	1	0.0646	2.3054	1.1225	3.4540	0.1260	2.5720	0.74	762	49	765	19	764	19	100
Sample 149	18059	1178	0	0	29	4	0.0653	1.7778	1.1424	2.9066	0.1270	2.2996	0.79	782	37	771	17	774	16	100
Sample 068	118706	7683	751	0	190	1	0.0647	1.5500	1.1408	2.5019	0.1278	1.9640	0.78	765	33	776	14	773	14	100
Sample 128	166172	10964	1501	0	256	1	0.0660	1.2000	1.2102	2.2344	0.1330	1.8849	0.84	806	25	805	14	805	12	100
Sample 112	104289	6940	366	1	155	1	0.0666	2.5534	1.2669	3.4415	0.1381	2.3075	0.67	824	53	834	18	831	20	100
Sample 148	63595	4281	0	0	92	1	0.0673	1.1291	1.3097	2.1730	0.1411	1.8566	0.85	847	23	851	15	850	13	100
Sample 185	29581	2005	0	0	43	1	0.0678	1.2838	1.3259	2.3423	0.1419	1.9591	0.84	862	27	855	16	857	14	100

Sample 171	31805	2158	1579	0	45	0	0.0679	1.3294	1.3566	2.3459	0.1450	1.9328	0.82	864	28	873	16	870	14	100
Sample 016	45306	3108	0	0	63	1	0.0686	1.1224	1.3887	2.2364	0.1468	1.9343	0.86	887	23	883	16	884	13	100
Sample 059	133425	9286	0	1	181	0	0.0696	3.0690	1.4465	3.8911	0.1507	2.3921	0.61	917	63	905	20	908	24	100
Sample 069	55538	3940	5438	0	72	1	0.0709	1.2069	1.5489	2.2900	0.1584	1.9462	0.85	956	25	948	17	950	14	100
Sample 046	103620	7622	635	0	125	1	0.0736	1.6157	1.7226	2.5629	0.1698	1.9894	0.78	1029	33	1011	19	1017	17	99
Sample 083	189764	13830	0	0	227	1	0.0729	1.0428	1.7162	2.1751	0.1708	1.9088	0.88	1011	21	1016	18	1015	14	100
Sample 102	139818	10300	0	0	165	1	0.0737	1.1266	1.7657	1.9751	0.1738	1.6223	0.82	1032	23	1033	16	1033	13	100
Sample 188	25844	1949	306	1	29	1	0.0754	3.2543	1.8872	4.0904	0.1815	2.4781	0.61	1079	65	1075	25	1077	28	100
Sample 091	131871	9951	1557	0	147	1	0.0755	1.1771	1.9109	2.2672	0.1837	1.9377	0.85	1081	24	1087	19	1085	15	100
Sample 044	38157	2866	221	1	42	1	0.0751	3.6161	1.9152	4.3299	0.1850	2.3815	0.55	1071	73	1094	24	1086	29	101
Sample 155	34084	2734	0	0	38	0	0.0802	1.7826	2.0551	2.7049	0.1858	2.0344	0.75	1202	35	1099	21	1134	19	97
Sample 176	55429	4239	0	0	60	1	0.0765	1.2029	1.9851	2.3590	0.1883	2.0292	0.86	1108	24	1112	21	1110	16	100
Sample 045	12721	970	0	0	14	4	0.0763	2.1508	1.9822	3.3981	0.1885	2.6307	0.77	1102	43	1113	27	1109	23	100
Sample 086	21974	1712	0	0	23	3	0.0779	1.2960	2.0919	2.3859	0.1947	2.0032	0.84	1145	26	1147	21	1146	17	100
Sample 047	7728	613	0	1	8	1	0.0794	3.2189	2.1312	4.1464	0.1947	2.6136	0.63	1182	64	1147	28	1159	29	99
Sample 065	120639	9220	0	1	127	1	0.0764	2.8186	2.0543	3.5440	0.1950	2.1484	0.61	1106	56	1148	23	1134	24	101
Sample 170	272319	21309	0	0	282	1	0.0783	1.0735	2.1302	2.2215	0.1974	1.9449	0.88	1153	21	1162	21	1159	15	100
Sample 121	126386	11860	0	0	98	1	0.0938	1.0870	3.4137	1.9970	0.2638	1.6753	0.84	1505	21	1509	23	1508	16	100
Sample 081	137353	14895	1169	0	88	1	0.1084	1.1949	4.7578	2.1697	0.3182	1.8110	0.83	1773	22	1781	28	1777	18	100
Sample 127	62035	7563	0	0	40	1	0.1219	1.3369	5.3605	2.3803	0.3189	1.9694	0.83	1985	24	1784	31	1879	21	95
Sample 132	86712	10645	0	1	55	1	0.1228	1.9475	5.4262	2.7891	0.3206	1.9966	0.72	1997	35	1793	31	1889	24	95
Sample 145	460293	54563	0	0	279	0	0.1185	1.1051	5.5152	2.0785	0.3374	1.7603	0.85	1934	20	1874	29	1903	18	98
Sample 049	24386	2852	0	0	15	2	0.1169	1.2742	5.4762	2.5291	0.3396	2.1847	0.86	1910	23	1885	36	1897	22	99
Sample 172	91997	10590	738	0	55	2	0.1151	1.2763	5.4164	2.2716	0.3413	1.8791	0.83	1882	23	1893	31	1887	20	100
Sample 063	98924	12179	0	0	56	1	0.1231	1.7058	6.1491	3.1423	0.3623	2.6390	0.84	2002	30	1993	45	1997	28	100
Sample 146	263839	33381	0	0	149	1	0.1265	1.0591	6.3291	2.0860	0.3628	1.7971	0.86	2050	19	1995	31	2022	18	99
Sample 041	224357	28736	5075	0	121	2	0.1281	1.0349	6.7131	2.0897	0.3801	1.8154	0.87	2072	18	2077	32	2074	19	100
Sample 141	125404	15984	4030	0	67	1	0.1275	1.0346	6.7562	2.1264	0.3844	1.8577	0.87	2063	18	2097	33	2080	19	101
Sample 144	119955	15755	440	1	63	1	0.1313	1.5054	7.0809	2.4405	0.3910	1.9208	0.79	2116	26	2128	35	2122	22	100
Sample 152	201606	27639	0	1	102	2	0.1371	1.7934	7.6263	2.6513	0.4035	1.9527	0.74	2191	31	2185	36	2188	24	100
Sample 018	38831	5441	3107	0	19	3	0.1401	1.2285	8.0077	2.2038	0.4145	1.8296	0.83	2229	21	2235	35	2232	20	100
Sample 039	17233	1098	0	0	39	1	0.0637	2.9181	0.7872	3.9920	0.0896	2.7241	0.68	733	62	553	14	590	18	94
Sample 109	148340	21910	0	0	70	1	0.1477	1.1578	8.7777	2.4609	0.4310	2.1716	0.88	2319	20	2310	42	2315	23	100

Sample: Marine Barrier 2, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	^{207*}Pb/^{206*}Pb	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	^{207*}Pb/^{206*}Pb	*2σ*	^{206*}Pb/^{238}U	*2σ*	^{207*}Pb/^{235}U	*2σ*	*Conc. %*
Sample 085	87	4	0	0	94	1	0.0456	193.3377	0.0025	197.6425	0.0004	41.0256	0.21	-22	4680	3	1	2	5	101
Sample 026	134	6	0	0	78	1	0.0483	141.9081	0.0067	146.3160	0.0010	35.6436	0.24	115	3348	7	2	7	10	96
Sample 090	720	33	0	0	93	1	0.0464	25.2586	0.0210	26.1288	0.0033	6.6869	0.26	18	607	21	1	21	5	100
Sample 082	923	43	0	0	42	1	0.0470	34.3471	0.0596	35.7130	0.0092	9.7826	0.27	50	820	59	6	59	21	100
Sample 062	1446	68	0	0	92	1	0.0472	16.1304	0.0600	16.8860	0.0092	4.9946	0.30	61	384	59	3	59	10	100
Sample 023	2038	98	0	0	71	1	0.0481	7.9867	0.1112	9.0675	0.0168	4.2934	0.47	103	189	107	5	107	9	100
Sample 106	5919	285	0	0	141	1	0.0481	6.8342	0.1181	7.6211	0.0178	3.3727	0.44	106	161	114	4	113	8	100
Sample 108	6078	303	0	1	101	1	0.0499	9.0740	0.1757	12.7604	0.0256	8.9716	0.70	189	211	163	14	164	20	99
Sample 113	12801	658	0	0	134	1	0.0514	5.4637	0.2864	6.2431	0.0404	3.0205	0.48	260	126	255	8	256	14	100
Sample 094	11882	596	75	4	109	1	0.0501	14.8028	0.3178	21.6645	0.0460	15.8186	0.73	202	344	290	45	280	54	103

Sample 044	18443	969	0	0	221	1	0.0526	4.5852	0.3534	5.8605	0.0488	3.6498	0.62	310	104	307	11	307	16	100
Sample 043	9279	501	0	0	92	3	0.0540	2.4435	0.4370	3.1648	0.0587	2.0112	0.64	372	55	368	7	368	10	100
Sample 022	71112	4077	1571	0	391	0	0.0573	1.3436	0.5079	1.9078	0.0643	1.3544	0.71	504	30	401	5	417	7	96
Sample 104	31471	1807	0	1	166	1	0.0574	3.7783	0.6357	4.8404	0.0803	3.0256	0.63	507	83	498	15	500	19	100
Sample 022	20504	1179	0	0	149	1	0.0575	1.7388	0.6373	2.6620	0.0804	2.0157	0.76	511	38	498	10	501	11	100
Sample 025	27782	1568	232	1	202	1	0.0565	4.6827	0.6269	5.9944	0.0805	3.7424	0.62	470	104	499	18	494	24	101
Sample 093	21633	1230	776	0	113	1	0.0569	3.8917	0.6328	5.0490	0.0807	3.2167	0.64	487	86	500	16	498	20	100
Sample 050	20831	1195	0	0	149	1	0.0574	1.8296	0.6444	2.5615	0.0814	1.7927	0.70	507	40	505	9	505	10	100
Sample 112	26420	1523	0	0	137	1	0.0577	2.3240	0.6509	3.2329	0.0819	2.2475	0.70	517	51	507	11	509	13	100
Sample 084	12658	728	0	0	65	1	0.0575	1.8267	0.6533	2.6129	0.0824	1.8683	0.72	510	40	511	9	510	11	100
Sample 070	48732	2823	0	0	344	1	0.0579	1.2086	0.6611	2.0787	0.0828	1.6912	0.81	527	26	513	8	515	8	99
Sample 031	20930	1215	0	0	145	2	0.0581	1.9115	0.6732	2.7997	0.0841	2.0457	0.73	532	42	520	10	523	12	100
Sample 092	97799	5607	0	0	490	0	0.0573	1.1338	0.6684	2.0066	0.0846	1.6556	0.83	504	25	523	8	520	8	101
Sample 080	22420	1300	0	0	112	0	0.0580	1.5868	0.6781	2.4113	0.0848	1.8156	0.75	529	35	525	9	526	10	100
Sample 052	25427	1477	0	0	173	1	0.0581	2.4441	0.6861	3.4290	0.0857	2.4051	0.70	534	54	530	12	530	14	100
Sample 071	16867	977	0	0	115	1	0.0579	1.6741	0.6848	2.4728	0.0857	1.8199	0.74	527	37	530	9	530	10	100
Sample 021	19294	1104	183	1	130	1	0.0572	5.4206	0.6818	6.6622	0.0864	3.8733	0.58	500	119	534	20	528	28	101
Sample 051	46668	2703	0	0	308	0	0.0579	1.4330	0.7064	2.3611	0.0885	1.8766	0.79	527	31	546	10	543	10	101
Sample 033	80492	4741	0	0	312	1	0.0589	1.1205	0.7400	1.6471	0.0911	1.2072	0.73	563	24	562	7	562	7	100
Sample 086	21437	1279	0	0	99	1	0.0596	2.4816	0.7526	3.6104	0.0915	2.6224	0.73	591	54	565	14	570	16	99
Sample 088	3481	191	38	7	16	1	0.0549	26.9508	0.6995	31.3163	0.0925	15.9489	0.51	406	603	570	88	538	140	106
Sample 069	28986	1735	0	0	175	1	0.0598	1.3703	0.7982	2.2121	0.0967	1.7366	0.79	598	30	595	10	596	10	100
Sample 016	24542	1466	0	0	89	1	0.0597	1.5902	0.8004	2.1737	0.0972	1.4819	0.68	594	34	598	8	597	10	100
Sample 105	10948	661	0	0	47	4	0.0604	2.2863	0.8218	2.9883	0.0987	1.9242	0.64	617	49	607	11	609	14	100
Sample 017	12548	755	0	0	45	2	0.0602	2.5756	0.8253	3.4614	0.0995	2.3125	0.67	610	56	611	13	611	16	100
Sample 027	38607	2326	0	0	222	2	0.0603	1.1784	0.8446	2.0779	0.1017	1.7114	0.82	613	25	624	10	622	10	100
Sample 059	46303	2791	384	1	263	0	0.0603	2.6659	0.8565	3.4457	0.1031	2.1831	0.63	614	58	632	13	628	16	101
Sample 035	36133	2251	0	0	123	0	0.0623	1.5246	0.8937	2.2491	0.1040	1.6535	0.74	685	33	638	10	648	11	98
Sample 083	48312	2992	0	1	183	0	0.0619	3.7330	0.9539	4.5926	0.1117	2.6751	0.58	672	80	683	17	680	23	100
Sample 087	65158	4086	0	0	245	0	0.0627	1.2279	0.9723	2.1321	0.1125	1.7430	0.82	698	26	687	11	690	11	100
Sample 049	5266	329	0	0	27	2	0.0626	3.9156	0.9773	4.7271	0.1133	2.6483	0.56	694	83	692	17	692	24	100
Sample 011	2443	155	0	0	7	1	0.0633	4.7048	1.0415	6.1265	0.1193	3.9242	0.64	720	100	726	27	725	32	100
Sample 034	120708	8633	5871	0	297	1	0.0715	1.1126	1.4183	1.7284	0.1438	1.3227	0.77	972	23	866	11	897	10	97
Sample 065	109207	7553	703	0	426	1	0.0692	1.6312	1.4292	2.4209	0.1499	1.7887	0.74	904	34	900	15	901	15	100
Sample 066	37475	2654	415	1	138	0	0.0708	2.5422	1.5462	3.3428	0.1583	2.1707	0.65	952	52	947	19	949	21	100
Sample 041	28370	2030	667	0	101	1	0.0715	1.7862	1.6222	2.6213	0.1644	1.9186	0.73	973	36	981	17	979	17	100
Sample 031	263669	19305	0	1	543	1	0.0732	2.9319	1.7332	3.4096	0.1717	1.7405	0.51	1020	59	1021	16	1021	22	100
Sample 042	6685	481	132	2	23	1	0.0720	6.5750	1.7039	7.5556	0.1718	3.7225	0.49	985	134	1022	35	1010	50	101
Sample 029	25102	1829	262	1	85	2	0.0729	3.2386	1.7434	3.9240	0.1735	2.2157	0.56	1010	66	1031	21	1025	26	101
Sample 047	32423	2427	0	0	108	1	0.0749	1.6564	1.8131	2.6440	0.1757	2.0608	0.78	1065	33	1043	20	1050	17	99
Sample 089	182164	13555	0	0	436	0	0.0744	1.2364	1.8142	2.1824	0.1768	1.7983	0.82	1053	25	1050	17	1051	14	100
Sample 038	150773	11190	1767	0	496	0	0.0742	1.1611	1.8170	2.0766	0.1776	1.7217	0.83	1047	23	1054	17	1052	14	100
Sample 019	85261	6447	0	0	165	1	0.0756	1.0977	1.9085	1.6766	0.1831	1.2673	0.76	1085	22	1084	13	1084	11	100
Sample 040	14267	1090	0	0	44	1	0.0764	1.4263	1.9808	2.3369	0.1880	1.8512	0.79	1106	29	1110	19	1109	16	100
Sample 061	16539	1241	137	2	51	1	0.0751	6.6979	1.9463	7.9354	0.1881	4.2554	0.54	1070	135	1111	44	1097	55	101
Sample 024	8842	688	0	0	27	1	0.0779	1.7339	2.0905	2.6646	0.1947	2.0233	0.76	1143	34	1147	21	1146	18	100

Sample 110	86379	6922	0	0	173	0	0.0801	1.1605	2.3312	2.0558	0.2110	1.6969	0.83	1200	23	1234	19	1222	15	101
Sample 048	100678	8174	0	1	278	1	0.0812	2.6914	2.3686	3.2927	0.2116	1.8969	0.58	1226	53	1237	21	1233	24	100
Sample 060	28895	2484	681	0	73	1	0.0860	1.5718	2.7527	2.3857	0.2322	1.7947	0.75	1338	30	1346	22	1343	18	100
Sample 068	82820	8284	575	1	168	1	0.1000	1.9117	3.9710	2.8657	0.2879	2.1349	0.74	1624	36	1631	31	1628	24	100
Sample 039	178514	18201	0	0	355	1	0.1020	1.1769	4.1364	2.0839	0.2942	1.7197	0.83	1660	22	1663	25	1662	17	100
Sample 067	21827	2296	0	0	42	1	0.1052	1.3786	4.4167	2.3351	0.3046	1.8847	0.81	1717	25	1714	28	1715	20	100
Sample 111	13414	1421	0	0	18	2	0.1059	2.2285	4.5238	3.4550	0.3098	2.6402	0.76	1730	41	1740	40	1735	29	100
Sample 045	39554	4224	0	0	74	1	0.1068	1.3579	4.5800	2.4705	0.3111	2.0638	0.84	1745	25	1746	32	1746	21	100
Sample 012	41002	5056	0	0	40	1	0.1233	1.1192	6.2130	1.7549	0.3655	1.3517	0.77	2005	20	2008	23	2006	15	100
Sample 046	31512	4183	0	0	48	1	0.1327	1.8156	7.0509	3.1549	0.3853	2.5801	0.82	2135	32	2101	46	2118	28	99
Sample 030	331842	56626	0	0	397	1	0.1706	1.0373	11.5006	1.9898	0.4888	1.6980	0.85	2564	17	2566	36	2565	19	100
Sample 063	21205	3646	730	0	25	2	0.1719	1.7821	11.6884	3.1538	0.4931	2.6020	0.83	2577	30	2584	56	2580	30	100
Sample 081	41462	7538	0	0	34	2	0.1818	1.3201	12.8300	2.4166	0.5118	2.0242	0.84	2669	22	2664	44	2667	23	100
Sample 023	25434	4867	0	0	17	1	0.1913	1.1341	13.9787	1.9986	0.5299	1.6457	0.82	2754	19	2741	37	2748	19	100

Sample: Eolic Barrier 2, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	$^{207*}Pb/^{206*}Pb$	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	$^{207*}Pb/^{206*}Pb$	*2σ*	$^{206*}Pb/^{238}U$	*2σ*	$^{207*}Pb/^{235}U$	*2σ*	*Conc. %*
Sample 081	116	6	0	0	259	2	0.0482	220.5144	0.0053	227.4394	0.0008	55.6962	0.24	110	5207	5	3	5	12	96
Sample 17	138	7	0	0	138	1	0.0519	177.6473	0.0127	186.4148	0.0018	56.4972	0.30	283	4064	11	6	13	24	89
Sample 023	190	9	0	0	260	1	0.0475	71.5189	0.0084	73.5241	0.0013	17.0543	0.23	73	1700	8	1	9	6	97
Sample 171	437	20	0	0	485	1	0.0463	36.8092	0.0102	38.5107	0.0016	11.3208	0.29	14	885	10	1	10	4	100
Sample 079	173	8	0	0	163	1	0.0477	137.6833	0.0123	142.9655	0.0019	38.5027	0.27	86	3265	12	5	12	18	97
Sample 090	198	10	0	0	166	1	0.0495	80.9495	0.0144	83.8338	0.0021	21.8009	0.26	172	1890	14	3	15	12	94
Sample 132	437	21	0	0	230	1	0.0470	56.3470	0.0217	58.7744	0.0034	16.7164	0.28	51	1345	22	4	22	13	99
Sample 172	567	27	0	0	115	1	0.0474	37.6793	0.0567	39.7534	0.0087	12.6728	0.32	69	896	56	7	56	22	99
Sample 104	1030	49	0	0	148	1	0.0472	21.9822	0.0801	23.2199	0.0123	7.4797	0.32	60	524	79	6	78	18	101
Sample 122	911	44	0	0	110	1	0.0479	20.2378	0.0967	21.7356	0.0146	7.9289	0.36	96	479	94	7	94	20	100
Sample 058	1259	61	0	0	145	1	0.0482	11.2126	0.1019	12.3103	0.0154	5.0814	0.41	107	265	98	5	99	12	100
Sample 089	2496	120	0	0	286	1	0.0480	8.0850	0.1020	9.0308	0.0154	4.0234	0.45	99	191	99	4	99	9	100
Sample 167	509	25	0	0	45	2	0.0485	40.2477	0.1328	42.3819	0.0199	13.2797	0.31	121	948	127	17	127	52	100
Sample 076	4621	227	0	0	362	1	0.0491	3.7709	0.1523	4.5170	0.0225	2.4867	0.55	151	88	144	4	144	6	100
Sample 082	1125	55	0	0	84	1	0.0491	13.2844	0.1594	14.1094	0.0236	4.7538	0.34	152	311	150	7	150	20	100
Sample 046	2321	116	0	0	136	1	0.0498	7.1228	0.2066	8.2304	0.0301	4.1237	0.50	188	166	191	8	191	14	100
Sample 013	21314	1111	0	0	805	0	0.0521	2.0138	0.3362	3.0643	0.0468	2.3097	0.75	292	46	295	7	294	8	100
Sample 097	5608	295	0	0	209	2	0.0525	3.4647	0.3426	4.2448	0.0473	2.4524	0.58	309	79	298	7	299	11	100
Sample 026	3822	204	0	0	140	1	0.0535	3.3844	0.3562	4.1738	0.0483	2.4426	0.59	349	77	304	7	309	11	98
Sample 129	2540	139	0	0	93	1	0.0549	10.0565	0.3664	11.8561	0.0484	6.2797	0.53	408	225	305	19	317	33	96
Sample 055	1713	90	0	0	61	1	0.0528	14.7566	0.3592	16.8753	0.0494	8.1864	0.49	320	335	311	25	312	46	100
Sample 101	3487	185	164	2	109	1	0.0530	7.9458	0.4146	10.2774	0.0567	6.5183	0.63	331	180	355	23	352	31	101
Sample 121	5605	308	0	0	163	1	0.0549	3.0237	0.4610	3.8999	0.0609	2.4631	0.63	408	68	381	9	385	13	99
Sample 020	10383	570	0	0	298	1	0.0549	2.2587	0.4656	3.2530	0.0615	2.3411	0.72	408	51	385	9	388	11	99
Sample 047	11568	632	0	0	331	1	0.0546	3.8074	0.4652	4.9360	0.0618	3.1412	0.64	397	85	386	12	388	16	100
Sample 124	15791	891	0	0	384	1	0.0564	3.8646	0.5654	5.3408	0.0727	3.6864	0.69	469	86	452	16	455	20	99
Sample 057	9556	542	0	0	232	6	0.0567	2.1881	0.5693	3.1987	0.0729	2.3332	0.73	479	48	453	10	458	12	99
Sample 120	1584	90	0	0	38	1	0.0569	44.9947	0.5842	46.0923	0.0744	9.9987	0.22	489	993	463	45	467	189	99
Sample 125	8333	479	0	0	197	1	0.0575	2.0017	0.5904	2.8962	0.0745	2.0931	0.72	509	44	463	9	471	11	98

Sample 108	7838	446	0	0	184	1	0.0569	2.4416	0.5898	3.2927	0.0751	2.2092	0.67	489	54	467	10	471	12	99
Sample 080	14752	836	0	0	343	0	0.0567	2.8239	0.5938	3.9690	0.0760	2.7891	0.70	478	62	472	13	473	15	100
Sample 170	4491	259	0	0	102	1	0.0577	3.7775	0.6168	4.8681	0.0775	3.0706	0.63	519	83	481	14	488	19	99
Sample 106	6306	365	0	0	140	1	0.0580	4.2623	0.6372	5.4122	0.0798	3.3354	0.62	528	93	495	16	501	22	99
Sample 040	2038	118	0	0	44	2	0.0580	7.3263	0.6544	8.5209	0.0818	4.3510	0.51	530	161	507	21	511	35	99
Sample 024	4627	269	0	0	100	3	0.0581	3.4091	0.6569	4.4608	0.0820	2.8770	0.64	533	75	508	14	513	18	99
Sample 123	20615	1211	0	0	435	3	0.0588	1.4125	0.6781	2.3961	0.0837	1.9355	0.81	558	31	518	10	526	10	99
Sample 118	2240	130	0	0	47	1	0.0579	7.5289	0.6777	8.5064	0.0849	3.9590	0.47	526	165	525	20	525	36	100
Sample 143	4505	264	0	1	92	1	0.0586	5.4882	0.7021	6.8017	0.0869	4.0179	0.59	553	120	537	21	540	29	99
Sample 142	3888	230	0	0	78	1	0.0590	4.4207	0.7155	5.4488	0.0879	3.1854	0.58	569	96	543	17	548	23	99
Sample 109	9935	581	0	0	197	1	0.0585	2.9392	0.7184	4.0649	0.0890	2.8080	0.69	549	64	550	15	550	17	100
Sample 165	1645	97	0	0	32	1	0.0592	8.0912	0.7348	9.4187	0.0900	4.8212	0.51	574	176	556	26	559	41	99
Sample 111	1663	100	0	0	32	2	0.0600	7.1952	0.7695	8.1110	0.0930	3.7439	0.46	605	156	573	21	579	36	99
Sample 146	6325	379	0	0	120	0	0.0600	4.4863	0.7697	5.7176	0.0931	3.5446	0.62	602	97	574	19	580	26	99
Sample 043	10967	613	48	6	208	0	0.0559	20.5836	0.7183	24.0801	0.0932	12.4966	0.52	448	457	574	69	550	108	105
Sample 066	2861	171	0	0	54	1	0.0599	4.6084	0.7770	5.6160	0.0941	3.2097	0.57	600	100	580	18	584	25	99
Sample 107	10800	649	0	0	201	1	0.0601	2.6960	0.7849	3.8021	0.0947	2.6810	0.71	607	58	584	15	588	17	99
Sample 067	8723	518	0	0	161	2	0.0594	1.9684	0.7821	2.8752	0.0954	2.0958	0.73	583	43	588	12	587	13	100
Sample 110	21285	1274	0	0	385	0	0.0599	3.3250	0.8057	4.6260	0.0976	3.2162	0.70	598	72	601	18	600	21	100
Sample 044	2190	134	0	0	39	1	0.0610	8.0793	0.8275	9.7456	0.0984	5.4499	0.56	640	174	605	32	612	46	99
Sample 069	19587	1188	0	0	350	1	0.0607	1.5496	0.8258	2.5988	0.0987	2.0863	0.80	627	33	607	12	611	12	99
Sample 174	1682	100	225	1	30	1	0.0595	7.9627	0.8127	9.0430	0.0990	4.2862	0.47	586	173	609	25	604	42	101
Sample 130	4645	283	0	0	83	1	0.0608	6.4781	0.8324	7.9534	0.0993	4.6141	0.58	633	139	610	27	615	37	99
Sample 139	2600	157	0	0	46	2	0.0604	4.9471	0.8312	5.7689	0.0997	2.9677	0.51	619	107	613	17	614	27	100
Sample 105	22255	1354	0	0	390	0	0.0609	1.9063	0.8460	2.9424	0.1008	2.2414	0.76	634	41	619	13	622	14	99
Sample 038	16025	966	0	0	280	0	0.0603	2.1570	0.8396	3.2677	0.1010	2.4547	0.75	613	47	620	15	619	15	100
Sample 140	3897	235	0	0	68	2	0.0604	3.7564	0.8439	4.7594	0.1013	2.9226	0.61	619	81	622	17	621	22	100
Sample 100	1627	99	0	0	28	1	0.0608	7.3684	0.8500	8.2226	0.1014	3.6493	0.44	632	159	623	22	625	39	100
Sample 131	7850	479	0	0	135	2	0.0610	2.3275	0.8657	3.2000	0.1029	2.1961	0.69	640	50	631	13	633	15	100
Sample 126	3087	190	0	0	53	3	0.0615	3.7103	0.8757	4.5715	0.1034	2.6705	0.58	655	80	634	16	639	22	99
Sample 119	2413	150	0	0	41	1	0.0620	5.1144	0.8856	5.9944	0.1036	3.1266	0.52	674	109	636	19	644	29	99
Sample 149	2088	127	0	0	36	1	0.0611	10.1884	0.8736	12.2081	0.1038	6.7258	0.55	641	219	637	41	638	60	100
Sample 078	11906	731	0	0	203	2	0.0614	2.1162	0.8792	3.1773	0.1038	2.3699	0.75	654	45	637	14	641	15	99
Sample 151	7969	488	0	0	136	2	0.0612	2.2716	0.8761	3.2822	0.1038	2.3690	0.72	646	49	637	14	639	16	100
Sample 128	16116	991	0	0	273	1	0.0615	1.9024	0.8831	2.9589	0.1041	2.2662	0.77	657	41	639	14	643	14	99
Sample 083	6625	407	0	0	112	2	0.0614	3.4348	0.8823	4.4947	0.1042	2.8991	0.64	654	74	639	18	642	22	99
Sample 059	1897	117	0	0	32	1	0.0618	9.1012	0.8969	11.1252	0.1053	6.3983	0.58	665	195	646	39	650	55	99
Sample 150	3996	244	436	1	67	1	0.0611	5.9229	0.8874	7.2582	0.1054	4.1955	0.58	641	127	646	26	645	35	100
Sample 061	3207	198	0	0	53	1	0.0616	3.6346	0.9113	4.5302	0.1072	2.7042	0.60	661	78	657	17	658	22	100
Sample 153	1076	69	0	0	16	2	0.0642	14.3392	1.0492	16.4084	0.1186	7.9764	0.49	747	303	723	55	728	89	99
Sample 036	11181	714	0	0	164	1	0.0638	1.6917	1.0574	2.6819	0.1201	2.0811	0.78	736	36	731	14	733	14	100
Sample 060	1790	116	0	0	26	1	0.0648	11.5996	1.1067	14.1069	0.1238	8.0284	0.57	769	244	752	57	757	78	99
Sample 022	29334	1906	0	0	415	0	0.0650	1.8467	1.1181	2.9431	0.1248	2.2917	0.78	774	39	758	16	762	16	99
Sample 034	5258	352	0	0	69	1	0.0669	2.4798	1.2361	3.4333	0.1339	2.3744	0.69	836	52	810	18	817	19	99
Sample 048	11022	786	0	0	134	1	0.0713	1.5715	1.4278	2.5620	0.1453	2.0234	0.79	965	32	875	17	901	15	97
Sample 077	3571	248	0	0	42	1	0.0696	5.0611	1.4263	6.4222	0.1487	3.9535	0.62	915	104	894	33	900	39	99

Sample 102	3219	226	0	0	38	1	0.0702	6.0584	1.4410	7.7751	0.1490	4.8731	0.63	933	124	895	41	906	48	99
Sample 160	6686	455	125	2	79	0	0.0680	6.9826	1.3984	7.9305	0.1492	3.7597	0.47	868	145	896	32	888	48	101
Sample 086	24828	1768	0	0	281	1	0.0712	1.4603	1.5310	2.4981	0.1559	2.0268	0.81	964	30	934	18	943	15	99
Sample 103	12277	929	0	1	131	1	0.0756	5.0336	1.7233	6.5538	0.1652	4.1970	0.64	1086	101	986	38	1017	43	97
Sample 144	27220	2059	0	0	289	1	0.0757	1.8636	1.7338	3.0534	0.1662	2.4188	0.79	1086	37	991	22	1021	20	97
Sample 168	9852	735	465	1	98	1	0.0746	2.4586	1.8188	3.3659	0.1769	2.2988	0.68	1057	50	1050	22	1052	22	100
Sample 045	5122	388	0	0	51	2	0.0757	2.3108	1.8479	3.2802	0.1770	2.3281	0.71	1088	46	1050	23	1063	22	99
Sample 147	25806	1924	0	0	257	1	0.0746	1.4217	1.8213	2.4066	0.1772	1.9417	0.81	1057	29	1051	19	1053	16	100
Sample 068	17882	1361	0	0	174	1	0.0761	1.3533	1.9010	2.3770	0.1812	1.9542	0.82	1098	27	1073	19	1081	16	99
Sample 016	3959	306	0	0	37	1	0.0772	4.7138	1.9948	6.3602	0.1874	4.2699	0.67	1127	94	1107	44	1114	44	99
Sample 099	9828	756	0	0	92	3	0.0769	1.8203	2.0013	2.8262	0.1887	2.1619	0.76	1119	36	1114	22	1116	19	100
Sample 085	5021	398	0	0	45	1	0.0792	2.5495	2.1617	3.5191	0.1979	2.4257	0.69	1178	50	1164	26	1169	25	100
Sample 014	12047	1006	0	0	97	1	0.0835	1.6890	2.5171	2.7120	0.2187	2.1218	0.78	1280	33	1275	25	1277	20	100
Sample 027	8121	670	71	4	66	3	0.0825	10.3675	2.4889	11.5060	0.2188	4.9902	0.43	1258	203	1275	58	1269	87	101
Sample 018	16528	1492	0	0	117	0	0.0903	1.4072	3.1059	2.4350	0.2496	1.9872	0.82	1431	27	1436	26	1434	19	100
Sample 015	10109	1126	0	0	71	1	0.1114	1.4817	3.8757	2.5376	0.2524	2.0601	0.81	1822	27	1451	27	1609	21	90
Sample 065	4294	429	0	1	28	1	0.1000	2.8926	3.7544	3.8915	0.2723	2.6032	0.67	1624	54	1552	36	1583	32	98
Sample 162	14356	1481	0	1	90	1	0.1031	2.4471	3.9898	3.3457	0.2805	2.2816	0.68	1682	45	1594	32	1632	28	98
Sample 019	2725	291	0	0	16	1	0.1068	4.2603	4.3600	6.3096	0.2961	4.6541	0.74	1746	78	1672	69	1705	53	98
Sample 064	7027	740	0	1	42	1	0.1054	2.8501	4.3409	4.0541	0.2988	2.8832	0.71	1721	52	1685	43	1701	34	99
Sample 087	1326	138	0	0	8	2	0.1044	8.2192	4.3366	10.9942	0.3013	7.3019	0.66	1704	151	1698	110	1700	95	100
Sample 035	14896	1567	0	0	86	1	0.1052	1.4257	4.4273	2.5141	0.3052	2.0708	0.82	1718	26	1717	31	1717	21	100
Sample 161	14199	1499	0	0	81	1	0.1056	1.5249	4.5080	2.6787	0.3097	2.2023	0.82	1724	28	1739	34	1732	23	100
Sample 173	19075	2187	5103	0	102	0	0.1147	2.9321	5.2156	4.7673	0.3299	3.7589	0.79	1875	53	1838	60	1855	41	99
Sample 098	60767	6988	594	1	319	0	0.1150	1.5180	5.3304	2.4397	0.3362	1.9099	0.78	1880	27	1868	31	1874	21	100
Sample 164	25916	3170	0	0	126	1	0.1223	1.4387	6.1169	2.6336	0.3627	2.2059	0.84	1990	26	1995	38	1993	23	100
Sample 088	7496	960	67	5	34	1	0.1281	7.7994	6.9090	9.0404	0.3913	4.5714	0.51	2071	137	2129	83	2100	84	101
Sample 063	13755	1832	0	0	62	1	0.1332	1.3591	7.1913	2.4578	0.3916	2.0479	0.83	2140	24	2130	37	2135	22	100
Sample 037	47953	6759	0	0	205	0	0.1410	1.1422	8.0339	2.1851	0.4134	1.8628	0.85	2239	20	2230	35	2235	20	100
Sample 021	70202	12370	0	0	251	1	0.1762	1.3451	11.9964	2.5332	0.4938	2.1467	0.85	2617	22	2587	46	2604	24	99
Sample 042	11877	2686	0	0	35	1	0.2261	1.3134	18.5333	2.6615	0.5944	2.3149	0.87	3025	21	3007	56	3018	26	100
Sample 152	57661	15145	0	0	155	1	0.2627	1.1689	23.7666	2.2321	0.6563	1.9016	0.85	3263	18	3253	49	3259	22	100
Sample 084	33857	9374	0	0	89	1	0.2769	2.8893	25.7266	4.6369	0.6739	3.6267	0.78	3345	45	3321	95	3336	46	100

Sample: Marine Barrier 2, 170-230µm. Age accepted: (±5 % of discordance)																				
File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 024	77	4	0	0	279	1	0.0527	210.3187	0.0011	220.6318	0.0002	66.6667	0.30	317	4782	1	1	1	2	87
Sample 049	184	10	0	0	143	1	0.0524	73.5867	0.0051	78.9388	0.0007	28.5714	0.36	301	1678	5	1	5	4	88
Sample 058	309	14	0	0	140	1	0.0465	51.7427	0.0077	53.8730	0.0012	15.0000	0.28	23	1242	8	1	8	4	99
Sample 070	625	29	0	0	142	2	0.0468	36.5734	0.0154	39.5537	0.0024	15.0628	0.38	40	875	15	2	16	6	99
Sample 019	7638	367	0	0	305	2	0.0481	6.1798	0.0902	7.5067	0.0136	4.2616	0.57	102	146	87	4	88	6	99
Sample 012	9478	448	160	2	335	1	0.0473	7.6059	0.1004	22.8166	0.0154	21.5116	0.94	65	181	98	21	97	21	101
Sample 016	17808	851	270	1	493	1	0.0478	4.7959	0.1109	12.7082	0.0168	11.7685	0.93	90	114	108	13	107	13	101
Sample 110	28828	1378	0	0	917	1	0.0478	1.3595	0.1127	2.2203	0.0171	1.7554	0.79	90	32	109	2	108	2	101
Sample 045	12365	602	0	0	349	1	0.0487	2.9146	0.1294	3.9720	0.0193	2.6985	0.68	134	69	123	3	124	5	100
Sample 122	28019	1369	0	0	649	1	0.0489	1.6779	0.1582	2.4526	0.0235	1.7888	0.73	142	39	150	3	149	3	100

Sample 023	2097	104	0	0	37	2	0.0494	10.2206	0.1820	10.7850	0.0267	3.4431	0.32	167	239	170	6	170	17	100
Sample 063	7462	385	0	1	137	2	0.0516	5.0965	0.2114	8.9519	0.0297	7.3595	0.82	269	117	189	14	195	16	97
Sample 106	6099	305	5217	0	110	2	0.0500	4.1055	0.2085	5.0813	0.0303	2.9941	0.59	195	95	192	6	192	9	100
Sample 046	11905	589	167	2	177	2	0.0495	7.5348	0.2142	12.9205	0.0314	10.4960	0.81	172	176	199	21	197	23	101
Sample 131	4938	255	0	0	64	2	0.0516	4.8228	0.2978	6.0385	0.0418	3.6338	0.60	269	111	264	9	265	14	100
Sample 127	3153	174	140	2	33	1	0.0551	8.7920	0.3914	12.1488	0.0515	8.3842	0.69	415	196	324	27	335	35	97
Sample 105	49748	2699	0	0	457	1	0.0543	1.3088	0.4424	2.1921	0.0591	1.7585	0.80	381	29	370	6	372	7	100
Sample 066	120257	7144	1065	0	1083	1	0.0594	2.1755	0.4947	3.3817	0.0604	2.5891	0.77	582	47	378	10	408	11	93
Sample 114	16362	893	0	0	143	1	0.0546	1.5210	0.4695	2.4019	0.0624	1.8590	0.77	395	34	390	7	391	8	100
Sample 018	20109	1098	0	0	175	1	0.0546	1.3368	0.4714	2.2076	0.0626	1.7569	0.80	396	30	391	7	392	7	100
Sample 037	28886	1591	0	0	213	1	0.0551	2.2335	0.4789	3.0609	0.0631	2.0929	0.68	415	50	394	8	397	10	99
Sample 088	36483	2562	805	0	267	1	0.0702	1.5766	0.7182	2.5063	0.0742	1.9484	0.78	935	32	461	9	550	11	84
Sample 039	11390	650	0	0	69	1	0.0571	2.4536	0.6048	3.2007	0.0769	2.0554	0.64	494	54	477	9	480	12	99
Sample 087	64485	4602	0	0	443	1	0.0714	1.1770	0.7787	2.0416	0.0791	1.6681	0.82	968	24	491	8	585	9	84
Sample 046	13241	748	140	2	90	1	0.0565	7.1558	0.6234	8.9210	0.0801	5.3271	0.60	471	158	497	26	492	35	101
Sample 045	20382	1194	0	0	117	1	0.0586	5.2066	0.6529	6.7090	0.0808	4.2311	0.63	552	114	501	20	510	27	98
Sample 090	16134	945	0	0	107	1	0.0586	1.4164	0.6595	2.3009	0.0816	1.8133	0.79	552	31	506	9	514	9	98
Sample 060	21287	1199	0	0	142	1	0.0563	1.3497	0.6346	2.2193	0.0817	1.7617	0.79	465	30	507	9	499	9	102
Sample 041	47393	2767	0	0	255	0	0.0584	1.3018	0.6967	2.1491	0.0866	1.7100	0.80	544	28	535	9	537	9	100
Sample 042	18376	1081	0	0	115	1	0.0588	1.3601	0.7019	2.2396	0.0866	1.7793	0.79	560	30	535	9	540	9	99
Sample 015	15818	923	0	0	99	1	0.0584	1.5938	0.7009	2.4841	0.0871	1.9054	0.77	543	35	538	10	539	10	100
Sample 021	19247	1119	0	0	101	1	0.0581	2.5976	0.7077	3.5681	0.0883	2.4462	0.69	535	57	545	13	543	15	100
Sample 102	3955	233	0	0	24	1	0.0588	3.9266	0.7189	5.0539	0.0886	3.1818	0.63	561	86	547	17	550	22	100
Sample 035	30807	1825	0	0	160	1	0.0593	1.4177	0.7305	2.2480	0.0894	1.7446	0.78	576	31	552	9	557	10	99
Sample 081	58358	3437	856	0	354	0	0.0589	1.6829	0.7280	2.5848	0.0897	1.9619	0.76	563	37	554	10	555	11	100
Sample 038	38883	2267	1501	0	236	1	0.0583	1.3983	0.7214	2.2671	0.0898	1.7845	0.79	541	31	554	9	551	10	100
Sample 018	5333	307	0	0	27	1	0.0576	5.9427	0.7330	7.0245	0.0924	3.7454	0.53	513	131	570	20	558	31	102
Sample 019	52956	3117	0	0	266	0	0.0589	1.7839	0.7513	2.7520	0.0926	2.0955	0.76	562	39	571	11	569	12	100
Sample 065	12434	754	0	0	73	1	0.0606	1.6172	0.7753	2.5421	0.0928	1.9614	0.77	625	35	572	11	583	11	98
Sample 064	34856	2003	136	2	204	0	0.0575	7.3477	0.7376	8.8443	0.0931	4.9226	0.56	510	162	574	27	561	39	102
Sample 062	17364	1057	913	0	100	1	0.0608	2.1447	0.7932	3.0347	0.0946	2.1471	0.71	634	46	582	12	593	14	98
Sample 057	50938	3009	0	0	293	1	0.0591	1.1679	0.7712	2.0893	0.0947	1.7323	0.83	570	25	583	10	580	9	100
Sample 126	39322	2336	0	0	225	1	0.0594	1.3300	0.7769	2.2657	0.0949	1.8343	0.81	582	29	584	10	584	10	100
Sample 039	272199	16313	912	0	1554	0	0.0599	1.5878	0.7870	2.5627	0.0952	2.0116	0.78	601	34	586	11	589	12	99
Sample 100	27401	1661	0	0	156	1	0.0606	1.2867	0.7968	2.1820	0.0953	1.7623	0.81	626	28	587	10	595	10	99
Sample 128	11503	688	0	0	65	1	0.0598	1.6731	0.7984	2.5622	0.0969	1.9405	0.76	595	36	596	11	596	12	100
Sample 101	12476	741	0	0	70	1	0.0594	1.9350	0.7974	2.9139	0.0973	2.1786	0.75	583	42	599	12	595	13	101
Sample 043	15769	943	0	0	75	2	0.0598	2.1728	0.8047	3.0015	0.0976	2.0707	0.69	597	47	600	12	599	14	100
Sample 017	20216	1254	0	0	112	1	0.0620	1.3383	0.8389	2.2057	0.0981	1.7533	0.79	675	29	603	10	619	10	98
Sample 092	37878	2265	0	0	209	0	0.0598	1.2544	0.8118	2.1505	0.0985	1.7467	0.81	596	27	605	10	603	10	100
Sample 124	44462	2704	2497	0	244	1	0.0608	1.3478	0.8301	2.2582	0.0990	1.8119	0.80	633	29	608	11	614	10	99
Sample 125	5009	302	0	0	27	1	0.0603	3.6312	0.8295	4.7796	0.0998	3.1078	0.65	615	78	613	18	613	22	100
Sample 041	32772	2006	0	0	178	2	0.0612	1.2582	0.8469	2.1582	0.1004	1.7535	0.81	646	27	617	10	623	10	99
Sample 011	15406	929	0	0	82	1	0.0603	1.5912	0.8462	2.5140	0.1017	1.9463	0.77	615	34	625	12	623	12	100
Sample 130	6975	413	122	2	37	1	0.0592	8.0526	0.8323	9.5335	0.1019	5.1033	0.54	576	175	626	30	615	45	102
Sample 112	30686	1863	0	0	159	1	0.0607	1.3177	0.8769	2.2264	0.1048	1.7946	0.81	629	28	642	11	639	11	100

Sample 036	8621	537	0	0	44	2	0.0623	1.7490	0.9063	2.6502	0.1055	1.9911	0.75	685	37	646	12	655	13	99
Sample 079	28839	1788	0	1	148	1	0.0620	3.4567	0.9031	4.3088	0.1057	2.5723	0.60	674	74	647	16	653	21	99
Sample 056	30659	1896	9945	0	156	1	0.0618	1.2162	0.9092	2.1115	0.1067	1.7260	0.82	668	26	653	11	657	10	99
Sample 115	11685	711	333	1	60	1	0.0608	3.3133	0.8951	4.2620	0.1068	2.6809	0.63	633	71	654	17	649	21	101
Sample 044	2292	144	0	0	9	1	0.0629	13.5230	1.0268	14.8355	0.1183	6.1011	0.41	706	288	721	42	717	79	101
Sample 044	9478	656	0	1	44	0	0.0693	4.0130	1.1307	5.1335	0.1184	3.2012	0.62	906	83	721	22	768	28	94
Sample 109	13623	890	5795	0	58	1	0.0653	1.8269	1.1436	2.8653	0.1269	2.2074	0.77	786	38	770	16	774	16	99
Sample 078	41752	2759	0	0	176	1	0.0661	1.8006	1.1745	2.6352	0.1289	1.9241	0.73	809	38	782	14	789	15	99
Sample 022	80618	5322	0	0	291	0	0.0660	1.1360	1.1736	2.0113	0.1289	1.6598	0.83	807	24	782	12	788	11	99
Sample 077	65491	4313	0	0	269	1	0.0659	1.1390	1.2022	2.0394	0.1324	1.6917	0.83	802	24	802	13	802	11	100
Sample 017	62385	4106	0	0	219	1	0.0658	1.1851	1.2038	2.0139	0.1327	1.6283	0.81	801	25	803	12	802	11	100
Sample 104	41230	2932	0	0	142	1	0.0711	1.2092	1.5499	2.1553	0.1581	1.7841	0.83	961	25	946	16	950	13	100
Sample 111	17520	1249	0	0	59	1	0.0713	1.4310	1.5977	2.3450	0.1626	1.8578	0.79	965	29	971	17	969	15	100
Sample 113	19144	1401	0	0	64	1	0.0732	1.5166	1.6451	2.5392	0.1630	2.0366	0.80	1019	31	974	18	988	16	99
Sample 013	47706	3398	866	0	136	1	0.0712	1.5471	1.6042	2.3794	0.1633	1.8078	0.76	964	32	975	16	972	15	100
Sample 083	17862	1304	0	0	58	2	0.0730	1.5886	1.6817	2.4612	0.1670	1.8799	0.76	1015	32	996	17	1002	16	99
Sample 061	3947	291	963	0	13	2	0.0737	2.7116	1.7083	3.7029	0.1682	2.5216	0.68	1033	55	1002	23	1012	24	99
Sample 027	58653	4359	0	0	188	1	0.0743	1.1033	1.7340	2.0085	0.1692	1.6783	0.84	1050	22	1008	16	1021	13	99
Sample 068	15313	1223	0	0	49	1	0.0799	1.3273	1.8663	2.2790	0.1695	1.8526	0.81	1194	26	1009	17	1069	15	94
Sample 103	19618	1447	0	0	63	1	0.0737	1.3697	1.7350	2.3033	0.1707	1.8517	0.80	1034	28	1016	17	1022	15	99
Sample 047	104022	7830	0	0	330	0	0.0753	1.3286	1.7776	2.4081	0.1713	2.0084	0.83	1076	27	1019	19	1037	16	98
Sample 040	32645	2431	267	1	102	1	0.0745	3.0759	1.7838	3.7420	0.1738	2.1311	0.57	1054	62	1033	20	1040	25	99
Sample 040	105854	7780	0	0	281	1	0.0735	1.2109	1.7747	2.1072	0.1751	1.7245	0.82	1028	24	1040	17	1036	14	100
Sample 013	41696	3148	0	0	128	1	0.0755	1.1258	1.8433	2.0342	0.1771	1.6942	0.83	1082	23	1051	16	1061	13	99
Sample 037	17919	1339	0	0	55	1	0.0748	1.3645	1.8262	2.3088	0.1772	1.8624	0.81	1062	27	1052	18	1055	15	100
Sample 035	19204	1433	159	2	59	1	0.0746	5.0170	1.8350	5.7338	0.1784	2.7761	0.48	1058	101	1058	27	1058	38	100
Sample 059	30097	2450	0	0	76	1	0.0814	1.2529	2.4133	2.1969	0.2150	1.8047	0.82	1231	25	1255	21	1247	16	101
Sample 016	74508	7118	323	1	172	0	0.0955	2.2716	3.1067	2.9062	0.2359	1.8126	0.62	1539	43	1365	22	1434	23	95
Sample 107	84241	8655	0	0	155	2	0.1027	1.2069	4.1905	2.2280	0.2958	1.8728	0.84	1674	22	1671	28	1672	18	100
Sample 067	79324	8784	0	0	137	2	0.1107	1.0837	4.8218	2.0137	0.3158	1.6972	0.84	1811	20	1769	26	1789	17	99
Sample 108	107413	12886	0	0	179	1	0.1200	1.9922	5.3826	3.1691	0.3254	2.4647	0.78	1956	36	1816	39	1882	28	96
Sample 043	31550	3574	0	0	52	1	0.1133	1.6244	5.1213	2.8754	0.3279	2.3725	0.83	1853	29	1828	38	1840	25	99
Sample 048	51239	5805	0	0	73	0	0.1133	4.2983	5.1238	6.0835	0.3280	4.3050	0.71	1853	78	1829	69	1840	53	99
Sample 015	26743	3111	0	0	37	1	0.1163	1.4012	5.4294	2.3344	0.3385	1.8671	0.80	1901	25	1879	31	1890	20	99
Sample 123	42292	5021	0	0	67	3	0.1187	1.1792	5.5783	2.1337	0.3408	1.7783	0.83	1937	21	1890	29	1913	19	99
Sample 034	71791	8641	0	0	95	1	0.1204	1.1964	5.8327	2.0707	0.3515	1.6900	0.82	1962	21	1942	28	1951	18	100
Sample 020	23838	2865	0	0	31	2	0.1202	1.5560	5.8934	2.6753	0.3557	2.1762	0.81	1959	28	1962	37	1960	23	100
Sample 014	71242	8626	0	0	90	2	0.1211	1.2141	6.1534	2.1814	0.3686	1.8123	0.83	1972	22	2023	32	1998	19	101
Sample 048	34517	4458	0	0	51	2	0.1291	1.1073	6.5732	2.0663	0.3692	1.7445	0.84	2086	19	2025	30	2056	18	99
Sample 042	90996	11629	1565	0	114	1	0.1278	1.1903	6.5346	2.0814	0.3708	1.7075	0.82	2068	21	2033	30	2051	18	99
Sample 025	95703	12820	0	0	113	1	0.1340	1.0973	7.2696	1.9956	0.3936	1.6668	0.84	2151	19	2139	30	2145	18	100
Sample 082	78320	12118	0	0	97	1	0.1547	1.6934	9.4103	3.0180	0.4411	2.4982	0.83	2399	29	2356	49	2379	28	99
Sample 026	230811	35379	0	0	239	0	0.1533	1.1678	9.5163	2.1002	0.4503	1.7456	0.83	2383	20	2396	35	2389	19	100
Sample 038	130782	22194	0	0	125	1	0.1697	1.3023	11.3907	2.1194	0.4868	1.6721	0.79	2555	22	2557	35	2556	20	100
Sample 084	67028	12144	0	0	71	1	0.1812	1.1094	12.7786	2.0536	0.5115	1.7281	0.84	2664	18	2663	38	2663	20	100
Sample 129	100062	18332	2887	0	105	1	0.1832	1.1633	13.1483	2.0908	0.5205	1.7373	0.83	2682	19	2701	38	2690	20	100

Sample 024	133644	24826	944	0	119	1	0.1858	1.1816	13.3791	2.0555	0.5224	1.6819	0.82	2705	20	2709	37	2707	20	100
Sample 069	353834	83958	0	0	316	1	0.2373	1.3275	19.9438	2.4428	0.6096	2.0505	0.84	3102	21	3068	50	3089	24	99

Sample: Eolic Barrier 2, 170-230µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 011	1271	57	107	2	318	0	0.0452	15.5429	0.0096	316.2490	0.0015	315.8668	1.00	-45	378	10	31	10	31	102
Sample 022	382	18	0	0	125	1	0.0461	74.5443	0.0098	77.0160	0.0016	19.3548	0.25	2	1796	10	2	10	8	100
Sample 032	1196	57	0	0	83	1	0.0473	32.6280	0.0473	34.2662	0.0073	10.4683	0.31	62	777	47	5	47	16	99
Sample 058	1039	49	0	0	39	1	0.0476	34.1181	0.0640	34.9066	0.0098	7.3770	0.21	78	810	63	5	63	22	99
Sample 019	10313	470	74	4	404	2	0.0455	16.2126	0.0813	57.4912	0.0130	55.1579	0.96	-27	393	83	46	79	45	105
Sample 038	2049	96	0	1	48	1	0.0470	20.0928	0.1013	24.7224	0.0157	14.4041	0.58	47	480	100	14	98	23	102
Sample 022	7494	362	0	0	157	1	0.0484	3.5153	0.1226	4.4450	0.0184	2.7203	0.61	117	83	117	3	117	5	100
Sample 019	2858	145	0	0	28	1	0.0507	8.1198	0.2579	8.6509	0.0369	2.9843	0.34	229	188	233	7	233	18	100
Sample 014	10775	551	296	1	99	2	0.0511	5.3946	0.2954	7.6042	0.0419	5.3593	0.70	247	124	265	14	263	18	101
Sample 039	38801	1997	284	1	449	1	0.0515	3.9912	0.3110	6.1485	0.0438	4.6770	0.76	262	92	277	13	275	15	101
Sample 022	22831	1215	0	0	188	2	0.0532	2.2552	0.3241	3.0391	0.0442	2.0371	0.67	338	51	279	6	285	8	98
Sample 021	22512	1176	0	0	189	1	0.0523	1.5882	0.3306	2.3910	0.0459	1.7873	0.75	297	36	289	5	290	6	100
Sample 046	9692	494	90	3	100	1	0.0510	12.4382	0.3445	17.5738	0.0490	12.4149	0.71	240	287	308	37	301	47	103
Sample 039	6070	345	0	0	44	1	0.0569	6.8881	0.3983	7.9550	0.0508	3.9795	0.50	488	152	319	12	340	23	94
Sample 054	14091	713	64	4	101	1	0.0506	17.1527	0.3552	23.9398	0.0509	16.7003	0.70	224	397	320	52	309	66	104
Sample 033	18179	1256	0	0	129	1	0.0691	3.9236	0.4889	5.0595	0.0513	3.1944	0.63	901	81	323	10	404	17	80
Sample 016	20106	1080	0	0	140	1	0.0537	1.6561	0.4102	2.4241	0.0554	1.7702	0.73	360	37	347	6	349	7	100
Sample 037	35496	1871	99	3	235	1	0.0527	10.6621	0.4232	14.3908	0.0582	9.6652	0.67	316	242	365	34	358	44	102
Sample 032	24267	1318	0	0	152	1	0.0543	2.1723	0.4363	2.9936	0.0583	2.0597	0.69	384	49	365	7	368	9	99
Sample 024	11257	616	0	0	90	1	0.0547	3.1067	0.4782	4.0839	0.0634	2.6507	0.65	401	70	396	10	397	14	100
Sample 043	2850	159	0	0	20	0	0.0559	6.3685	0.5588	6.9513	0.0725	2.7862	0.40	448	141	451	12	451	26	100
Sample 037	11785	669	0	0	56	3	0.0567	2.5207	0.6027	3.2009	0.0771	1.9727	0.62	481	56	478	9	479	12	100
Sample 057	34910	1984	0	0	165	1	0.0568	1.8652	0.6051	2.6375	0.0772	1.8648	0.71	485	41	480	9	480	10	100
Sample 045	76409	4344	0	0	356	1	0.0569	2.3219	0.6132	3.2689	0.0782	2.3009	0.70	486	51	486	11	486	13	100
Sample 037	25837	1468	0	0	165	1	0.0568	1.5309	0.6212	2.3371	0.0793	1.7659	0.76	485	34	492	8	491	9	100
Sample 062	26334	1500	1032	0	120	1	0.0570	3.2071	0.6304	3.8987	0.0803	2.2169	0.57	490	71	498	11	496	15	100
Sample 023	17984	1041	0	0	79	1	0.0579	1.7453	0.6620	2.4613	0.0830	1.7356	0.71	525	38	514	9	516	10	100
Sample 017	30073	1727	148	2	139	0	0.0574	6.7518	0.6620	8.3487	0.0836	4.9105	0.59	508	148	518	24	516	34	100
Sample 041	46385	2666	612	0	199	3	0.0575	2.0441	0.6741	2.8103	0.0851	1.9286	0.69	510	45	526	10	523	12	101
Sample 034	22861	1329	0	0	135	1	0.0582	1.5993	0.6881	2.4212	0.0858	1.8178	0.75	535	35	531	9	532	10	100
Sample 011	35010	2034	0	0	200	1	0.0581	1.6010	0.7118	2.2939	0.0889	1.6428	0.72	533	35	549	9	546	10	101
Sample 019	40660	2508	0	0	176	2	0.0617	2.1397	0.7576	3.0214	0.0891	2.1332	0.71	663	46	550	11	573	13	96
Sample 041	24794	1455	0	0	106	1	0.0587	1.4997	0.7266	2.2950	0.0898	1.7372	0.76	555	33	554	9	555	10	100
Sample 043	40850	2435	0	0	166	1	0.0596	2.1976	0.7393	3.0948	0.0900	2.1790	0.70	589	48	555	12	562	13	99
Sample 042	16693	979	0	0	66	2	0.0586	2.8313	0.7420	3.5860	0.0918	2.2007	0.61	553	62	566	12	564	16	100
Sample 033	13660	806	0	0	74	1	0.0590	3.8286	0.7636	4.9475	0.0938	3.1337	0.63	568	83	578	17	576	22	100
Sample 043	16737	994	0	0	68	0	0.0594	2.6427	0.7768	3.6884	0.0948	2.5730	0.70	582	57	584	14	584	17	100
Sample 038	21663	1370	0	0	114	1	0.0633	1.6759	0.8394	2.5112	0.0963	1.8701	0.74	717	36	592	11	619	12	96
Sample 015	8358	502	0	0	33	1	0.0601	2.2962	0.8037	3.0724	0.0970	2.0414	0.66	607	50	597	12	599	14	100
Sample 035	20957	1276	0	0	83	1	0.0609	2.1182	0.8186	3.0950	0.0975	2.2566	0.73	636	46	600	13	607	14	99
Sample 055	43954	2628	0	0	164	1	0.0598	2.0408	0.8049	2.8625	0.0977	2.0072	0.70	596	44	601	12	600	13	100

Sample 052	42990	2579	660	0	157	2	0.0600	2.4308	0.8248	3.2965	0.0997	2.2266	0.68	603	53	613	13	611	15	100
Sample 013	67081	3979	66588	0	243	1	0.0593	1.2813	0.8229	2.1048	0.1006	1.6698	0.79	579	28	618	10	610	10	101
Sample 034	33103	2016	0	1	126	1	0.0609	3.5502	0.8516	4.4007	0.1014	2.6004	0.59	635	76	623	15	626	21	100
Sample 053	17008	1012	140	2	61	1	0.0595	7.1562	0.8405	8.3578	0.1025	4.3176	0.52	585	155	629	26	619	40	102
Sample 025	10422	638	0	0	39	1	0.0612	2.0425	0.8737	2.8513	0.1035	1.9896	0.70	646	44	635	12	638	14	100
Sample 045	92965	5649	0	0	345	1	0.0608	1.3658	0.8702	2.2219	0.1039	1.7525	0.79	631	29	637	11	636	11	100
Sample 035	66576	4055	0	0	233	1	0.0609	1.2477	0.8768	2.0820	0.1044	1.6667	0.80	636	27	640	10	639	10	100
Sample 036	13865	847	0	0	48	3	0.0611	2.3077	0.8809	3.0466	0.1046	1.9891	0.65	643	50	641	12	641	15	100
Sample 039	75869	4645	593	0	279	0	0.0612	2.0298	0.8849	2.8488	0.1048	1.9989	0.70	647	44	643	12	644	14	100
Sample 040	117819	7199	0	0	409	1	0.0611	1.3093	0.8853	2.1711	0.1051	1.7318	0.80	643	28	644	11	644	10	100
Sample 063	59092	4048	1491	0	204	1	0.0685	1.4870	0.9982	2.2457	0.1057	1.6828	0.75	884	31	648	10	703	11	92
Sample 026	23684	1456	404	1	86	2	0.0615	2.7339	0.8977	3.5511	0.1059	2.2663	0.64	655	59	649	14	650	17	100
Sample 015	97658	6080	0	0	333	1	0.0623	1.2689	0.9177	2.1991	0.1069	1.7961	0.82	683	27	655	11	661	11	99
Sample 036	13812	846	0	0	49	1	0.0613	2.9388	0.9182	3.9812	0.1087	2.6858	0.67	648	63	665	17	661	20	101
Sample 036	31045	1837	0	0	141	0	0.0592	1.4872	0.9115	2.2592	0.1117	1.7007	0.75	573	32	683	11	658	11	104
Sample 013	25152	1821	0	0	84	1	0.0724	2.8035	1.1570	3.9837	0.1159	2.8303	0.71	997	57	707	19	781	22	91
Sample 059	30639	1923	691	0	96	1	0.0628	2.6639	1.0129	3.4405	0.1170	2.1774	0.63	701	57	713	15	710	18	100
Sample 047	5799	372	0	0	25	1	0.0642	6.6822	1.0374	8.0593	0.1172	4.5055	0.56	748	141	714	31	723	43	99
Sample 035	22747	1449	1328	0	98	1	0.0637	1.6272	1.0338	2.4037	0.1177	1.7692	0.74	732	34	717	12	721	12	99
Sample 017	30655	1968	255	1	124	1	0.0642	3.6363	1.1124	4.3759	0.1257	2.4342	0.56	748	77	763	18	759	24	101
Sample 018	80744	5288	602	0	230	0	0.0655	1.8623	1.1540	2.6362	0.1278	1.8659	0.71	790	39	775	14	779	14	100
Sample 017	39373	2558	124	2	105	1	0.0650	7.1477	1.2243	8.1114	0.1367	3.8348	0.47	774	150	826	30	812	46	102
Sample 020	18384	1236	0	0	66	0	0.0673	1.7249	1.2998	2.5856	0.1402	1.9261	0.74	846	36	846	15	846	15	100
Sample 038	13541	929	0	0	37	1	0.0686	2.0836	1.3336	3.0299	0.1409	2.1997	0.73	888	43	850	18	860	18	99
Sample 033	25799	1753	0	0	71	1	0.0680	1.6627	1.3207	2.5366	0.1410	1.9156	0.76	867	34	850	15	855	15	99
Sample 060	6612	472	0	1	16	1	0.0715	5.0453	1.5121	5.7146	0.1535	2.6836	0.47	971	103	920	23	935	36	98
Sample 012	13884	999	0	0	43	1	0.0719	2.2241	1.6225	2.9783	0.1636	1.9808	0.67	984	45	977	18	979	19	100
Sample 064	353912	25577	0	0	772	0	0.0723	1.3284	1.6654	2.1569	0.1671	1.6993	0.79	994	27	996	16	995	14	100
Sample 021	29756	2178	0	0	63	1	0.0732	1.3934	1.7325	2.2352	0.1717	1.7476	0.78	1019	28	1021	17	1021	14	100
Sample 014	108929	7995	2529	0	229	0	0.0734	1.1579	1.7583	2.0356	0.1737	1.6741	0.82	1025	23	1033	16	1030	13	100
Sample 044	116223	8681	0	0	238	1	0.0747	1.5665	1.8342	2.5395	0.1781	1.9988	0.79	1060	32	1057	20	1058	17	100
Sample 016	20298	1540	0	0	58	1	0.0759	2.7145	1.8642	3.9125	0.1782	2.8177	0.72	1092	54	1057	28	1068	26	99
Sample 040	37473	2820	219	1	103	1	0.0752	3.7608	1.9042	4.3745	0.1836	2.2344	0.51	1075	76	1086	22	1083	30	100
Sample 047	56049	4511	0	0	110	1	0.0805	1.4039	2.1750	2.3445	0.1960	1.8777	0.80	1209	28	1154	20	1173	16	98
Sample 018	13426	1066	0	0	26	1	0.0794	1.8519	2.1942	2.7961	0.2005	2.0950	0.75	1182	37	1178	23	1179	20	100
Sample 048	109935	9071	0	0	207	2	0.0825	2.0119	2.3284	3.1048	0.2047	2.3648	0.76	1258	39	1200	26	1221	22	98
Sample 042	114814	12909	0	0	209	1	0.1124	1.5121	3.2759	2.5048	0.2113	1.9970	0.80	1839	27	1236	22	1475	20	84
Sample 061	70530	5779	0	0	120	1	0.0819	1.2694	2.4143	2.0426	0.2137	1.6002	0.78	1244	25	1249	18	1247	15	100
Sample 056	40625	3368	0	0	68	0	0.0829	2.7138	2.4835	3.9116	0.2173	2.8170	0.72	1267	53	1267	32	1267	29	100
Sample 024	149588	14486	0	0	203	1	0.0968	1.0636	3.5918	1.8892	0.2690	1.5613	0.83	1564	20	1536	21	1548	15	99
Sample 034	102304	10979	0	0	123	1	0.1073	1.0995	4.4865	1.9275	0.3032	1.5831	0.82	1754	20	1707	24	1728	16	99
Sample 044	87617	9274	0	0	144	1	0.1059	1.1526	4.4892	2.0353	0.3076	1.6776	0.82	1729	21	1729	25	1729	17	100
Sample 040	294900	34548	0	0	331	1	0.1172	1.3487	5.5379	2.3124	0.3429	1.8784	0.81	1913	24	1900	31	1907	20	100
Sample 066	47734	6232	0	1	49	1	0.1306	2.0971	6.3609	2.8575	0.3533	1.9409	0.68	2106	37	1951	33	2027	25	96
Sample 020	128956	15881	1339	0	139	1	0.1231	1.3740	6.0688	2.2253	0.3574	1.7505	0.79	2002	24	1970	30	1986	20	99
Sample 012	24552	2923	90	3	26	1	0.1191	6.0918	5.8899	6.9516	0.3588	3.3488	0.48	1942	109	1976	57	1960	62	101

Sample 041	163097	20653	829	0	227	1	0.1266	1.2764	6.3461	2.1753	0.3635	1.7615	0.81	2052	23	1999	30	2025	19	99
Sample 016	46084	5751	8544	0	45	1	0.1248	1.5636	6.3770	2.4314	0.3706	1.8619	0.77	2026	28	2032	33	2029	22	100
Sample 015	40076	5202	588	1	54	1	0.1298	1.3760	6.6853	2.1700	0.3735	1.6779	0.77	2095	24	2046	29	2071	19	99
Sample 014	128979	16234	0	1	173	0	0.1259	1.9216	6.5440	2.5309	0.3771	1.6470	0.65	2041	34	2063	29	2052	23	101
Sample 046	41570	5422	0	0	42	1	0.1304	1.6025	6.8435	2.7064	0.3806	2.1809	0.81	2104	28	2079	39	2091	24	99
Sample 025	33138	4357	154	2	30	1	0.1315	3.3275	7.1881	3.9486	0.3966	2.1258	0.54	2118	58	2153	39	2135	36	101
Sample 021	37166	5114	0	0	47	1	0.1376	1.1191	7.5528	2.0212	0.3981	1.6831	0.83	2197	19	2160	31	2179	18	99
Sample 044	118438	17706	0	0	105	1	0.1495	2.1405	8.9242	3.4222	0.4329	2.6701	0.78	2340	37	2319	52	2330	32	100
Sample 045	238765	36623	0	1	273	1	0.1534	1.9336	9.3833	2.8384	0.4437	2.0780	0.73	2384	33	2367	41	2376	26	100
Sample 023	67344	11195	1629	0	55	0	0.1662	1.6109	10.9074	2.9194	0.4759	2.4348	0.83	2520	27	2509	51	2515	28	100
Sample 024	241753	42904	1762	0	185	1	0.1775	1.2894	12.2912	2.2183	0.5023	1.8051	0.81	2629	21	2624	39	2627	21	100
Sample 020	88507	16221	0	0	63	1	0.1833	1.0967	13.0463	2.0464	0.5163	1.7277	0.84	2683	18	2683	38	2683	19	100

Sample: Marine Barrier 3, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 038	20583	997	0	1	1157	2	0.0484	4.9813	0.0145	92.3188	0.0022	92.1843	1.00	121	117	14	13	15	13	96
Sample 013	3821	183	0	1	199	2	0.0478	6.7563	0.0154	85.7750	0.0023	85.5085	1.00	92	160	15	13	16	13	97
Sample 147	6725	322	0	0	73	1	0.0479	4.8195	0.0868	5.2696	0.0131	2.1309	0.40	96	114	84	2	85	4	100
Sample 012	15934	764	0	0	131	2	0.0480	1.7928	0.0984	2.0905	0.0149	1.0753	0.51	98	42	95	1	95	2	100
Sample 043	81824	3948	0	1	595	2	0.0483	4.3916	0.1116	12.7542	0.0168	11.9743	0.94	112	104	107	13	107	13	100
Sample 023	26785	1333	0	0	150	1	0.0498	1.8280	0.1500	2.2325	0.0219	1.2815	0.57	185	43	139	2	142	3	98
Sample 031	49884	2484	0	0	211	2	0.0498	1.2249	0.1985	1.5196	0.0289	0.8993	0.59	186	29	184	2	184	3	100
Sample 020	15999	812	0	0	51	1	0.0508	2.2853	0.2655	2.8094	0.0379	1.6342	0.58	230	53	240	4	239	6	100
Sample 171	24593	1300	0	1	76	1	0.0529	4.2637	0.3339	6.2237	0.0458	4.5338	0.73	323	97	289	13	293	16	99
Sample 167	115242	6261	0	0	275	0	0.0543	1.2332	0.4453	1.5518	0.0595	0.9420	0.61	385	28	372	3	374	5	100
Sample 165	161305	8831	459	1	367	1	0.0547	2.4223	0.4705	3.2240	0.0623	2.1276	0.66	402	54	390	8	392	11	100
Sample 016	310847	17544	0	0	504	1	0.0564	1.0985	0.5854	1.3576	0.0752	0.7977	0.59	470	24	468	4	468	5	100
Sample 162	65607	3757	0	0	119	1	0.0573	1.2572	0.6191	1.6192	0.0784	1.0204	0.63	502	28	487	5	489	6	99
Sample 140	161444	9217	0	0	286	1	0.0571	1.1911	0.6294	1.6048	0.0800	1.0755	0.67	495	26	496	5	496	6	100
Sample 019	156650	8990	0	0	235	1	0.0574	1.3417	0.6436	1.7236	0.0813	1.0820	0.63	507	30	504	5	505	7	100
Sample 142	58125	3368	1678	0	101	1	0.0579	1.4252	0.6528	1.8296	0.0817	1.1473	0.63	528	31	506	6	510	7	99
Sample 044	117009	6727	0	0	175	1	0.0575	1.1828	0.6482	1.4746	0.0818	0.8805	0.60	510	26	507	4	507	6	100
Sample 174	64985	3867	0	0	106	1	0.0595	1.8824	0.7132	2.5849	0.0869	1.7715	0.69	585	41	537	9	547	11	98
Sample 152	79666	4636	265	1	129	1	0.0582	3.7003	0.7022	4.4834	0.0875	2.5315	0.56	537	81	541	13	540	19	100
Sample 010	56074	3288	0	0	76	2	0.0586	1.2619	0.7275	1.6242	0.0900	1.0224	0.63	554	28	555	5	555	7	100
Sample 176	221871	13106	0	0	348	0	0.0591	1.0835	0.7374	1.4555	0.0905	0.9719	0.67	570	24	559	5	561	6	100
Sample 033	144041	8566	0	0	193	1	0.0595	1.0930	0.7477	1.3484	0.0912	0.7896	0.59	584	24	563	4	567	6	99
Sample 037	131988	7852	3501	0	176	1	0.0595	1.2217	0.7488	1.5260	0.0913	0.9144	0.60	585	27	563	5	568	7	99
Sample 141	71876	4261	0	0	111	2	0.0593	1.1471	0.7483	1.4966	0.0916	0.9612	0.64	577	25	565	5	567	7	100
Sample 151	131388	7755	0	0	203	1	0.0590	1.1691	0.7462	1.5265	0.0917	0.9815	0.64	568	25	566	5	566	7	100
Sample 017	4179	251	0	0	47	1	0.0602	2.6255	0.7623	3.6278	0.0919	2.5035	0.69	610	57	567	14	575	16	98
Sample 144	80239	4749	0	0	123	1	0.0592	1.6898	0.7532	2.2419	0.0923	1.4733	0.66	574	37	569	8	570	10	100
Sample 014	63860	3806	0	0	84	2	0.0596	1.3591	0.7621	1.7349	0.0927	1.0783	0.62	589	29	572	6	575	8	99
Sample 045	15723	930	0	0	21	2	0.0591	2.1143	0.7603	2.6959	0.0933	1.6726	0.62	572	46	575	9	574	12	100
Sample 161	213217	12499	0	0	322	3	0.0586	1.9447	0.7604	2.5695	0.0941	1.6794	0.65	553	42	580	9	574	11	101
Sample 163	118182	7037	0	0	177	1	0.0595	1.1253	0.7782	1.4999	0.0948	0.9917	0.66	587	24	584	6	584	7	100

Sample 169	14873	831	42	7	22	0	0.0559	23.7224	0.7352	27.4554	0.0954	13.8219	0.50	448	527	588	78	560	126	105
Sample 139	238550	14215	4070	0	352	1	0.0596	1.0809	0.7906	1.4228	0.0962	0.9251	0.65	589	23	592	5	591	6	100
Sample 154	46352	2792	0	0	68	1	0.0602	1.1954	0.7991	1.5704	0.0962	1.0184	0.65	612	26	592	6	596	7	99
Sample 014	14926	891	0	0	160	0	0.0597	3.0318	0.7945	4.1961	0.0965	2.9010	0.69	593	66	594	16	594	19	100
Sample 172	58307	3498	0	0	86	1	0.0600	1.2502	0.7998	1.6094	0.0967	1.0135	0.63	603	27	595	6	597	7	100
Sample 024	35264	2147	0	0	364	1	0.0609	1.4455	0.8413	2.3999	0.1002	1.9158	0.80	635	31	616	11	620	11	99
Sample 146	80688	4913	0	0	114	2	0.0609	1.1332	0.8417	1.4965	0.1003	0.9775	0.65	635	24	616	6	620	7	99
Sample 022	7907	481	0	0	80	1	0.0608	2.4519	0.8546	3.6083	0.1020	2.6473	0.73	631	53	626	16	627	17	100
Sample 138	129269	7819	947	0	178	0	0.0605	1.4755	0.8570	1.8652	0.1028	1.1409	0.61	621	32	631	7	628	9	100
Sample 177	119811	7323	0	1	165	1	0.0611	3.4889	0.8678	4.1336	0.1030	2.2167	0.54	644	75	632	13	634	20	100
Sample 021	17717	1093	9496	0	178	1	0.0617	1.6401	0.8768	2.5857	0.1031	1.9990	0.77	663	35	632	12	639	12	99
Sample 041	17281	1049	0	0	20	1	0.0607	1.9928	0.8634	2.6363	0.1031	1.7260	0.65	629	43	633	10	632	12	100
Sample 016	46651	2835	0	0	466	1	0.0608	1.3164	0.8687	2.2878	0.1037	1.8711	0.82	631	28	636	11	635	11	100
Sample 168	998737	61173	0	0	1349	0	0.0613	1.0612	0.8868	1.5181	0.1050	1.0856	0.72	648	23	644	7	645	7	100
Sample 153	129073	7935	0	0	174	1	0.0615	1.2036	0.8906	1.5829	0.1051	1.0280	0.65	656	26	644	6	647	8	100
Sample 012	2523	154	0	0	25	1	0.0611	3.4059	0.8883	4.5107	0.1055	2.9573	0.66	642	73	647	18	645	22	100
Sample 148	135328	8185	0	1	180	1	0.0605	3.6822	0.8889	4.3719	0.1066	2.3570	0.54	621	79	653	15	646	21	101
Sample 023	9278	578	0	0	89	3	0.0623	1.8290	0.9294	2.8331	0.1082	2.1637	0.76	685	39	662	14	667	14	99
Sample 020	2168	137	0	0	20	1	0.0631	8.6647	0.9760	11.2809	0.1121	7.2238	0.64	713	184	685	47	692	58	99
Sample 015	6609	428	0	0	58	3	0.0648	2.6848	1.0517	3.8454	0.1177	2.7530	0.72	768	57	717	19	730	20	98
Sample 018	186952	12221	1995	0	181	0	0.0654	1.1376	1.1349	1.4323	0.1259	0.8701	0.61	786	24	765	6	770	8	99
Sample 011	10090	667	0	0	80	1	0.0661	1.7236	1.1941	2.7347	0.1309	2.1231	0.78	811	36	793	16	798	15	99
Sample 035	110471	7286	542	1	100	1	0.0660	1.9252	1.2254	2.2475	0.1348	1.1596	0.52	805	40	815	9	812	13	100
Sample 018	18445	1291	0	0	124	1	0.0700	1.5576	1.4824	2.5388	0.1536	2.0048	0.79	928	32	921	17	923	16	100
Sample 175	98138	6870	0	0	90	1	0.0700	1.1429	1.4929	1.5157	0.1547	0.9956	0.66	928	23	927	9	928	9	100
Sample 039	90786	6397	8884	0	71	1	0.0705	1.3230	1.5246	1.7431	0.1569	1.1349	0.65	942	27	940	10	940	11	100
Sample 021	79314	6018	0	0	60	1	0.0759	1.0938	1.6971	1.3933	0.1622	0.8631	0.62	1092	22	969	8	1007	9	96
Sample 145	228256	16809	0	0	187	1	0.0736	1.0592	1.7618	1.4119	0.1735	0.9336	0.66	1032	21	1031	9	1032	9	100
Sample 143	335193	31695	126979	0	179	1	0.0946	1.0364	3.4649	1.3796	0.2658	0.9106	0.66	1519	20	1519	12	1519	11	100
Sample 149	367978	39094	0	0	169	1	0.1062	1.0542	4.5176	1.4213	0.3084	0.9533	0.67	1736	19	1733	15	1734	12	100
Sample 040	376493	42968	0	1	137	1	0.1141	2.0482	5.2604	2.3102	0.3343	1.0686	0.46	1866	37	1859	17	1862	20	100
Sample 017	928734	115395	0	0	317	1	0.1243	0.9819	6.1251	1.2880	0.3575	0.8335	0.65	2018	17	1970	14	1994	11	99
Sample 034	134994	16905	341	1	44	2	0.1252	1.7805	6.4451	2.0449	0.3733	1.0057	0.49	2032	32	2045	18	2038	18	100
Sample 013	33623	4434	0	0	90	1	0.1319	2.2369	7.0616	3.6579	0.3884	2.8943	0.79	2123	39	2115	52	2119	33	100
Sample 019	29352	4009	0	0	76	1	0.1366	2.1962	7.5458	3.5550	0.4006	2.7955	0.79	2185	38	2172	52	2178	32	100

Sample: Eolic Barrier 3, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 060	648	31	0	0	68	1	0.0486	67.9835	0.0079	70.0645	0.0012	16.9492	0.24	129	1600	8	1	8	6	95
Sample 065	2377	110	0	0	194	1	0.0464	23.4153	0.0143	24.0256	0.0022	5.3812	0.22	17	563	14	1	14	3	100
Sample 075	30765	1392	56	5	336	1	0.0452	20.9345	0.0711	84.7196	0.0114	82.0924	0.97	-42	509	73	60	70	59	105
Sample 081	17778	831	99	3	151	1	0.0468	11.7336	0.0943	38.1481	0.0146	36.2987	0.95	37	281	94	34	92	34	102
Sample 012	7777	374	0	0	62	1	0.0481	5.5925	0.1032	5.8749	0.0156	1.7995	0.31	104	132	100	2	100	6	100
Sample 059	11009	514	76	3	83	1	0.0467	15.2419	0.1064	44.5846	0.0165	41.8983	0.94	32	365	106	44	103	45	103
Sample 039	6610	302	43	6	49	1	0.0456	27.5946	0.1046	78.2180	0.0166	73.1888	0.94	-22	668	106	78	101	78	105
Sample 015	74277	3618	185	1	401	1	0.0487	6.0277	0.1551	13.8163	0.0231	12.4321	0.90	134	142	147	18	146	19	101

Sample 098	30710	1537	0	0	126	3	0.0501	3.0769	0.2090	3.6241	0.0303	1.9148	0.53	197	71	192	4	193	6	100
Sample 056	37011	1908	0	0	111	1	0.0515	1.4746	0.2955	1.8150	0.0416	1.0582	0.58	265	34	263	3	263	4	100
Sample 083	43029	2226	0	0	125	1	0.0517	1.2952	0.3053	1.6534	0.0428	1.0278	0.62	273	30	270	3	271	4	100
Sample 105	29628	1560	0	0	79	1	0.0527	1.7664	0.3407	2.0851	0.0469	1.1080	0.53	314	40	296	3	298	5	99
Sample 110	29888	1602	0	0	68	1	0.0536	2.4254	0.4071	2.6892	0.0551	1.1617	0.43	354	55	346	4	347	8	100
Sample 058	168048	9016	0	0	363	1	0.0537	1.0624	0.4265	1.4163	0.0577	0.9365	0.66	356	24	361	3	361	4	100
Sample 101	21773	1171	0	0	46	1	0.0538	2.6228	0.4373	2.9221	0.0590	1.2884	0.44	361	59	369	5	368	9	100
Sample 074	141815	7737	5776	0	277	1	0.0546	1.2036	0.4788	1.6370	0.0637	1.1095	0.68	394	27	398	4	397	5	100
Sample 042	118640	7090	0	0	284	1	0.0598	1.1881	0.6260	1.6593	0.0760	1.1584	0.70	595	26	472	5	494	7	96
Sample 034	64860	3708	0	0	101	1	0.0572	1.4168	0.6275	1.8284	0.0796	1.1558	0.63	498	31	494	5	495	7	100
Sample 023	101826	5839	8412	0	155	1	0.0573	1.3302	0.6451	1.7142	0.0816	1.0813	0.63	505	29	506	5	505	7	100
Sample 018	61225	3561	0	0	92	0	0.0582	1.3065	0.6673	1.6962	0.0832	1.0817	0.64	536	29	515	5	519	7	99
Sample 018	35781	2089	0	0	74	1	0.0584	1.5756	0.7036	2.1669	0.0874	1.4876	0.69	544	34	540	8	541	9	100
Sample 016	53465	3123	0	0	76	0	0.0584	1.3696	0.7074	1.7242	0.0878	1.0474	0.61	545	30	543	5	543	7	100
Sample 042	294469	17203	0	0	417	2	0.0584	1.1640	0.7088	1.6427	0.0880	1.1591	0.71	546	25	544	6	544	7	100
Sample 039	89842	5256	568	0	182	3	0.0585	2.0395	0.7248	2.6070	0.0899	1.6239	0.62	548	45	555	9	553	11	100
Sample 045	220906	12956	0	0	305	0	0.0587	1.0401	0.7295	1.3813	0.0902	0.9090	0.66	554	23	557	5	556	6	100
Sample 097	29748	1751	0	0	41	2	0.0589	2.5484	0.7407	3.1565	0.0913	1.8626	0.59	562	56	563	10	563	14	100
Sample 063	84680	5053	0	0	114	1	0.0597	1.2066	0.7609	1.6059	0.0925	1.0597	0.66	592	26	570	6	575	7	99
Sample 053	187531	11138	0	1	251	0	0.0594	3.5358	0.7626	4.2532	0.0931	2.3639	0.56	581	77	574	13	576	19	100
Sample 065	69425	4218	0	0	93	1	0.0608	1.2840	0.7801	1.6200	0.0931	0.9879	0.61	630	28	574	5	586	7	98
Sample 043	134912	7987	0	0	179	1	0.0592	1.1993	0.7649	1.6196	0.0937	1.0885	0.67	574	26	577	6	577	7	100
Sample 106	22627	1344	0	0	30	3	0.0594	2.1388	0.7771	2.6222	0.0949	1.5171	0.58	581	46	585	8	584	12	100
Sample 111	226399	12500	0	1	296	2	0.0552	3.8320	0.7239	4.5111	0.0951	2.3802	0.53	421	86	586	13	553	19	106
Sample 054	463531	27640	1471	0	606	1	0.0596	1.4485	0.7835	1.9185	0.0953	1.2579	0.66	590	31	587	7	587	9	100
Sample 067	72125	4328	0	0	94	1	0.0600	1.4831	0.7885	2.0293	0.0953	1.3851	0.68	604	32	587	8	590	9	99
Sample 017	23975	1394	128	2	46	3	0.0582	7.4890	0.7673	8.8225	0.0957	4.6638	0.53	536	164	589	26	578	40	102
Sample 062	99248	5950	0	0	187	1	0.0600	1.4512	0.7966	2.0242	0.0964	1.4112	0.70	602	31	593	8	595	9	100
Sample 085	67922	4081	0	0	87	2	0.0601	1.9973	0.8044	2.5763	0.0971	1.6272	0.63	606	43	597	9	599	12	100
Sample 038	65442	3940	2133	0	121	1	0.0602	1.2537	0.8139	1.7297	0.0981	1.1917	0.69	611	27	603	7	605	8	100
Sample 066	31862	1920	0	0	40	1	0.0603	1.4767	0.8219	1.8609	0.0989	1.1325	0.61	613	32	608	7	609	9	100
Sample 078	16038	984	0	0	20	2	0.0613	2.4947	0.8378	2.9609	0.0991	1.5948	0.54	651	54	609	9	618	14	99
Sample 055	94894	5730	0	0	119	1	0.0604	1.1593	0.8289	1.5740	0.0996	1.0647	0.68	617	25	612	6	613	7	100
Sample 046	313282	18788	0	0	390	0	0.0600	1.0839	0.8263	1.4617	0.0999	0.9807	0.67	602	23	614	6	612	7	100
Sample 019	239471	14486	0	0	296	1	0.0605	1.0250	0.8397	1.3865	0.1007	0.9337	0.67	621	22	618	6	619	6	100
Sample 108	114791	6952	0	0	142	0	0.0606	1.2219	0.8407	1.6932	0.1007	1.1720	0.69	624	26	618	7	620	8	100
Sample 089	92344	5587	0	0	114	1	0.0605	1.3223	0.8423	1.7647	0.1010	1.1687	0.66	622	29	620	7	620	8	100
Sample 032	29423	1782	0	0	36	1	0.0606	1.8332	0.8472	2.2478	0.1015	1.3007	0.58	623	40	623	8	623	11	100
Sample 019	36898	2239	0	0	66	2	0.0607	1.4170	0.8517	1.8946	0.1018	1.2576	0.66	628	31	625	7	626	9	100
Sample 064	72418	4364	177	2	88	0	0.0603	5.2738	0.8472	6.1691	0.1020	3.2008	0.52	613	114	626	19	623	29	100
Sample 038	50970	3086	259	1	61	0	0.0606	3.8052	0.8639	4.4634	0.1035	2.3329	0.52	623	82	635	14	632	21	100
Sample 040	85915	5257	0	0	103	1	0.0612	1.2584	0.8741	1.7103	0.1036	1.1583	0.68	646	27	635	7	638	8	100
Sample 014	76988	4691	0	0	92	1	0.0609	1.2802	0.8779	1.6574	0.1045	1.0526	0.64	637	28	641	6	640	8	100
Sample 096	316692	19500	1773	0	376	0	0.0616	1.1690	0.8906	1.5370	0.1049	0.9978	0.65	659	25	643	6	647	7	99
Sample 017	16071	958	85	3	19	1	0.0596	11.8037	0.8749	13.6086	0.1065	6.7726	0.50	589	256	652	42	638	67	102
Sample 036	70419	4253	187	1	82	5	0.0604	5.0206	0.8885	5.8270	0.1067	2.9576	0.51	618	108	654	18	646	28	101

Sample 103	133005	8016	0	0	149	1	0.0603	1.3937	0.9229	1.8553	0.1111	1.2246	0.66	613	30	679	8	664	9	102
Sample 055	47284	3258	0	0	75	1	0.0689	1.6834	1.0918	2.3113	0.1149	1.5838	0.69	896	35	701	11	749	12	94
Sample 084	57324	3670	0	0	61	1	0.0640	1.6086	1.0341	2.1896	0.1171	1.4855	0.68	743	34	714	10	721	11	99
Sample 099	237689	15752	0	0	225	1	0.0663	1.1166	1.2042	1.5412	0.1318	1.0623	0.69	815	23	798	8	803	9	99
Sample 022	863677	57064	0	1	806	1	0.0661	3.1924	1.2160	3.6468	0.1335	1.7630	0.48	809	67	808	13	808	21	100
Sample 087	189220	13622	0	0	137	1	0.0720	1.0418	1.7016	1.4065	0.1714	0.9450	0.67	986	21	1020	9	1009	9	101
Sample 044	347808	25901	0	0	253	0	0.0745	1.0205	1.7612	1.3905	0.1715	0.9445	0.68	1054	21	1020	9	1031	9	99
Sample 107	85169	6275	4270	0	61	1	0.0737	1.1541	1.7631	1.5613	0.1736	1.0515	0.67	1033	23	1032	10	1032	10	100
Sample 109	311242	23312	0	0	220	1	0.0749	1.0414	1.8184	1.3971	0.1761	0.9314	0.67	1066	21	1046	9	1052	9	99
Sample 057	87520	6485	216	1	61	1	0.0741	3.7029	1.8117	4.1158	0.1773	1.7968	0.44	1044	75	1052	17	1050	27	100
Sample 037	139705	10574	1134	0	98	1	0.0757	1.2459	1.8597	1.6008	0.1782	1.0051	0.63	1087	25	1057	10	1067	11	99
Sample 041	707945	54214	0	0	493	1	0.0766	1.0185	1.8893	1.3777	0.1789	0.9277	0.67	1110	20	1061	9	1077	9	98
Sample 088	46049	3442	0	0	32	1	0.0747	1.4049	1.8525	1.9612	0.1798	1.3685	0.70	1062	28	1066	13	1064	13	100
Sample 011	319706	25445	0	0	191	1	0.0796	1.1182	2.2904	1.5433	0.2087	1.0637	0.69	1187	22	1222	12	1209	11	101
Sample 013	155840	13880	0	1	80	1	0.0891	2.4765	2.9784	2.7743	0.2425	1.2505	0.45	1406	47	1400	16	1402	21	100
Sample 025	192988	19853	0	0	82	1	0.1029	1.0401	4.1787	1.4321	0.2946	0.9844	0.69	1677	19	1665	14	1670	12	100
Sample 062	105408	11361	0	0	43	1	0.1078	1.0299	4.5538	1.4255	0.3064	0.9855	0.69	1762	19	1723	15	1741	12	99
Sample 077	74743	8179	222	1	29	3	0.1094	2.7435	4.8775	3.1540	0.3233	1.5560	0.49	1790	50	1806	25	1798	27	100
Sample 102	885124	104002	0	0	332	1	0.1175	1.1064	5.3852	1.6436	0.3324	1.2154	0.74	1919	20	1850	20	1882	14	98
Sample 082	230094	27945	9720	0	80	1	0.1215	1.0469	6.0184	1.4262	0.3594	0.9684	0.68	1978	19	1979	17	1979	12	100
Sample 104	205969	25977	0	0	69	2	0.1261	1.0625	6.4588	1.5167	0.3714	1.0823	0.71	2045	19	2036	19	2040	13	100
Sample 100	138385	17482	474	1	46	1	0.1263	1.5187	6.5406	1.9584	0.3755	1.2364	0.63	2048	27	2055	22	2051	17	100
Sample 021	199871	25751	0	0	66	1	0.1288	1.0168	6.7043	1.4014	0.3774	0.9645	0.69	2082	18	2064	17	2073	12	100
Sample 061	440128	56505	2518	0	144	1	0.1284	1.0302	6.7241	1.3801	0.3799	0.9184	0.67	2076	18	2076	16	2076	12	100
Sample 033	271797	36476	870	0	85	1	0.1342	1.1623	7.3544	1.5576	0.3975	1.0369	0.67	2154	20	2157	19	2155	14	100
Sample 060	281186	43293	0	1	114	2	0.1540	1.6717	9.5318	2.0671	0.4490	1.2159	0.59	2390	28	2391	24	2391	19	100
Sample 076	1096114	171783	0	0	300	1	0.1567	1.0082	9.8470	1.3929	0.4557	0.9612	0.69	2421	17	2421	19	2421	13	100
Sample 064	292942	55609	0	0	102	2	0.1898	1.0430	13.7122	1.5155	0.5239	1.0995	0.73	2741	17	2716	24	2730	14	99
Sample 079	183749	36134	0	0	42	1	0.1967	1.0526	14.7948	1.4934	0.5457	1.0593	0.71	2799	17	2807	24	2802	14	100

Sample: Marine Barrier 3, 170-230 µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	^{207*}*Pb*/^{206*}*Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	^{207*}*Pb*/^{206*}*Pb*	*2σ*	^{206*}*Pb*/^{238}*U*	*2σ*	^{207*}*Pb*/^{235}*U*	*2σ*	*Conc. %*
Sample 123	35	2	0	0	103	1	0.0451	515.3283	0.0011	528.5869	0.0002	117.6471	0.22	-51	####	1	1	1	6	102
Sample 017	147	6	0	0	250	1	0.0430	144.6175	0.0014	146.7625	0.0002	25.0000	0.17	-167	3600	2	0	1	2	107
Sample 154	206	10	0	0	125	2	0.0468	157.2374	0.0053	162.0077	0.0008	39.0244	0.24	41	3761	5	2	5	9	99
Sample 036	281	13	0	0	77	1	0.0462	44.4204	0.0117	46.0185	0.0018	12.0219	0.26	10	1069	12	1	12	5	100
Sample 104	287	13	0	0	70	1	0.0466	34.9302	0.0132	36.5416	0.0021	10.7317	0.29	26	838	13	1	13	5	99
Sample 021	2671	124	0	0	351	1	0.0465	6.6896	0.0199	7.1671	0.0031	2.5723	0.36	23	161	20	1	20	1	100
Sample 090	1828	88	0	0	63	1	0.0483	8.2144	0.0966	9.5296	0.0145	4.8309	0.51	115	194	93	4	94	9	99
Sample 163	12973	624	0	0	434	3	0.0481	3.6806	0.0987	4.4798	0.0149	2.5538	0.57	104	87	95	2	96	4	100
Sample 151	1510	73	0	0	46	1	0.0482	11.8954	0.1077	12.9251	0.0162	5.0555	0.39	108	281	104	5	104	13	100
Sample 060	3742	180	0	0	114	1	0.0481	3.8677	0.1085	4.5749	0.0164	2.4435	0.53	104	91	105	3	105	5	100
Sample 105	11807	571	0	0	337	1	0.0484	2.7491	0.1165	3.7284	0.0175	2.5186	0.68	118	65	112	3	112	4	100
Sample 038	4745	230	0	0	121	1	0.0485	3.6487	0.1310	4.3958	0.0196	2.4515	0.56	124	86	125	3	125	5	100
Sample 047	28254	1380	0	0	649	7	0.0489	1.3303	0.1461	2.2004	0.0217	1.7528	0.80	141	31	138	2	138	3	100
Sample 153	10383	509	11711	0	214	2	0.0490	3.8379	0.1633	4.8619	0.0242	2.9847	0.61	148	90	154	5	154	7	100

Sample 101	8981	446	0	0	161	2	0.0497	2.0318	0.1902	2.7640	0.0278	1.8739	0.68	181	47	176	3	177	4	100
Sample 098	18936	961	234	1	241	1	0.0507	4.8256	0.2738	7.8081	0.0391	6.1384	0.79	228	111	248	15	246	17	101
Sample 102	8267	409	66	4	103	3	0.0494	16.4293	0.2722	26.0587	0.0399	20.2271	0.78	168	384	252	50	244	58	103
Sample 086	5443	280	0	0	68	1	0.0514	4.1440	0.2836	5.1747	0.0400	3.0992	0.60	259	95	253	8	253	12	100
Sample 103	33041	1707	0	0	393	2	0.0517	1.7612	0.2987	2.4933	0.0419	1.7648	0.71	271	40	265	5	265	6	100
Sample 025	7775	401	0	0	74	3	0.0515	2.0575	0.3057	2.7730	0.0430	1.8592	0.67	264	47	272	5	271	7	100
Sample 015	10227	524	0	0	90	1	0.0512	3.3769	0.3295	4.2976	0.0467	2.6581	0.62	251	78	294	8	289	11	102
Sample 149	11653	618	0	0	116	1	0.0531	2.3747	0.3664	3.2620	0.0501	2.2364	0.69	331	54	315	7	317	9	99
Sample 140	25734	1385	0	0	238	1	0.0538	1.5233	0.4007	2.3134	0.0540	1.7411	0.75	364	34	339	6	342	7	99
Sample 100	22048	1193	0	0	194	1	0.0541	2.1615	0.4218	2.9806	0.0565	2.0524	0.69	376	49	354	7	357	9	99
Sample 111	14731	791	0	0	128	1	0.0537	1.5450	0.4260	2.3785	0.0575	1.8084	0.76	359	35	360	6	360	7	100
Sample 077	19783	1062	4223	0	168	1	0.0537	2.7479	0.4341	3.7144	0.0586	2.4992	0.67	358	62	367	9	366	11	100
Sample 062	2046	113	0	0	16	1	0.0551	6.4985	0.4907	7.3803	0.0646	3.4985	0.47	416	145	404	14	405	25	100
Sample 059	112892	6421	0	0	765	1	0.0569	1.1252	0.5771	2.0038	0.0736	1.6581	0.83	487	25	458	7	463	7	99
Sample 091	48917	2745	630	0	322	1	0.0561	1.9200	0.5865	2.7652	0.0758	1.9899	0.72	457	43	471	9	469	10	101
Sample 083	8542	461	52	5	55	4	0.0540	20.0739	0.5767	24.5463	0.0775	14.1266	0.58	371	452	481	66	462	96	104
Sample 067	5845	342	0	0	37	3	0.0584	5.0659	0.6341	6.7072	0.0787	4.3959	0.66	546	111	488	21	499	27	98
Sample 039	22498	1297	0	0	135	1	0.0577	1.9768	0.6625	2.8755	0.0833	2.0883	0.73	517	43	516	10	516	12	100
Sample 145	22367	1293	407	1	133	2	0.0578	3.0487	0.6693	4.0644	0.0840	2.6879	0.66	522	67	520	13	520	17	100
Sample 124	10994	639	0	0	64	1	0.0581	3.5272	0.6824	4.3860	0.0852	2.6069	0.59	534	77	527	13	528	18	100
Sample 087	14215	831	0	0	81	0	0.0585	2.0174	0.7083	2.8435	0.0878	2.0039	0.70	548	44	543	10	544	12	100
Sample 131	10595	632	0	0	60	1	0.0597	1.6924	0.7229	2.5537	0.0879	1.9124	0.75	592	37	543	10	552	11	98
Sample 150	16468	928	78	3	93	1	0.0564	12.5900	0.6852	15.0592	0.0882	8.2627	0.55	467	279	545	43	530	64	103
Sample 065	22991	1354	0	0	128	1	0.0589	1.3754	0.7242	2.2075	0.0892	1.7267	0.78	563	30	551	9	553	9	100
Sample 132	23035	1371	0	0	129	2	0.0595	2.2513	0.7331	3.1437	0.0893	2.1941	0.70	586	49	552	12	558	14	99
Sample 035	12199	722	0	0	68	1	0.0592	1.8581	0.7350	2.6331	0.0901	1.8656	0.71	574	40	556	10	560	11	99
Sample 120	10373	607	0	0	57	1	0.0585	2.8557	0.7279	3.4703	0.0903	1.9719	0.57	548	62	557	11	555	15	100
Sample 165	34061	2010	0	0	188	1	0.0590	1.9661	0.7349	2.7835	0.0903	1.9703	0.71	567	43	558	11	559	12	100
Sample 061	17477	1043	0	0	96	1	0.0597	2.7158	0.7448	3.9360	0.0906	2.8489	0.72	591	59	559	15	565	17	99
Sample 173	20208	1194	0	0	108	1	0.0591	1.5564	0.7601	2.3807	0.0933	1.8014	0.76	571	34	575	10	574	10	100
Sample 018	7018	419	0	0	31	1	0.0596	2.8504	0.7676	3.6447	0.0933	2.2713	0.62	591	62	575	13	578	16	99
Sample 043	40938	2397	0	0	218	1	0.0586	1.2810	0.7556	2.1877	0.0936	1.7735	0.81	550	28	577	10	571	10	101
Sample 084	36342	2136	600	0	189	1	0.0588	2.1426	0.7774	3.0153	0.0959	2.1217	0.70	559	47	590	12	584	13	101
Sample 122	39152	2360	2485	0	203	0	0.0603	1.7795	0.7979	2.6102	0.0960	1.9096	0.73	614	38	591	11	596	12	99
Sample 024	55555	3354	0	0	236	1	0.0604	1.1264	0.7994	1.9767	0.0960	1.6243	0.82	617	24	591	9	597	9	99
Sample 162	94911	5645	0	0	492	1	0.0595	1.1601	0.7879	2.0468	0.0961	1.6863	0.82	585	25	591	10	590	9	100
Sample 142	36069	2151	0	0	187	1	0.0596	1.2575	0.7902	2.1198	0.0961	1.7066	0.81	591	27	592	10	591	10	100
Sample 027	23907	1460	0	0	100	1	0.0611	1.3102	0.8230	2.1286	0.0978	1.6776	0.79	641	28	601	10	610	10	99
Sample 066	55777	3395	0	0	282	1	0.0609	1.2981	0.8276	2.2397	0.0986	1.8252	0.81	634	28	606	11	612	10	99
Sample 088	20731	1255	0	0	103	1	0.0606	1.3377	0.8401	2.1862	0.1006	1.7291	0.79	623	29	618	10	619	10	100
Sample 022	56850	3449	0	0	229	0	0.0607	1.1373	0.8487	1.9443	0.1015	1.5770	0.81	628	25	623	9	624	9	100
Sample 068	47621	2913	0	0	232	1	0.0612	1.4716	0.8608	2.4347	0.1021	1.9397	0.80	645	32	627	12	631	12	99
Sample 146	33324	2028	0	0	162	0	0.0609	2.7773	0.8621	3.8234	0.1028	2.6277	0.69	634	60	631	16	631	18	100
Sample 046	40428	2440	0	0	195	1	0.0604	1.1930	0.8588	2.0025	0.1032	1.6084	0.80	616	26	633	10	629	9	101
Sample 020	28447	1753	0	0	113	1	0.0616	1.3303	0.8777	2.1620	0.1033	1.7043	0.79	662	29	634	10	640	10	99
Sample 107	8199	507	0	0	39	2	0.0619	1.8908	0.8899	2.7066	0.1043	1.9367	0.72	670	40	640	12	646	13	99

Sample 126	13238	933	0	0	63	1	0.0705	3.2075	1.0151	4.6654	0.1045	3.3879	0.73	942	66	641	21	711	24	90
Sample 049	92329	5675	0	0	439	1	0.0615	1.1225	0.8887	2.0352	0.1049	1.6977	0.83	656	24	643	10	646	10	100
Sample 069	3682	215	64	4	17	2	0.0585	14.9493	0.8489	17.1790	0.1053	8.4639	0.49	548	327	645	52	624	83	103
Sample 064	22802	1403	0	0	107	1	0.0615	1.5445	0.9001	2.4805	0.1061	1.9410	0.78	657	33	650	12	652	12	100
Sample 023	29044	1762	0	0	111	2	0.0607	1.2856	0.8911	2.1084	0.1065	1.6710	0.79	628	28	653	10	647	10	101
Sample 080	20976	1362	0	0	87	1	0.0649	1.6015	1.0793	2.5811	0.1205	2.0242	0.78	772	34	734	14	743	14	99
Sample 167	51886	3317	3207	0	211	1	0.0639	1.3872	1.0783	2.3147	0.1223	1.8530	0.80	739	29	744	13	743	12	100
Sample 078	51097	3318	0	0	203	0	0.0649	1.3397	1.1243	2.3080	0.1256	1.8794	0.81	772	28	763	14	765	12	100
Sample 109	86776	5594	0	0	339	1	0.0645	1.1168	1.1344	1.9887	0.1276	1.6455	0.83	757	24	774	12	770	11	101
Sample 058	44265	2911	0	0	172	0	0.0658	1.2774	1.1657	2.2108	0.1286	1.8045	0.82	799	27	780	13	785	12	99
Sample 110	106614	7116	540	1	411	0	0.0667	2.1673	1.1883	3.1251	0.1291	2.2514	0.72	830	45	783	17	795	17	98
Sample 026	46609	3117	0	0	146	1	0.0669	1.5702	1.1999	2.5411	0.1301	1.9978	0.79	834	33	789	15	801	14	99
Sample 127	129870	8752	0	0	482	0	0.0674	1.3949	1.2477	2.4472	0.1343	2.0107	0.82	850	29	812	15	822	14	99
Sample 141	19842	1345	0	0	71	1	0.0678	1.3868	1.3019	2.2680	0.1393	1.7946	0.79	862	29	841	14	847	13	99
Sample 045	50100	3434	0	1	177	0	0.0685	3.1215	1.3334	3.7900	0.1411	2.1496	0.57	885	65	851	17	860	22	99
Sample 125	103114	7395	2586	0	314	1	0.0717	1.2235	1.6188	2.0092	0.1637	1.5936	0.79	978	25	977	14	978	13	100
Sample 129	6612	475	0	0	20	3	0.0719	2.6023	1.6318	3.7036	0.1647	2.6353	0.71	982	53	983	24	983	24	100
Sample 079	19784	1436	0	0	58	1	0.0726	1.2949	1.6880	2.1716	0.1687	1.7433	0.80	1003	26	1005	16	1004	14	100
Sample 170	13939	1056	0	0	41	1	0.0757	2.5881	1.7709	3.8439	0.1696	2.8420	0.74	1088	52	1010	27	1035	25	98
Sample 106	37019	2747	0	0	107	1	0.0742	1.1993	1.7595	2.1075	0.1720	1.7330	0.82	1047	24	1023	16	1031	14	99
Sample 057	41519	3088	1351	0	120	1	0.0744	1.2735	1.7647	2.0807	0.1721	1.6454	0.79	1052	26	1023	16	1033	14	99
Sample 161	44788	3255	655	0	129	1	0.0727	1.7059	1.7395	2.4704	0.1736	1.7869	0.72	1005	35	1032	17	1023	16	101
Sample 085	59608	4504	1156	0	166	0	0.0756	1.2869	1.8622	2.0890	0.1787	1.6456	0.79	1084	26	1060	16	1068	14	99
Sample 166	8963	704	0	0	25	0	0.0785	5.1445	1.9636	6.2511	0.1814	3.5511	0.57	1160	102	1074	35	1103	43	97
Sample 014	44871	3409	0	0	100	1	0.0760	1.4214	1.9124	2.3256	0.1826	1.8406	0.79	1095	28	1081	18	1085	16	100
Sample 119	37942	2963	0	0	100	1	0.0781	1.4855	2.0313	2.5198	0.1887	2.0354	0.81	1149	30	1114	21	1126	17	99
Sample 081	119652	9232	0	0	313	0	0.0772	1.0627	2.0270	1.9171	0.1905	1.5955	0.83	1125	21	1124	16	1125	13	100
Sample 099	17024	1342	0	0	44	1	0.0789	2.4984	2.1061	3.7356	0.1937	2.7772	0.74	1168	49	1141	29	1151	26	99
Sample 112	86876	6690	137	2	219	1	0.0770	5.5482	2.0953	6.2025	0.1973	2.7729	0.45	1121	111	1161	30	1147	44	101
Sample 056	151770	12157	0	0	366	1	0.0801	1.0861	2.2832	1.8831	0.2067	1.5382	0.82	1199	21	1211	17	1207	13	100
Sample 152	106578	9811	0	0	214	0	0.0921	1.0755	3.1554	1.9756	0.2486	1.6571	0.84	1468	20	1431	21	1446	15	99
Sample 044	60779	5692	0	0	115	1	0.0937	1.0892	3.4042	1.9298	0.2636	1.5931	0.83	1501	21	1508	21	1505	15	100
Sample 144	78494	8024	0	0	135	1	0.1022	1.1152	4.0859	2.0713	0.2899	1.7454	0.84	1665	21	1641	25	1651	17	99
Sample 041	40708	4249	0	0	69	1	0.1044	1.1880	4.2111	2.1662	0.2926	1.8113	0.84	1703	22	1655	26	1676	18	99
Sample 108	32924	3567	645	0	51	1	0.1084	1.5357	4.7667	2.3223	0.3191	1.7421	0.75	1772	28	1785	27	1779	20	100
Sample 040	128438	14691	2009	0	196	0	0.1144	1.2431	5.1511	2.2862	0.3266	1.9187	0.84	1870	22	1822	31	1845	20	99
Sample 063	108180	12468	0	0	159	2	0.1153	1.0672	5.3780	2.0139	0.3384	1.7078	0.85	1884	19	1879	28	1881	17	100
Sample 089	132568	15943	0	1	193	0	0.1203	1.9567	5.6702	2.6032	0.3420	1.7170	0.66	1960	35	1896	28	1927	23	98
Sample 070	40259	4850	0	0	56	1	0.1205	1.4694	5.9269	2.7039	0.3569	2.2699	0.84	1963	26	1967	39	1965	24	100
Sample 128	167539	21567	0	0	226	1	0.1287	1.0409	6.5596	1.9377	0.3696	1.6343	0.84	2081	18	2027	28	2054	17	99
Sample 019	39919	5163	0	0	44	1	0.1293	1.2526	6.6100	2.3203	0.3707	1.9532	0.84	2089	22	2033	34	2061	21	99
Sample 028	66263	8429	0	0	73	1	0.1272	1.0613	6.5376	1.9191	0.3728	1.5989	0.83	2060	19	2042	28	2051	17	100
Sample 042	49998	6492	0	0	66	1	0.1298	1.0705	6.7968	1.9571	0.3797	1.6383	0.84	2096	19	2075	29	2085	17	99
Sample 169	116141	15930	0	0	144	1	0.1372	1.8081	7.5873	3.2843	0.4012	2.7418	0.83	2192	31	2175	51	2183	30	100
Sample 172	28678	3980	282	1	35	1	0.1388	2.0603	7.8625	2.7819	0.4109	1.8693	0.67	2212	36	2219	35	2215	25	100
Sample 148	19686	3126	0	0	21	2	0.1588	2.0972	10.0332	3.9648	0.4583	3.3647	0.85	2443	36	2432	69	2438	37	100

Sample 147	169393	27822	580	1	178	2	0.1642	1.3793	10.7348	2.4195	0.4740	1.9878	0.82	2500	23	2501	41	2500	23	100
Sample 048	131853	22600	0	1	136	1	0.1714	1.7046	11.4499	2.6370	0.4845	2.0119	0.76	2571	28	2547	42	2561	25	99
Sample 164	87645	15175	0	0	89	1	0.1731	1.1320	11.7677	2.1070	0.4929	1.7771	0.84	2588	19	2583	38	2586	20	100
Sample 143	446913	77770	141070	0	449	1	0.1740	1.1378	11.8911	2.1739	0.4956	1.8523	0.85	2597	19	2595	40	2596	21	100
Sample 130	121686	22222	0	0	118	1	0.1826	1.2102	12.9929	2.2618	0.5160	1.9108	0.84	2677	20	2682	42	2679	22	100

Sample: Eolic Barrier 3, 170-230 µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	^{207*}*Pb/*^{206*}*Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	^{207*}*Pb/*^{206*}*Pb*	*2σ*	^{206*}*Pb/*^{238}*U*	*2σ*	^{207*}*Pb/*^{235}*U*	*2σ*	*Conc. %*
Sample 022	3760	174	0	0	1647	1	0.0462	7.5590	0.0066	8.4983	0.0010	3.8835	0.46	7	182	7	0	7	1	100
Sample 104	391	18	0	0	86	2	0.0471	43.2541	0.0133	44.8255	0.0020	11.7647	0.26	56	1032	13	2	13	6	98
Sample 084	1133	53	0	0	218	1	0.0466	26.6309	0.0151	28.8377	0.0024	11.0638	0.38	29	638	15	2	15	4	99
Sample 121	8550	398	284	1	1248	1	0.0465	6.1060	0.0198	60.0303	0.0031	59.7189	0.99	24	147	20	12	20	12	100
Sample 127	2288	107	0	0	171	1	0.0468	9.5808	0.0388	10.3772	0.0060	3.9867	0.38	37	229	39	2	39	4	100
Sample 086	1674	80	0	0	58	1	0.0478	10.4415	0.0863	11.3414	0.0131	4.4275	0.39	89	248	84	4	84	9	100
Sample 060	11745	561	0	0	395	1	0.0478	4.9204	0.0882	6.1752	0.0134	3.7313	0.60	87	117	86	3	86	5	100
Sample 035	3707	187	0	1	119	2	0.0506	14.0357	0.0978	21.7104	0.0140	16.5632	0.76	221	325	90	15	95	20	95
Sample 040	5328	259	0	0	159	1	0.0486	8.1259	0.1013	9.6269	0.0151	5.1621	0.54	129	191	97	5	98	9	99
Sample 151	3244	156	0	0	85	1	0.0482	9.3380	0.1147	10.3241	0.0173	4.4032	0.43	109	221	110	5	110	11	100
Sample 142	3035	147	0	0	79	1	0.0483	7.3307	0.1160	7.9152	0.0174	2.9851	0.38	114	173	111	3	111	8	100
Sample 075	5574	273	0	0	118	1	0.0489	3.1908	0.1433	3.9088	0.0213	2.2578	0.58	143	75	136	3	136	5	100
Sample 055	20403	1037	0	0	341	2	0.0508	2.7745	0.1893	3.6965	0.0270	2.4426	0.66	233	64	172	4	176	6	98
Sample 024	7149	347	131	2	119	1	0.0485	8.7862	0.1817	17.3800	0.0272	14.9956	0.86	122	207	173	26	170	28	102
Sample 047	4274	213	0	0	64	2	0.0500	5.6657	0.2074	6.8514	0.0301	3.8525	0.56	193	132	191	7	191	12	100
Sample 058	11391	577	0	0	151	2	0.0506	3.4769	0.2372	4.4795	0.0340	2.8244	0.63	224	80	215	6	216	9	100
Sample 061	24661	1283	617	0	262	1	0.0520	3.2945	0.3048	4.6036	0.0425	3.2155	0.70	286	75	268	8	270	11	99
Sample 162	43619	2271	0	0	453	1	0.0521	1.7864	0.3122	2.5974	0.0435	1.8855	0.73	288	41	274	5	276	6	99
Sample 098	7242	376	0	0	73	1	0.0520	3.4264	0.3223	4.2090	0.0450	2.4444	0.58	283	78	284	7	284	10	100
Sample 017	26088	1360	0	0	256	1	0.0521	1.3234	0.3300	2.1194	0.0459	1.6554	0.78	292	30	289	5	290	5	100
Sample 106	15021	793	0	0	135	1	0.0528	1.7232	0.3663	2.4841	0.0503	1.7893	0.72	321	39	316	6	317	7	100
Sample 117	44358	2370	0	0	339	1	0.0534	1.2355	0.4350	2.0688	0.0591	1.6593	0.80	347	28	370	6	367	6	101
Sample 059	9995	533	205	1	75	6	0.0533	5.3660	0.4405	7.1993	0.0599	4.7996	0.67	343	121	375	18	371	23	101
Sample 100	60390	3295	0	0	449	1	0.0546	1.5762	0.4570	2.4507	0.0608	1.8765	0.77	394	35	380	7	382	8	99
Sample 107	16874	952	0	0	104	1	0.0564	2.0376	0.5701	2.9472	0.0733	2.1294	0.72	470	45	456	9	458	11	99
Sample 150	52874	3020	0	0	322	0	0.0571	1.3658	0.5831	2.1400	0.0741	1.6475	0.77	496	30	461	7	466	8	99
Sample 063	22556	1278	237	1	133	0	0.0567	4.4860	0.5971	5.7820	0.0764	3.6480	0.63	479	99	475	17	475	22	100
Sample 120	15168	860	0	0	88	2	0.0567	2.2563	0.6049	3.0438	0.0773	2.0429	0.67	481	50	480	9	480	12	100
Sample 126	14268	826	0	0	81	1	0.0579	2.8325	0.6363	3.8515	0.0797	2.6098	0.68	526	62	494	12	500	15	99
Sample 096	12569	715	180	2	71	1	0.0569	5.7636	0.6274	7.2005	0.0800	4.3160	0.60	488	127	496	21	494	29	100
Sample 163	80688	4590	0	0	438	1	0.0569	1.2834	0.6514	2.1570	0.0831	1.7337	0.80	487	28	514	9	509	9	101
Sample 011	28768	1604	98	3	155	0	0.0557	10.0936	0.6421	12.2015	0.0836	6.8553	0.56	442	225	517	34	504	50	103
Sample 138	17172	989	0	0	91	1	0.0576	2.5004	0.6728	3.3904	0.0847	2.2896	0.68	514	55	524	12	522	14	100
Sample 036	31192	1820	0	0	165	1	0.0583	1.2684	0.6853	2.0944	0.0852	1.6667	0.80	543	28	527	8	530	9	99
Sample 145	18580	1071	0	0	98	2	0.0576	1.6311	0.6807	2.4102	0.0857	1.7745	0.74	516	36	530	9	527	10	101
Sample 068	54699	3216	0	0	282	1	0.0588	1.1396	0.7105	1.9995	0.0877	1.6429	0.82	559	25	542	9	545	8	99
Sample 054	36908	2193	0	0	190	1	0.0594	1.2788	0.7199	2.1697	0.0879	1.7528	0.81	583	28	543	9	551	9	99
Sample 159	39253	2321	0	0	201	1	0.0591	1.6064	0.7197	2.3717	0.0883	1.7448	0.74	572	35	545	9	550	10	99

Sample 143	23736	1423	0	0	121	1	0.0600	1.7181	0.7341	2.4895	0.0888	1.8016	0.72	602	37	548	9	559	11	98
Sample 102	29889	1841	0	0	147	1	0.0616	1.3472	0.7786	2.1535	0.0917	1.6801	0.78	661	29	565	9	585	10	97
Sample 033	33635	2000	0	0	165	1	0.0595	1.2616	0.7538	2.0793	0.0920	1.6529	0.79	584	27	567	9	570	9	99
Sample 097	10120	613	0	0	49	1	0.0606	2.8722	0.7819	3.8217	0.0936	2.5211	0.66	624	62	577	14	587	17	98
Sample 122	66158	3909	0	0	318	0	0.0591	1.3372	0.7639	2.1012	0.0938	1.6208	0.77	570	29	578	9	576	9	100
Sample 037	7612	456	0	0	37	5	0.0599	3.2382	0.7765	4.1502	0.0940	2.5957	0.63	600	70	579	14	583	19	99
Sample 023	26095	1547	1061	0	125	1	0.0593	1.6046	0.7725	2.3949	0.0945	1.7778	0.74	577	35	582	10	581	11	100
Sample 045	10057	594	0	0	48	1	0.0591	2.2670	0.7709	3.1290	0.0946	2.1567	0.69	571	49	583	12	580	14	100
Sample 101	21849	1311	0	0	104	1	0.0600	1.4162	0.7832	2.2380	0.0946	1.7329	0.77	604	31	583	10	587	10	99
Sample 080	44474	2669	231	1	210	0	0.0600	4.1062	0.7918	5.0670	0.0957	2.9688	0.59	604	89	589	17	592	23	99
Sample 140	26958	1605	0	0	127	1	0.0595	1.7299	0.7873	2.6459	0.0959	2.0021	0.76	587	38	590	11	590	12	100
Sample 167	122446	7423	882	0	575	1	0.0606	1.6041	0.8028	2.4154	0.0960	1.8057	0.75	626	35	591	10	598	11	99
Sample 161	27903	1715	0	0	130	1	0.0615	1.4969	0.8193	2.2779	0.0967	1.7170	0.75	655	32	595	10	608	10	98
Sample 129	23978	1467	0	0	112	1	0.0612	1.5204	0.8169	2.3534	0.0969	1.7964	0.76	645	33	596	10	606	11	98
Sample 160	58966	3481	446	1	274	1	0.0590	2.4343	0.7893	3.2225	0.0970	2.1115	0.66	568	53	597	12	591	15	101
Sample 123	64677	3898	0	0	301	2	0.0603	1.5265	0.8060	2.2933	0.0970	1.7115	0.75	613	33	597	10	600	10	99
Sample 165	126365	7596	590	0	574	0	0.0601	1.9938	0.8235	2.8003	0.0994	1.9663	0.70	608	43	611	11	610	13	100
Sample 039	27033	1630	2466	0	122	2	0.0603	1.7475	0.8310	2.6508	0.1000	1.9932	0.75	614	38	614	12	614	12	100
Sample 015	25822	1566	0	1	114	1	0.0607	3.5637	0.8543	4.4315	0.1022	2.6341	0.59	627	77	627	16	627	21	100
Sample 066	51881	3154	0	0	229	1	0.0608	1.1515	0.8573	2.0060	0.1023	1.6425	0.82	632	25	628	10	629	9	100
Sample 152	23103	1412	0	0	102	2	0.0611	1.4723	0.8649	2.2902	0.1026	1.7542	0.77	644	32	630	11	633	11	100
Sample 012	8826	530	103	3	39	1	0.0600	9.2355	0.8523	10.8595	0.1030	5.7125	0.53	605	200	632	34	626	52	101
Sample 032	71406	4471	0	0	313	0	0.0626	1.3255	0.8890	2.0424	0.1030	1.5539	0.76	695	28	632	9	646	10	98
Sample 108	22977	1392	733	0	100	2	0.0606	1.9066	0.8636	2.7317	0.1034	1.9563	0.72	624	41	634	12	632	13	100
Sample 021	46654	2841	0	0	204	1	0.0609	1.1494	0.8686	2.0055	0.1034	1.6435	0.82	636	25	635	10	635	10	100
Sample 164	13903	858	0	1	59	1	0.0617	6.0023	0.9011	7.4392	0.1059	4.3948	0.59	665	129	649	27	652	36	99
Sample 131	37620	2408	0	0	158	2	0.0640	2.2340	0.9500	3.2630	0.1076	2.3783	0.73	742	47	659	15	678	16	97
Sample 103	37520	2426	0	0	153	1	0.0647	1.6391	0.9898	2.5718	0.1110	1.9818	0.77	764	35	679	13	699	13	97
Sample 076	57144	3748	0	1	230	1	0.0656	3.5874	1.0122	4.5206	0.1119	2.7506	0.61	794	75	684	18	710	23	96
Sample 087	50914	3233	0	0	199	0	0.0635	1.5906	1.0098	2.3658	0.1153	1.7513	0.74	725	34	704	12	709	12	99
Sample 042	75839	4888	482	1	273	2	0.0644	2.2150	1.1157	2.8772	0.1256	1.8363	0.64	756	47	762	13	761	16	100
Sample 014	35400	2331	0	0	125	0	0.0659	1.1691	1.1575	2.0330	0.1275	1.6631	0.82	802	24	773	12	781	11	99
Sample 105	1987	131	0	0	7	0	0.0658	7.3871	1.1637	8.6204	0.1283	4.4431	0.52	800	155	778	33	784	48	99
Sample 041	112604	7490	0	0	388	1	0.0665	1.1275	1.2006	2.0749	0.1309	1.7418	0.84	823	24	793	13	801	12	99
Sample 118	70529	4695	0	0	239	1	0.0666	1.1417	1.2245	1.9934	0.1334	1.6341	0.82	824	24	807	12	812	11	99
Sample 128	36368	2465	0	0	119	1	0.0678	1.4606	1.2848	2.2429	0.1375	1.7021	0.76	862	30	830	13	839	13	99
Sample 044	36451	2488	1482	0	117	1	0.0683	1.5650	1.3216	2.4608	0.1404	1.8990	0.77	877	32	847	15	855	14	99
Sample 119	26623	1888	0	0	84	1	0.0709	1.6072	1.4049	2.4943	0.1437	1.9074	0.76	955	33	865	15	891	15	97
Sample 056	24385	1665	322	1	76	0	0.0683	3.2616	1.3585	4.0571	0.1443	2.4128	0.59	877	68	869	20	871	24	100
Sample 081	17534	1221	0	0	54	1	0.0696	2.0250	1.3996	3.0784	0.1458	2.3186	0.75	917	42	877	19	889	18	99
Sample 147	12364	916	0	0	34	1	0.0741	1.9838	1.6739	2.8445	0.1638	2.0386	0.72	1044	40	978	19	999	18	98
Sample 083	37073	2724	0	0	100	1	0.0735	1.3063	1.6974	2.1974	0.1675	1.7670	0.80	1027	26	998	16	1008	14	99
Sample 038	37463	2799	0	0	100	1	0.0747	1.1511	1.7371	2.0204	0.1686	1.6604	0.82	1061	23	1005	15	1022	13	98
Sample 085	43981	3335	662	0	114	1	0.0758	1.6168	1.8120	2.3783	0.1733	1.7442	0.73	1090	32	1030	17	1050	16	98
Sample 013	68353	5197	0	0	173	2	0.0760	1.1443	1.8666	1.9448	0.1781	1.5725	0.81	1096	23	1056	15	1069	13	99
Sample 141	118768	9368	0	1	271	0	0.0789	2.7754	2.1477	3.3696	0.1975	1.9109	0.57	1169	55	1162	20	1164	24	100

Sample 077	22657	1854	0	0	50	0	0.0818	1.4177	2.3021	2.2709	0.2041	1.7740	0.78	1241	28	1197	19	1213	16	99
Sample 110	31595	2598	0	0	68	3	0.0822	1.2162	2.3842	2.0844	0.2103	1.6927	0.81	1251	24	1230	19	1238	15	99
Sample 079	110555	9042	0	1	233	0	0.0818	2.6814	2.4136	3.2538	0.2140	1.8431	0.57	1241	53	1250	21	1247	24	100
Sample 018	130516	13349	920	0	266	2	0.1023	1.1958	3.1178	2.0185	0.2211	1.6261	0.81	1666	22	1288	19	1437	16	90
Sample 064	76062	6628	0	0	145	0	0.0871	1.2164	2.8506	2.1968	0.2373	1.8292	0.83	1364	23	1372	23	1369	17	100
Sample 020	56093	5060	0	0	104	0	0.0902	1.3081	3.0240	2.1998	0.2431	1.7687	0.80	1430	25	1403	22	1414	17	99
Sample 088	85766	8983	0	0	128	1	0.1047	1.0789	4.3629	1.9535	0.3021	1.6285	0.83	1710	20	1702	24	1705	16	100
Sample 078	35890	4133	0	1	48	1	0.1151	2.0715	5.3073	2.7490	0.3343	1.8071	0.66	1882	37	1859	29	1870	24	99
Sample 124	61655	7378	0	0	81	2	0.1197	1.1197	5.6729	2.0006	0.3438	1.6579	0.83	1951	20	1905	27	1927	17	99
Sample 065	53270	6635	0	0	69	2	0.1246	1.5976	5.9574	2.8151	0.3469	2.3178	0.82	2023	28	1920	39	1970	25	97
Sample 146	118598	15227	0	0	141	1	0.1284	1.1294	6.7011	2.0113	0.3785	1.6643	0.83	2076	20	2069	30	2073	18	100
Sample 144	68052	8905	0	1	81	1	0.1309	1.8969	6.8744	2.5739	0.3810	1.7398	0.68	2109	33	2081	31	2095	23	99
Sample 109	45672	5880	0	0	54	0	0.1288	1.1417	6.8015	2.0710	0.3831	1.7278	0.83	2081	20	2091	31	2086	19	100
Sample 025	28120	3656	0	0	33	1	0.1300	1.3997	6.8779	2.5115	0.3836	2.0853	0.83	2098	25	2093	37	2096	23	100
Sample 043	73271	9834	0	0	85	0	0.1342	1.0580	7.2073	1.9631	0.3895	1.6536	0.84	2154	18	2120	30	2137	18	99
Sample 082	109690	14512	0	0	125	1	0.1323	1.0809	7.2167	1.9288	0.3956	1.5975	0.83	2129	19	2149	29	2139	17	100
Sample 148	45399	6414	0	0	51	1	0.1413	1.1961	7.7642	2.1167	0.3986	1.7463	0.83	2243	21	2162	32	2204	19	98
Sample 062	35657	6150	358	1	33	1	0.1725	1.5753	11.7497	2.4435	0.4941	1.8679	0.76	2582	26	2588	40	2585	23	100
Sample 019	22020	4118	0	0	19	1	0.1870	1.1175	13.3300	2.1015	0.5169	1.7797	0.85	2716	18	2686	39	2703	20	99
Sample 125	58365	10759	0	0	51	1	0.1843	1.1121	13.2266	2.0336	0.5204	1.7026	0.84	2692	18	2701	38	2696	19	100
Sample 057	143868	26718	500236	0	124	1	0.1857	1.0446	13.4078	1.9143	0.5236	1.6042	0.84	2705	17	2715	36	2709	18	100

Sample: Marine Barrier 4, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*^{207*}Pb/^{206*}Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*^{207*}Pb/^{206*}Pb*	*2σ*	*^{206*}Pb/^{238}U*	*2σ*	*^{207*}Pb/^{235}U*	*2σ*	*Conc. %*
Sample 128	88	8	0	0	209	1	0.0941	144.8470	0.0052	158.7629	0.0004	65.0000	0.41	1511	2735	3	2	5	8	49
Sample 127	35	7	0	1	15	3	0.2050	56.3647	0.0644	117.5989	0.0023	103.2110	0.88	2866	917	15	15	63	75	23
Sample 182	863	41	0	0	66	1	0.0473	16.0956	0.0660	18.0165	0.0101	8.0948	0.45	63	383	65	5	65	11	100
Sample 044	1581	85	0	1	97	1	0.0538	8.7989	0.0968	18.2223	0.0131	15.9571	0.88	362	198	84	13	94	16	89
Sample 173	910	44	0	0	45	1	0.0484	24.9329	0.1049	27.2280	0.0157	10.9415	0.40	119	588	101	11	101	27	99
Sample 141	2652	123	64	4	126	1	0.0465	18.7592	0.1055	53.7271	0.0165	50.3457	0.94	23	450	105	53	102	53	103
Sample 083	1808	89	0	0	103	2	0.0492	7.5594	0.1135	8.2674	0.0167	3.3473	0.40	158	177	107	4	109	9	98
Sample 076	890	44	0	0	48	1	0.0497	30.9380	0.1219	33.3180	0.0178	12.3665	0.37	180	721	114	14	117	37	97
Sample 035	3173	155	0	0	116	1	0.0488	4.0197	0.1475	4.7134	0.0219	2.4613	0.52	136	94	140	3	140	6	100
Sample 119	1549	79	0	0	49	2	0.0508	11.3103	0.2125	11.9379	0.0304	3.8196	0.32	229	261	193	7	196	21	99
Sample 058	2595	131	0	0	79	2	0.0503	9.2824	0.2177	10.8125	0.0314	5.5449	0.51	209	215	199	11	200	20	100
Sample 165	4972	255	0	0	100	2	0.0514	5.6053	0.2752	7.0802	0.0388	4.3254	0.61	258	129	246	10	247	16	100
Sample 171	14270	755	0	0	252	1	0.0529	2.9845	0.3221	4.1303	0.0441	2.8552	0.69	326	68	278	8	284	10	98
Sample 024	7504	381	81	3	190	1	0.0508	13.1995	0.3300	19.3652	0.0471	14.1698	0.73	233	305	297	41	290	50	102
Sample 183	1147	61	0	0	18	2	0.0531	13.3233	0.3632	15.5556	0.0496	8.0290	0.52	335	302	312	24	315	43	99
Sample 190	5582	278	44	6	80	1	0.0498	24.6452	0.3720	33.4360	0.0541	22.5960	0.68	187	574	340	75	321	96	106
Sample 126	21858	1181	0	0	383	1	0.0540	1.8690	0.4049	2.6489	0.0543	1.8771	0.71	373	42	341	6	345	8	99
Sample 086	12310	675	0	0	195	1	0.0548	3.7219	0.4548	4.9239	0.0602	3.2237	0.65	404	83	377	12	381	16	99
Sample 149	15777	915	0	1	171	0	0.0580	4.6849	0.5737	6.2014	0.0717	4.0632	0.66	530	103	447	18	460	23	97
Sample 181	10676	602	0	0	112	1	0.0564	3.4379	0.5805	4.7265	0.0746	3.2435	0.69	469	76	464	15	465	18	100
Sample 087	25023	1433	0	1	305	1	0.0573	3.8522	0.6164	5.0190	0.0781	3.2173	0.64	501	85	485	15	488	20	99
Sample 056	5519	319	0	0	66	1	0.0578	5.4873	0.6324	7.0389	0.0794	4.4086	0.63	521	120	492	21	498	28	99

Sample 099	35702	2078	0	1	424	1	0.0582	3.7612	0.6430	4.9461	0.0801	3.2120	0.65	537	82	497	15	504	20	99
Sample 081	33230	1958	0	0	378	0	0.0589	1.2559	0.6798	2.2084	0.0837	1.8164	0.82	564	27	518	9	527	9	98
Sample 121	13955	801	398	1	158	1	0.0574	4.2015	0.6658	5.3693	0.0841	3.3432	0.62	507	92	521	17	518	22	100
Sample 130	32543	1872	240	1	366	0	0.0575	4.2247	0.6714	5.3220	0.0846	3.2366	0.61	512	93	524	16	522	22	100
Sample 084	7627	442	0	0	85	1	0.0580	2.8798	0.6789	3.7961	0.0849	2.4732	0.65	529	63	525	12	526	16	100
Sample 042	5062	294	0	0	47	2	0.0582	4.6424	0.6847	5.8792	0.0854	3.6074	0.61	536	102	528	18	530	25	100
Sample 144	8764	514	0	0	80	0	0.0587	2.2487	0.6932	3.0620	0.0857	2.0782	0.68	556	49	530	11	535	13	99
Sample 057	12214	720	0	0	135	1	0.0589	1.7651	0.6967	2.6369	0.0858	1.9590	0.74	564	38	530	10	537	11	99
Sample 103	6276	371	0	0	69	0	0.0591	5.7709	0.6999	6.9195	0.0859	3.8179	0.55	570	126	531	20	539	29	99
Sample 163	10902	639	0	0	99	1	0.0586	2.4415	0.6953	3.4841	0.0861	2.4855	0.71	551	53	532	13	536	15	99
Sample 169	4413	257	0	0	40	1	0.0583	3.7914	0.6932	4.9613	0.0863	3.2000	0.64	541	83	533	16	535	21	100
Sample 085	11751	713	0	1	129	1	0.0606	5.6213	0.7242	7.2467	0.0866	4.5733	0.63	626	121	536	24	553	31	97
Sample 034	7208	424	0	0	67	1	0.0588	1.9048	0.7026	2.8013	0.0867	2.0540	0.73	560	42	536	11	540	12	99
Sample 146	23141	1365	0	0	206	1	0.0590	1.4579	0.7127	2.3725	0.0876	1.8717	0.79	567	32	541	10	546	10	99
Sample 118	11611	664	0	0	125	0	0.0572	4.6544	0.6977	5.8379	0.0885	3.5238	0.60	497	103	547	19	537	25	102
Sample 059	2581	157	0	0	27	3	0.0609	5.4187	0.7555	6.5434	0.0900	3.6679	0.56	636	117	555	20	571	29	97
Sample 145	29206	1706	201	1	251	0	0.0584	5.0152	0.7312	6.2553	0.0908	3.7385	0.60	546	110	560	20	557	27	101
Sample 106	8763	504	131	2	92	0	0.0576	7.7029	0.7213	9.2261	0.0909	5.0780	0.55	513	169	561	27	551	40	102
Sample 088	5330	315	0	0	56	1	0.0592	2.5853	0.7434	3.4058	0.0911	2.2171	0.65	574	56	562	12	564	15	100
Sample 021	7273	435	0	0	95	1	0.0598	2.2754	0.7534	3.1565	0.0914	2.1877	0.69	595	49	564	12	570	14	99
Sample 089	22658	1335	0	0	235	1	0.0589	2.1890	0.7450	3.1368	0.0917	2.2467	0.72	565	48	566	12	565	14	100
Sample 066	5322	314	0	0	54	1	0.0591	2.6917	0.7572	3.5278	0.0930	2.2803	0.65	570	59	573	13	572	16	100
Sample 065	4991	300	0	0	51	3	0.0601	4.4419	0.7727	5.5744	0.0932	3.3680	0.60	608	96	575	19	581	25	99
Sample 104	12394	739	0	0	126	0	0.0596	4.5142	0.7713	5.6437	0.0939	3.3873	0.60	589	98	578	19	581	25	100
Sample 077	9531	567	0	0	97	1	0.0595	2.4026	0.7707	3.3705	0.0939	2.3640	0.70	586	52	579	13	580	15	100
Sample 020	5058	306	0	0	62	0	0.0604	2.9460	0.8142	3.9831	0.0977	2.6806	0.67	619	64	601	15	605	18	99
Sample 068	4983	302	0	0	48	2	0.0606	2.6403	0.8167	3.5231	0.0977	2.3327	0.66	625	57	601	13	606	16	99
Sample 080	9932	621	0	1	96	1	0.0625	4.4770	0.8462	5.7388	0.0981	3.5903	0.63	693	95	603	21	623	27	97
Sample 186	9174	558	0	0	73	2	0.0609	1.9224	0.8272	2.8395	0.0986	2.0897	0.74	634	41	606	12	612	13	99
Sample 019	13923	847	0	0	168	0	0.0608	2.7458	0.8274	3.9197	0.0987	2.7972	0.71	633	59	607	16	612	18	99
Sample 164	29276	1795	825	0	231	1	0.0613	1.8230	0.8355	2.7188	0.0988	2.0171	0.74	650	39	608	12	617	13	99
Sample 022	4307	262	0	0	52	2	0.0609	2.8234	0.8316	3.7478	0.0990	2.4646	0.66	636	61	609	14	614	17	99
Sample 090	15460	937	0	1	148	3	0.0606	3.6327	0.8323	4.5680	0.0996	2.7694	0.61	625	78	612	16	615	21	100
Sample 063	23406	1408	0	0	223	1	0.0602	1.3300	0.8265	2.2430	0.0997	1.8061	0.81	609	29	612	11	612	10	100
Sample 123	18198	1125	0	0	174	1	0.0618	3.7522	0.8506	4.9887	0.0998	3.2876	0.66	668	80	613	19	625	24	98
Sample 147	12211	758	0	0	95	2	0.0621	3.4311	0.8572	4.7571	0.1002	3.2951	0.69	677	73	615	19	629	23	98
Sample 040	5675	346	0	0	45	1	0.0609	3.3662	0.8536	4.2878	0.1017	2.6559	0.62	636	72	624	16	627	20	100
Sample 046	15544	938	172	2	122	0	0.0604	5.4922	0.8509	6.5943	0.1022	3.6497	0.55	617	119	627	22	625	31	100
Sample 016	19192	1179	0	0	222	1	0.0614	1.7581	0.8707	2.7696	0.1028	2.1401	0.77	654	38	631	13	636	13	99
Sample 152	22435	1366	0	0	170	1	0.0609	2.1193	0.8629	3.0393	0.1028	2.1786	0.72	635	46	631	13	632	14	100
Sample 100	20613	1261	0	0	189	0	0.0612	1.7329	0.8736	2.5516	0.1036	1.8729	0.73	645	37	635	11	638	12	100
Sample 027	28737	1787	0	1	326	0	0.0622	3.5601	0.8983	4.5182	0.1048	2.7821	0.62	681	76	642	17	651	22	99
Sample 108	10260	619	219	1	93	1	0.0603	4.9412	0.8737	5.9790	0.1051	3.3663	0.56	615	107	644	21	638	29	101
Sample 018	26538	1603	208	1	299	1	0.0604	4.5572	0.8786	5.5066	0.1055	3.0911	0.56	618	98	647	19	640	26	101
Sample 060	2810	176	0	0	25	2	0.0625	5.9049	0.9098	7.2601	0.1056	4.2239	0.58	691	126	647	26	657	36	99
Sample 025	5586	339	112	2	63	1	0.0607	8.8293	0.8895	10.4343	0.1063	5.5605	0.53	629	190	651	35	646	51	101

Sample 101	10365	637	0	0	92	1	0.0614	3.8418	0.9068	4.9845	0.1071	3.1758	0.64	654	82	656	20	655	24	100
Sample 105	12311	759	0	0	108	2	0.0617	1.9942	0.9233	2.7910	0.1086	1.9527	0.70	663	43	664	12	664	14	100
Sample 161	47617	2934	0	0	341	0	0.0616	1.2496	0.9247	2.2070	0.1088	1.8192	0.82	661	27	666	12	665	11	100
Sample 150	3201	188	45	6	23	3	0.0586	22.1973	0.8853	25.2222	0.1096	11.9767	0.47	552	484	670	77	644	128	104
Sample 140	19378	1206	0	0	137	1	0.0622	2.5719	0.9434	3.7227	0.1100	2.6914	0.72	681	55	673	17	675	19	100
Sample 125	13695	862	0	0	117	1	0.0629	3.5442	0.9677	4.7693	0.1116	3.1914	0.67	706	75	682	21	687	24	99
Sample 168	13132	824	0	0	92	0	0.0628	1.8637	0.9664	2.8181	0.1116	2.1139	0.75	701	40	682	14	687	14	99
Sample 189	15865	1003	0	0	110	1	0.0632	1.6453	0.9836	2.5644	0.1129	1.9670	0.77	715	35	689	13	695	13	99
Sample 142	7390	433	43	6	51	0	0.0586	22.1937	0.9132	25.1592	0.1131	11.8501	0.47	551	484	691	78	659	130	105
Sample 185	15632	991	0	0	105	1	0.0634	2.2405	1.0131	3.1946	0.1159	2.2772	0.71	721	48	707	15	710	16	100
Sample 017	3860	252	0	1	38	1	0.0654	5.3769	1.0950	6.7607	0.1215	4.0982	0.61	786	113	739	29	751	37	98
Sample 172	37316	2419	0	0	239	1	0.0648	1.3113	1.0889	2.2582	0.1218	1.8385	0.81	768	28	741	13	748	12	99
Sample 048	4816	321	0	0	31	1	0.0667	2.8949	1.1612	3.8888	0.1263	2.5966	0.67	827	60	767	19	783	21	98
Sample 124	18740	1238	0	0	134	1	0.0660	1.6808	1.2079	2.6164	0.1327	2.0051	0.77	808	35	803	15	804	15	100
Sample 038	16542	1103	0	0	98	0	0.0667	2.4738	1.2396	3.6623	0.1348	2.7005	0.74	828	52	815	21	819	21	100
Sample 037	16910	1117	227	1	99	1	0.0661	4.1997	1.2486	5.0429	0.1371	2.7916	0.55	808	88	828	22	823	29	101
Sample 043	32990	2246	0	0	191	1	0.0681	1.2781	1.3004	2.2467	0.1386	1.8477	0.82	871	26	836	15	846	13	99
Sample 107	11290	783	0	0	76	1	0.0693	2.7694	1.3450	3.8386	0.1407	2.6581	0.69	909	57	849	21	865	23	98
Sample 151	26845	1850	0	0	145	1	0.0689	1.2915	1.3703	2.2403	0.1442	1.8305	0.82	896	27	868	15	876	13	99
Sample 039	11803	831	0	0	61	1	0.0704	3.6632	1.4989	4.9856	0.1544	3.3819	0.68	941	75	925	29	930	31	100
Sample 098	37073	2658	0	0	218	1	0.0717	1.3251	1.5988	2.3301	0.1618	1.9165	0.82	977	27	966	17	970	15	100
Sample 082	9057	667	0	0	51	0	0.0736	1.7117	1.7043	2.6605	0.1679	2.0367	0.77	1031	35	1001	19	1010	17	99
Sample 026	15467	1153	0	0	106	1	0.0745	1.4088	1.7826	2.3765	0.1735	1.9139	0.81	1056	28	1031	18	1039	16	99
Sample 188	15413	1134	0	0	69	1	0.0736	1.4812	1.7704	2.4386	0.1745	1.9372	0.79	1030	30	1037	19	1035	16	100
Sample 143	22845	1658	0	0	101	1	0.0726	1.4471	1.7584	2.3615	0.1758	1.8662	0.79	1002	29	1044	18	1030	15	101
Sample 013	2965	223	0	0	20	1	0.0753	3.2682	1.8279	4.4812	0.1761	3.0659	0.68	1076	66	1046	30	1056	30	99
Sample 174	4574	363	0	0	18	2	0.0795	4.9213	2.1303	6.9997	0.1945	4.9776	0.71	1183	97	1146	52	1159	50	99
Sample 047	17490	1487	0	0	66	1	0.0850	1.3758	2.5025	2.3858	0.2134	1.9491	0.82	1316	27	1247	22	1273	17	98
Sample 120	6411	539	179	2	28	1	0.0840	4.8388	2.5404	5.8164	0.2193	3.2275	0.55	1293	94	1278	38	1284	43	100
Sample 097	98733	10106	0	0	321	2	0.1024	1.6315	4.1296	2.8844	0.2926	2.3787	0.82	1667	30	1655	35	1660	24	100
Sample 110	26436	2746	0	0	84	1	0.1039	2.1567	4.2933	3.2427	0.2998	2.4215	0.75	1694	40	1690	36	1692	27	100
Sample 078	10822	1109	124	2	34	1	0.1025	4.9152	4.2756	5.5776	0.3025	2.6364	0.47	1670	91	1704	40	1689	47	101
Sample 069	34303	3602	0	0	107	1	0.1050	1.1905	4.4071	2.1912	0.3044	1.8396	0.84	1714	22	1713	28	1714	18	100
Sample 131	25580	3109	0	0	75	1	0.1216	1.4397	5.4357	2.5637	0.3243	2.1212	0.83	1979	26	1811	34	1891	22	96
Sample 067	20241	2248	0	0	59	1	0.1111	1.2517	5.0060	2.2620	0.3269	1.8841	0.83	1817	23	1824	30	1820	19	100
Sample 102	23810	2741	0	0	67	1	0.1151	1.2680	5.3827	2.2739	0.3391	1.8876	0.83	1882	23	1882	31	1882	20	100
Sample 045	49132	5789	0	0	114	1	0.1178	1.1883	5.5839	2.2531	0.3437	1.9143	0.85	1923	21	1905	32	1914	20	100
Sample 162	32904	4116	0	0	70	1	0.1251	1.2232	6.2876	2.1985	0.3646	1.8268	0.83	2030	22	2004	32	2017	19	99
Sample 153	15023	1864	169	2	32	2	0.1241	3.2347	6.2995	3.9546	0.3683	2.2750	0.58	2015	57	2021	40	2018	35	100
Sample 055	50954	6381	728	0	131	0	0.1252	1.2828	6.3845	2.2009	0.3698	1.7885	0.81	2032	23	2028	31	2030	20	100
Sample 139	31946	4060	0	0	67	0	0.1271	2.3607	6.4960	3.5240	0.3707	2.6164	0.74	2058	42	2033	46	2045	31	99
Sample 062	33016	4172	0	0	85	1	0.1264	1.4088	6.4742	2.5862	0.3716	2.1688	0.84	2048	25	2037	38	2042	23	100
Sample 166	16783	2209	0	0	34	0	0.1316	1.2839	7.0408	2.3294	0.3879	1.9436	0.83	2120	22	2113	35	2117	21	100
Sample 023	24303	3211	0	0	74	1	0.1321	1.1883	7.1122	2.1939	0.3904	1.8442	0.84	2126	21	2125	33	2126	20	100
Sample 132	91170	12260	2416	0	222	1	0.1345	1.8391	7.2486	2.8407	0.3909	2.1651	0.76	2157	32	2127	39	2142	26	99
Sample 064	64214	8677	0	0	156	1	0.1351	1.2802	7.2874	2.1385	0.3911	1.7130	0.80	2166	22	2128	31	2147	19	99

Sample 079	14397	1901	154	2	35	1	0.1320	3.3248	7.1919	4.0225	0.3950	2.2642	0.56	2125	58	2146	41	2135	37	100
Sample 041	67750	9532	0	0	133	1	0.1407	1.0732	7.9227	2.1018	0.4084	1.8071	0.86	2236	19	2208	34	2222	19	99
Sample 111	68892	10343	0	0	152	1	0.1501	1.7785	8.9463	3.2043	0.4322	2.6655	0.83	2347	30	2316	52	2333	30	99
Sample 061	144727	23784	0	0	290	0	0.1643	1.4847	10.7738	2.8023	0.4755	2.3766	0.85	2501	25	2508	50	2504	26	100
Sample 187	42547	9357	0	0	57	1	0.2199	1.2005	17.6927	2.2032	0.5835	1.8474	0.84	2980	19	2963	44	2973	21	100
Sample 160	62501	15126	413	1	78	1	0.2420	1.3746	20.7432	2.3309	0.6216	1.8824	0.81	3133	22	3116	47	3127	23	100
Sample 015	38586	9726	0	0	71	1	0.2521	1.1108	22.3479	2.2039	0.6430	1.9035	0.86	3198	18	3201	48	3199	22	100

Sample: Eolic Barrier 4, 80-170µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	^{207*}*Pb/*^{206*}*Pb*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	^{207*}*Pb/*^{206*}*Pb*	*2σ*	^{206*}*Pb/*^{238}*U*	*2σ*	^{207*}*Pb/*^{235}*U*	*2σ*	*Conc. %*
Sample 033	153	8	0	1	121	1	0.0493	69.4853	0.0059	240.8601	0.0009	230.6195	0.96	162	1625	6	13	6	14	94
Sample 046	168	8	0	0	126	1	0.0465	67.2336	0.0059	69.4465	0.0009	17.3913	0.25	21	1614	6	1	6	4	99
Sample 023	2086	97	0	0	760	1	0.0464	6.8393	0.0121	7.5401	0.0019	3.1746	0.42	16	164	12	0	12	1	100
Sample 107	306	14	0	0	57	1	0.0471	44.1920	0.0166	46.6369	0.0026	14.9020	0.32	54	1054	16	2	17	8	98
Sample 119	9782	455	0	0	1648	1	0.0465	4.0241	0.0180	4.9294	0.0028	2.8470	0.58	22	97	18	1	18	1	100
Sample 040	714	33	0	0	117	1	0.0468	28.1931	0.0271	29.4673	0.0042	8.5714	0.29	40	674	27	2	27	8	99
Sample 081	2144	101	0	0	100	1	0.0472	10.6825	0.0664	11.8366	0.0102	5.0980	0.43	58	255	65	3	65	8	100
Sample 127	2909	140	0	1	117	1	0.0480	10.9344	0.0776	21.0685	0.0117	18.0089	0.85	98	259	75	13	76	16	99
Sample 097	4117	201	0	0	113	1	0.0489	8.5241	0.1162	10.2475	0.0172	5.6878	0.56	144	200	110	6	112	11	99
Sample 128	8691	421	0	0	224	1	0.0484	2.5826	0.1229	3.3750	0.0184	2.1727	0.64	119	61	118	3	118	4	100
Sample 159	25655	1251	0	0	634	2	0.0488	2.0295	0.1289	2.9865	0.0192	2.1909	0.73	137	48	122	3	123	3	99
Sample 146	6736	328	0	0	153	1	0.0488	8.4103	0.1397	10.2004	0.0208	5.7720	0.57	136	198	133	8	133	13	100
Sample 063	29008	1427	0	0	619	2	0.0492	1.2805	0.1506	2.1377	0.0222	1.7117	0.80	157	30	142	2	142	3	99
Sample 169	987	48	0	0	20	4	0.0490	18.8814	0.1570	20.4398	0.0233	7.8280	0.38	147	443	148	11	148	29	100
Sample 045	7590	370	295	1	220	1	0.0487	4.3407	0.1598	8.9265	0.0238	7.8001	0.87	134	102	152	12	151	13	101
Sample 096	8063	400	0	1	158	2	0.0496	4.9018	0.1652	9.9328	0.0242	8.6391	0.87	175	114	154	13	155	14	99
Sample 014	3892	193	0	0	97	2	0.0495	3.6342	0.1877	4.2771	0.0275	2.2554	0.53	173	85	175	4	175	7	100
Sample 016	11684	600	0	0	199	1	0.0514	1.7708	0.2857	2.5862	0.0403	1.8849	0.73	258	41	255	5	255	6	100
Sample 019	19105	995	0	0	293	1	0.0521	1.4977	0.3219	2.3641	0.0448	1.8291	0.77	289	34	283	5	283	6	100
Sample 103	37030	2000	0	0	387	1	0.0540	1.6478	0.3375	2.5805	0.0453	1.9859	0.77	371	37	286	6	295	7	97
Sample 163	14294	724	73	4	146	1	0.0506	14.7051	0.3241	21.7093	0.0464	15.9704	0.74	225	340	293	46	285	55	103
Sample 143	26004	1445	0	0	224	1	0.0556	4.5176	0.4212	5.8692	0.0550	3.7468	0.64	435	101	345	13	357	18	97
Sample 144	15070	815	0	0	120	2	0.0541	2.6442	0.4425	3.4992	0.0593	2.2919	0.65	374	60	372	8	372	11	100
Sample 041	18700	1024	0	0	201	1	0.0548	1.5519	0.4835	2.4093	0.0640	1.8429	0.76	403	35	400	7	400	8	100
Sample 060	14932	822	0	0	110	1	0.0551	2.8883	0.4894	3.9316	0.0645	2.6675	0.68	414	65	403	10	405	13	100
Sample 100	35797	2020	1291	0	226	0	0.0564	1.4308	0.5847	2.2931	0.0752	1.7920	0.78	469	32	467	8	467	9	100
Sample 167	30371	1704	139	2	190	1	0.0561	7.0628	0.5855	8.9093	0.0757	5.4306	0.61	457	157	470	25	468	34	100
Sample 121	51418	2958	0	0	314	2	0.0575	1.2517	0.6143	2.1353	0.0775	1.7299	0.81	512	28	481	8	486	8	99
Sample 106	33979	2017	1051	0	195	1	0.0593	1.6613	0.6740	2.4748	0.0824	1.8343	0.74	580	36	510	9	523	10	98
Sample 012	27776	1617	0	0	232	2	0.0582	1.5284	0.6622	2.3204	0.0825	1.7459	0.75	538	33	511	9	516	9	99
Sample 142	27117	1571	0	0	155	1	0.0579	1.3637	0.6598	2.2134	0.0826	1.7433	0.79	527	30	512	9	514	9	99
Sample 025	34777	2037	812	0	281	1	0.0586	1.6909	0.6884	2.5317	0.0852	1.8842	0.74	551	37	527	10	532	11	99
Sample 044	23893	1391	0	0	193	1	0.0582	1.4433	0.6846	2.2567	0.0853	1.7348	0.77	537	32	528	9	530	9	100
Sample 034	17796	1029	0	0	144	1	0.0578	1.4533	0.6800	2.3172	0.0853	1.8048	0.78	522	32	528	9	527	10	100
Sample 098	32000	1873	0	0	178	1	0.0585	1.2814	0.6886	2.1564	0.0853	1.7344	0.80	550	28	528	9	532	9	99
Sample 149	17608	1031	0	0	95	1	0.0586	1.8778	0.7071	2.8013	0.0876	2.0788	0.74	552	41	541	11	543	12	100

Sample 056	8720	517	0	0	46	1	0.0593	2.4633	0.7290	3.3309	0.0892	2.2422	0.67	577	54	551	12	556	14	99
Sample 080	16939	999	0	0	90	1	0.0590	1.5254	0.7257	2.3888	0.0892	1.8384	0.77	567	33	551	10	554	10	99
Sample 066	21251	1262	0	0	112	2	0.0594	2.1216	0.7349	2.9971	0.0898	2.1170	0.71	581	46	554	11	559	13	99
Sample 076	8811	519	0	0	46	1	0.0589	3.2965	0.7344	4.3871	0.0905	2.8947	0.66	562	72	559	16	559	19	100
Sample 075	53255	3176	0	1	276	0	0.0596	3.5530	0.7499	4.4956	0.0912	2.7544	0.61	590	77	563	15	568	20	99
Sample 039	23246	1379	0	0	173	0	0.0593	1.3486	0.7555	2.1953	0.0924	1.7322	0.79	579	29	570	9	571	10	100
Sample 086	23178	1380	3476	0	118	2	0.0596	1.3854	0.7617	2.2356	0.0928	1.7546	0.78	587	30	572	10	575	10	99
Sample 020	13469	825	0	1	98	2	0.0612	4.1818	0.7985	5.3398	0.0946	3.3205	0.62	648	90	582	19	596	24	98
Sample 059	6182	363	224	1	31	2	0.0587	5.2145	0.7688	6.3536	0.0949	3.6300	0.57	557	114	585	20	579	28	101
Sample 120	74014	4425	0	0	364	0	0.0598	1.1875	0.7939	2.0761	0.0963	1.7030	0.82	596	26	593	10	593	9	100
Sample 148	25943	1564	245	1	127	1	0.0603	3.9368	0.8068	4.8898	0.0970	2.9004	0.59	614	85	597	17	601	22	99
Sample 079	27024	1643	0	0	130	0	0.0608	1.2998	0.8246	2.1783	0.0984	1.7480	0.80	631	28	605	10	611	10	99
Sample 084	48283	2933	1265	0	230	2	0.0607	1.4108	0.8340	2.2117	0.0996	1.7033	0.77	630	30	612	10	616	10	99
Sample 036	42003	2528	0	0	288	1	0.0602	1.2128	0.8335	2.0501	0.1004	1.6529	0.81	610	26	617	10	616	10	100
Sample 082	20380	1205	0	0	96	2	0.0591	2.2658	0.8193	3.2067	0.1005	2.2691	0.71	572	49	617	13	608	15	102
Sample 165	18386	1142	0	0	87	1	0.0621	3.9755	0.8608	5.3250	0.1005	3.5426	0.67	679	85	617	21	631	25	98
Sample 124	35949	2198	533	1	168	1	0.0611	2.0886	0.8543	2.8869	0.1014	1.9931	0.69	644	45	622	12	627	14	99
Sample 130	33433	2046	1926	0	156	1	0.0612	1.3720	0.8581	2.2568	0.1017	1.7918	0.79	646	29	624	11	629	11	99
Sample 022	9590	571	222	1	65	2	0.0595	4.6414	0.8350	5.6515	0.1017	3.2244	0.57	586	101	625	19	616	26	101
Sample 104	18575	1137	0	0	86	0	0.0612	1.8304	0.8589	2.6423	0.1018	1.9057	0.72	646	39	625	11	630	12	99
Sample 151	9711	597	0	0	44	1	0.0615	2.3104	0.8866	3.2289	0.1046	2.2556	0.70	655	50	641	14	645	16	100
Sample 018	92915	5652	2939	0	608	0	0.0608	1.1274	0.8829	1.9776	0.1053	1.6247	0.82	633	24	645	10	643	9	100
Sample 137	28476	1754	0	0	126	1	0.0616	1.3966	0.9054	2.3083	0.1066	1.8380	0.80	660	30	653	11	655	11	100
Sample 043	29588	1850	0	0	186	1	0.0625	1.4393	0.9430	2.4142	0.1094	1.9382	0.80	692	31	669	12	674	12	99
Sample 054	21433	1331	0	0	92	1	0.0621	2.2061	0.9443	3.3497	0.1103	2.5206	0.75	678	47	674	16	675	17	100
Sample 161	111653	7012	471	1	451	0	0.0628	2.1893	1.0143	2.9313	0.1171	1.9492	0.66	701	47	714	13	711	15	100
Sample 105	48950	3249	0	0	182	0	0.0664	1.1903	1.1634	2.0616	0.1271	1.6833	0.82	818	25	771	12	784	11	98
Sample 123	58895	3874	0	0	214	0	0.0658	1.1707	1.1799	2.0440	0.1301	1.6755	0.82	799	25	788	12	791	11	100
Sample 108	70146	4664	700	0	250	0	0.0665	2.0513	1.2159	3.0572	0.1326	2.2669	0.74	822	43	803	17	808	17	99
Sample 095	63215	4427	1348	0	199	1	0.0700	1.2743	1.4494	2.1256	0.1501	1.7013	0.80	929	26	902	14	910	13	99
Sample 078	10569	729	131	2	33	1	0.0689	6.5980	1.4325	7.5705	0.1507	3.7120	0.49	897	136	905	31	903	46	100
Sample 064	217793	15771	5246	0	676	0	0.0724	1.0462	1.5235	1.9341	0.1526	1.6268	0.84	998	21	915	14	940	12	97
Sample 160	15717	1116	6651	0	47	1	0.0710	1.7084	1.5494	2.6669	0.1583	2.0478	0.77	957	35	947	18	950	17	100
Sample 077	30697	2269	0	0	87	1	0.0739	1.5965	1.7009	2.6070	0.1669	2.0610	0.79	1039	32	995	19	1009	17	99
Sample 065	58533	4371	0	0	163	0	0.0747	1.1383	1.7553	2.0273	0.1705	1.6775	0.83	1060	23	1015	16	1029	13	99
Sample 053	131774	9624	2212	0	361	1	0.0730	1.1498	1.7396	2.0401	0.1728	1.6852	0.83	1015	23	1027	16	1023	13	100
Sample 145	12242	907	0	0	33	1	0.0741	4.0761	1.7727	5.9409	0.1735	4.3220	0.73	1044	82	1032	41	1036	39	100
Sample 118	77115	5735	999	0	205	1	0.0744	1.3737	1.8237	2.1814	0.1779	1.6946	0.78	1051	28	1055	17	1054	14	100
Sample 164	121245	9183	926	0	315	0	0.0757	1.4050	1.9040	2.2311	0.1823	1.7331	0.78	1088	28	1080	17	1082	15	100
Sample 017	22874	1705	0	0	86	1	0.0745	1.3553	1.8896	2.2574	0.1839	1.8052	0.80	1056	27	1088	18	1077	15	101
Sample 074	106286	7903	0	0	257	1	0.0744	1.1700	2.0067	1.9528	0.1957	1.5635	0.80	1051	24	1152	17	1118	13	103
Sample 058	40876	3851	739	0	73	1	0.0942	1.4485	3.4293	2.2858	0.2640	1.7683	0.77	1512	27	1510	24	1511	18	100
Sample 037	16188	1551	0	0	42	1	0.0958	1.3358	3.5162	2.2991	0.2661	1.8712	0.81	1544	25	1521	25	1531	18	99
Sample 140	142261	15288	1424	0	235	2	0.1075	1.3233	4.2433	2.3599	0.2864	1.9539	0.83	1757	24	1623	28	1682	20	96
Sample 162	92493	9594	4002	0	152	1	0.1037	1.1466	4.1308	2.0482	0.2888	1.6972	0.83	1692	21	1636	25	1660	17	99
Sample 062	59943	6455	0	0	94	1	0.1077	1.5879	4.4827	2.6064	0.3019	2.0669	0.79	1761	29	1701	31	1728	22	98

Sample 117	10143	1098	0	0	16	4	0.1083	1.8098	4.5621	2.9043	0.3055	2.2715	0.78	1771	33	1719	34	1742	24	99
Sample 129	80256	8509	0	0	123	1	0.1060	1.1130	4.5114	2.0356	0.3086	1.7044	0.84	1732	20	1734	26	1733	17	100
Sample 138	44432	4776	0	0	68	1	0.1075	1.1816	4.6134	2.1415	0.3113	1.7860	0.83	1757	22	1747	27	1752	18	100
Sample 122	144774	15454	0	1	220	1	0.1067	2.1659	4.5891	2.8041	0.3118	1.7809	0.64	1745	40	1750	27	1747	24	100
Sample 013	16176	1763	0	0	35	2	0.1090	1.4130	4.7404	2.5089	0.3155	2.0732	0.83	1783	26	1767	32	1774	21	100
Sample 168	54354	6014	0	0	80	1	0.1107	1.1658	4.8924	2.0738	0.3207	1.7151	0.83	1810	21	1793	27	1801	18	100
Sample 067	296683	35338	0	0	412	2	0.1191	1.2425	5.5959	2.3310	0.3407	1.9722	0.85	1943	22	1890	32	1915	20	99
Sample 147	39489	4779	0	0	55	1	0.1210	1.1569	5.7121	2.0806	0.3424	1.7292	0.83	1971	21	1898	28	1933	18	98
Sample 061	114827	13376	0	0	159	1	0.1165	1.0731	5.4989	1.9906	0.3424	1.6766	0.84	1903	19	1898	28	1900	17	100
Sample 088	57591	6904	884	0	79	1	0.1199	1.3073	5.6758	2.2759	0.3434	1.8630	0.82	1955	23	1903	31	1928	20	99
Sample 057	54304	6439	3883	0	74	1	0.1186	1.1210	5.6901	2.0472	0.3481	1.7129	0.84	1935	20	1925	29	1930	18	100
Sample 032	67193	8516	0	0	130	1	0.1267	1.0652	6.1949	1.9760	0.3545	1.6643	0.84	2053	19	1956	28	2004	17	98
Sample 015	122864	15003	0	0	230	1	0.1221	1.0482	6.1874	1.9310	0.3675	1.6218	0.84	1987	19	2018	28	2003	17	101
Sample 102	19593	2575	0	0	25	1	0.1314	1.2478	6.6682	2.2796	0.3680	1.9078	0.84	2117	22	2020	33	2068	20	98
Sample 038	45128	5650	0	0	84	0	0.1252	1.1101	6.3733	2.0358	0.3692	1.7065	0.84	2032	20	2025	30	2029	18	100
Sample 024	102199	14043	0	0	189	0	0.1374	1.0480	7.0580	1.9577	0.3725	1.6536	0.84	2195	18	2041	29	2119	18	96
Sample 139	65976	8478	881	0	83	1	0.1285	1.2445	6.6605	2.1170	0.3759	1.7125	0.81	2078	22	2057	30	2067	19	100
Sample 035	28600	3844	0	0	51	1	0.1344	1.2574	7.1804	2.3212	0.3875	1.9511	0.84	2156	22	2111	35	2134	21	99
Sample 101	377663	51721	0	0	443	2	0.1370	1.1099	7.6301	2.0242	0.4041	1.6927	0.84	2189	19	2188	31	2188	18	100
Sample 042	232388	41449	0	0	342	1	0.1784	1.1381	11.4947	2.2552	0.4674	1.9469	0.86	2638	19	2472	40	2564	21	96
Sample 011	51202	9216	653	0	69	1	0.1800	1.2294	12.6888	2.1426	0.5113	1.7549	0.82	2653	20	2662	38	2657	20	100
Sample 141	212445	40568	0	0	193	2	0.1910	1.1887	13.7506	2.1634	0.5223	1.8076	0.84	2750	20	2709	40	2733	21	99
Sample 055	136462	25853	0	0	123	1	0.1895	1.2035	13.7422	2.4026	0.5261	2.0795	0.87	2737	20	2725	46	2732	23	100
Sample 087	219977	42165	1556	0	195	2	0.1917	1.1468	14.1295	2.1858	0.5346	1.8608	0.85	2757	19	2761	42	2758	21	100
Sample 021	241653	47671	78382	0	306	0	0.1973	1.0138	14.7722	1.9364	0.5431	1.6498	0.85	2804	17	2796	38	2801	19	100
Sample: Marine Barrier 4, 170-230µm. Age accepted: (±5 % of discordance)																				
File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*$^{207*}Pb/^{206*}Pb$*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*$^{207*}Pb/^{206*}Pb$*	*2σ*	*$^{206*}Pb/^{238}U$*	*2σ*	*$^{207*}Pb/^{235}U$*	*2σ*	*Conc. %*
Sample 101	82	4	0	0	66	1	0.0474	95.8412	0.0097	101.1105	0.0015	32.2148	0.32	68	2281	10	3	10	10	98
Sample 165	278	13	0	0	138	2	0.0463	37.1379	0.0125	39.7908	0.0020	14.2857	0.36	11	893	13	2	13	5	100
Sample 065	141	7	0	0	79	1	0.0478	59.4974	0.0142	63.8809	0.0022	23.2558	0.36	87	1411	14	3	14	9	97
Sample 109	389	18	0	0	191	2	0.0471	18.8150	0.0158	20.2096	0.0024	7.3770	0.37	54	449	16	1	16	3	98
Sample 141	256	12	0	0	83	1	0.0465	29.8302	0.0192	31.4618	0.0030	10.0000	0.32	25	716	19	2	19	6	100
Sample 023	258	12	0	0	107	1	0.0469	43.2985	0.0256	47.1589	0.0040	18.6869	0.40	46	1035	25	5	26	12	99
Sample 062	10852	515	0	0	1092	1	0.0475	3.0316	0.0779	4.0524	0.0119	2.6891	0.66	74	72	76	2	76	3	100
Sample 087	1529	75	0	0	98	1	0.0488	6.1526	0.1252	7.3245	0.0186	3.9742	0.54	136	145	119	5	120	8	99
Sample 044	776	354	0	0	49	2	0.4568	2.6337	1.1884	4.9910	0.0189	4.2395	0.85	4107	39	121	5	795	28	15
Sample 149	14579	722	0	0	549	1	0.0496	2.7043	0.1768	3.8799	0.0259	2.7821	0.72	174	63	165	5	165	6	100
Sample 036	5646	285	0	0	246	1	0.0504	3.3327	0.1910	4.4734	0.0275	2.9840	0.67	214	77	175	5	177	7	98
Sample 018	15441	774	0	0	892	1	0.0501	1.4571	0.1967	2.3918	0.0285	1.8967	0.79	200	34	181	3	182	4	99
Sample 144	5782	297	0	0	137	2	0.0514	3.1724	0.2905	4.1548	0.0410	2.6829	0.65	258	73	259	7	259	10	100
Sample 151	16647	868	0	0	372	1	0.0522	1.6491	0.3131	2.6439	0.0436	2.0666	0.78	292	38	275	6	277	6	99
Sample 102	8759	453	0	0	237	1	0.0518	4.1924	0.3157	5.5074	0.0442	3.5714	0.65	275	96	279	10	279	14	100
Sample 077	5135	258	81	3	139	2	0.0503	13.9596	0.3073	20.7630	0.0444	15.3699	0.74	207	324	280	42	272	51	103
Sample 088	9684	503	0	0	259	0	0.0520	1.8280	0.3205	2.8192	0.0447	2.1462	0.76	284	42	282	6	282	7	100
Sample 169	4609	240	134	2	99	1	0.0521	8.3812	0.3250	12.4805	0.0453	9.2477	0.74	288	192	285	26	286	32	100

Sample 130	1583	83	0	0	33	2	0.0522	6.7842	0.3361	8.1857	0.0467	4.5805	0.56	293	155	294	13	294	21	100
Sample 063	13377	715	0	0	307	1	0.0535	1.5903	0.3850	2.5480	0.0522	1.9908	0.78	348	36	328	6	331	7	99
Sample 105	6040	332	0	0	124	1	0.0549	3.9680	0.4416	5.4054	0.0583	3.6707	0.68	410	89	365	13	371	17	98
Sample 082	12065	663	0	0	245	1	0.0550	1.8013	0.4463	2.7969	0.0589	2.1396	0.76	411	40	369	8	375	9	98
Sample 095	5316	274	48	6	102	1	0.0515	21.8898	0.4455	28.3594	0.0627	18.0303	0.64	265	502	392	69	374	93	105
Sample 104	5147	283	0	0	97	1	0.0549	2.6402	0.4815	3.6040	0.0636	2.4532	0.68	409	59	397	9	399	12	100
Sample 108	18935	1054	0	0	338	0	0.0556	1.3480	0.5144	2.3370	0.0671	1.9090	0.82	438	30	418	8	421	8	99
Sample 011	6857	390	0	0	151	0	0.0569	1.8099	0.5854	2.7859	0.0746	2.1180	0.76	488	40	464	9	468	10	99
Sample 107	11483	649	0	0	181	0	0.0565	5.5575	0.5908	7.2917	0.0758	4.7205	0.65	472	123	471	21	471	28	100
Sample 041	11225	638	133	2	161	1	0.0568	7.3885	0.6554	9.0954	0.0837	5.3044	0.58	484	163	518	26	512	37	101
Sample 045	3810	221	0	0	55	2	0.0581	4.0268	0.6706	5.3593	0.0837	3.5364	0.66	534	88	518	18	521	22	99
Sample 128	14074	813	0	0	163	1	0.0578	2.1464	0.6702	3.2381	0.0841	2.4245	0.75	521	47	521	12	521	13	100
Sample 160	4596	268	0	0	53	1	0.0582	3.7101	0.6786	5.0209	0.0845	3.3830	0.67	538	81	523	17	526	21	99
Sample 081	8203	478	0	0	114	1	0.0583	2.2489	0.6926	3.3491	0.0862	2.4817	0.74	539	49	533	13	534	14	100
Sample 125	12772	750	0	0	143	0	0.0587	1.5676	0.7032	2.5248	0.0869	1.9793	0.78	556	34	537	10	541	11	99
Sample 110	13986	831	0	0	191	1	0.0594	1.5312	0.7195	2.5225	0.0878	2.0046	0.79	583	33	543	10	550	11	99
Sample 046	9831	584	408	1	134	2	0.0594	2.7640	0.7227	3.7664	0.0882	2.5585	0.68	583	60	545	13	552	16	99
Sample 129	48259	2808	826	0	532	0	0.0582	1.6771	0.7087	2.5786	0.0883	1.9587	0.76	537	37	546	10	544	11	100
Sample 123	7394	434	0	0	81	2	0.0588	1.9745	0.7247	2.9827	0.0895	2.2356	0.75	558	43	552	12	553	13	100
Sample 163	34882	2054	0	0	377	0	0.0589	1.3250	0.7323	2.3035	0.0902	1.8843	0.82	562	29	557	10	558	10	100
Sample 097	2757	165	0	0	36	1	0.0598	5.3204	0.7519	6.8111	0.0912	4.2525	0.62	595	115	563	23	569	30	99
Sample 120	7126	422	0	0	76	1	0.0592	2.0274	0.7489	3.0736	0.0918	2.3101	0.75	574	44	566	13	568	13	100
Sample 168	5261	301	55	5	55	1	0.0571	17.6369	0.7338	20.8253	0.0931	11.0741	0.53	497	389	574	61	559	94	103
Sample 150	5456	328	0	0	56	1	0.0602	3.0233	0.7846	4.2029	0.0945	2.9197	0.69	611	65	582	16	588	19	99
Sample 148	9716	689	0	0	99	1	0.0709	5.2208	0.9312	7.0677	0.0953	4.7639	0.67	954	107	587	27	668	35	88
Sample 140	11003	657	0	0	112	1	0.0597	3.4315	0.7852	4.9342	0.0953	3.5456	0.72	594	74	587	20	588	22	100
Sample 124	2350	142	0	0	24	0	0.0605	4.8414	0.7976	6.4269	0.0956	4.2268	0.66	622	104	588	24	595	29	99
Sample 118	36216	2143	0	0	368	0	0.0592	1.3013	0.7818	2.3023	0.0958	1.8992	0.82	573	28	590	11	587	10	101
Sample 040	5453	333	0	0	67	1	0.0611	2.0311	0.8179	3.0418	0.0972	2.2643	0.74	641	44	598	13	607	14	98
Sample 174	6933	415	0	0	69	1	0.0599	2.0524	0.8060	2.9894	0.0975	2.1735	0.73	601	44	600	12	600	14	100
Sample 017	3289	199	0	1	55	0	0.0605	6.0684	0.8146	7.7384	0.0976	4.8018	0.62	622	131	601	28	605	36	99
Sample 152	8933	539	0	0	89	1	0.0604	1.6727	0.8151	2.6560	0.0979	2.0631	0.78	617	36	602	12	605	12	99
Sample 121	10480	646	0	0	103	0	0.0617	2.5616	0.8438	3.7963	0.0992	2.8019	0.74	663	55	610	16	621	18	98
Sample 038	13718	841	0	0	165	0	0.0613	1.4516	0.8429	2.4436	0.0997	1.9657	0.80	650	31	613	11	621	11	99
Sample 117	40221	2511	0	0	392	0	0.0624	1.2975	0.8606	2.2681	0.1000	1.8604	0.82	689	28	614	11	630	11	97
Sample 083	3429	212	0	0	41	1	0.0618	2.9945	0.8626	4.0490	0.1013	2.7254	0.67	667	64	622	16	632	19	98
Sample 076	23279	1438	0	0	275	1	0.0618	1.7970	0.8630	2.9417	0.1013	2.3290	0.79	666	38	622	14	632	14	98
Sample 161	18379	1138	0	0	177	1	0.0619	1.3725	0.8654	2.3554	0.1014	1.9142	0.81	672	29	622	11	633	11	98
Sample 061	8418	514	0	0	98	1	0.0611	1.8500	0.8636	2.8181	0.1026	2.1258	0.75	642	40	629	13	632	13	100
Sample 024	5978	368	0	0	96	2	0.0615	2.2266	0.8732	3.2664	0.1029	2.3900	0.73	658	48	632	14	637	16	99
Sample 075	18983	1158	213	1	221	0	0.0610	4.4354	0.8663	5.4397	0.1030	3.1492	0.58	638	95	632	19	634	26	100
Sample 012	15727	953	289	1	251	2	0.0606	3.5098	0.8616	4.4376	0.1031	2.7155	0.61	625	76	633	16	631	21	100
Sample 043	27587	1719	0	0	316	1	0.0623	1.3481	0.8977	2.4200	0.1045	2.0098	0.83	685	29	641	12	651	12	98
Sample 147	17022	1050	0	0	158	1	0.0617	1.4746	0.8904	2.4596	0.1047	1.9685	0.80	664	32	642	12	647	12	99
Sample 056	10099	620	0	0	115	2	0.0614	2.2331	0.8873	3.3222	0.1049	2.4597	0.74	652	48	643	15	645	16	100
Sample 037	10844	665	0	0	124	1	0.0613	2.7896	0.8876	3.9252	0.1050	2.7614	0.70	650	60	644	17	645	19	100

Sample 058	11121	680	0	0	127	1	0.0612	1.6514	0.8879	2.6932	0.1053	2.1275	0.79	645	35	645	13	645	13	100
Sample 015	1953	120	0	0	30	1	0.0615	4.2297	0.8940	5.4112	0.1055	3.3750	0.62	656	91	646	21	649	26	100
Sample 167	14725	906	0	0	136	1	0.0615	2.4699	0.8962	3.7073	0.1056	2.7646	0.75	658	53	647	17	650	18	100
Sample 084	18479	1120	269	1	209	1	0.0606	3.7087	0.8840	4.6192	0.1058	2.7537	0.60	625	80	648	17	643	22	101
Sample 013	15230	943	0	0	235	1	0.0619	1.5181	0.9116	2.4549	0.1068	1.9292	0.79	671	32	654	12	658	12	99
Sample 173	15235	945	0	0	139	1	0.0620	1.5638	0.9139	2.5556	0.1069	2.0213	0.79	675	33	654	13	659	12	99
Sample 098	16913	1051	0	0	190	1	0.0622	1.5442	0.9163	2.5730	0.1069	2.0582	0.80	680	33	655	13	660	13	99
Sample 042	15118	934	0	0	168	1	0.0618	1.8941	0.9160	2.9698	0.1076	2.2873	0.77	666	41	659	14	660	15	100
Sample 122	12334	760	0	0	112	1	0.0616	1.5914	0.9140	2.5902	0.1077	2.0437	0.79	660	34	659	13	659	13	100
Sample 074	11151	689	0	0	123	1	0.0618	2.6371	0.9276	3.7882	0.1088	2.7196	0.72	668	56	666	17	666	19	100
Sample 162	17434	1086	1967	0	155	1	0.0623	1.5749	0.9423	2.5334	0.1098	1.9843	0.78	683	34	671	13	674	13	100
Sample 164	21521	1338	0	0	189	1	0.0622	1.5919	0.9529	2.6397	0.1111	2.1056	0.80	681	34	679	14	680	13	100
Sample 033	4997	311	0	0	53	1	0.0623	2.9044	0.9635	4.0469	0.1121	2.8182	0.70	685	62	685	18	685	20	100
Sample 019	5451	340	0	0	79	3	0.0624	4.4217	0.9718	6.1458	0.1129	4.2685	0.69	689	94	690	28	689	31	100
Sample 172	2238	142	0	0	19	1	0.0635	5.4471	0.9928	7.1213	0.1134	4.5872	0.64	726	116	692	30	700	37	99
Sample 175	588	37	0	0	5	0	0.0628	12.9376	0.9825	14.6773	0.1134	6.9312	0.47	703	275	692	46	695	77	100
Sample 034	6774	431	0	0	70	2	0.0636	2.4839	1.0097	3.5626	0.1151	2.5539	0.72	729	53	702	17	709	18	99
Sample 054	21772	1414	0	0	206	2	0.0649	1.3861	1.1329	2.3364	0.1265	1.8808	0.81	772	29	768	14	769	13	100
Sample 014	11945	783	1147	0	154	1	0.0655	1.8888	1.1508	2.9234	0.1273	2.2313	0.76	792	40	773	16	778	16	99
Sample 100	7195	475	0	0	67	1	0.0660	3.4258	1.1688	4.9661	0.1285	3.5953	0.72	805	72	779	26	786	28	99
Sample 099	15349	1000	128	2	138	1	0.0651	6.8854	1.1966	7.9331	0.1332	3.9401	0.50	779	145	806	30	799	45	101
Sample 139	15177	1024	1454	0	108	1	0.0675	1.6147	1.2680	2.6048	0.1363	2.0440	0.78	852	34	824	16	831	15	99
Sample 119	4897	329	3461	0	35	1	0.0672	3.8304	1.2801	5.4646	0.1381	3.8975	0.71	845	80	834	31	837	32	100
Sample 020	10733	758	0	0	121	4	0.0706	1.6140	1.4234	2.7090	0.1462	2.1757	0.80	947	33	879	18	899	16	98
Sample 079	48402	3392	0	0	386	1	0.0701	1.2131	1.4508	2.2580	0.1502	1.9045	0.84	930	25	902	16	910	14	99
Sample 132	12719	865	56	5	78	0	0.0680	14.8608	1.4916	16.3191	0.1591	6.7431	0.41	869	308	952	60	927	104	103
Sample 153	14915	1098	0	0	85	1	0.0737	1.3985	1.7317	2.4162	0.1705	1.9703	0.82	1032	28	1015	19	1020	16	99
Sample 106	3817	286	0	0	26	2	0.0749	2.4579	1.8421	3.6105	0.1785	2.6447	0.73	1065	49	1059	26	1061	24	100
Sample 171	35919	2705	0	0	195	0	0.0753	1.4073	1.8653	2.4582	0.1796	2.0155	0.82	1077	28	1065	20	1069	16	100
Sample 053	10692	868	140	2	59	1	0.0812	5.3206	2.4261	6.0420	0.2168	2.8631	0.47	1226	105	1265	33	1250	44	101
Sample 078	90102	9275	0	0	364	1	0.1029	1.5543	4.2072	2.8440	0.2964	2.3818	0.84	1678	29	1674	35	1675	24	100
Sample 085	10663	1128	0	0	42	1	0.1058	1.3985	4.4390	2.5044	0.3042	2.0775	0.83	1729	26	1712	31	1720	21	100
Sample 170	19868	2112	0	0	63	1	0.1063	1.5143	4.4963	2.6633	0.3067	2.1909	0.82	1737	28	1725	33	1730	22	100
Sample 025	12250	1302	0	0	65	1	0.1063	1.2798	4.5096	2.3976	0.3078	2.0275	0.85	1736	23	1730	31	1733	20	100
Sample 035	45248	4962	531	1	169	2	0.1097	1.5228	4.8381	2.4268	0.3200	1.8896	0.78	1794	28	1790	30	1792	21	100
Sample 142	10472	1135	0	0	32	2	0.1084	1.4668	4.7874	2.6268	0.3203	2.1791	0.83	1773	27	1791	34	1783	22	100
Sample 021	23636	2633	0	0	120	1	0.1114	1.6246	4.9600	2.8396	0.3229	2.3290	0.82	1823	29	1804	37	1813	24	100
Sample 096	14755	1674	0	0	53	1	0.1135	1.4720	5.2193	2.6072	0.3337	2.1519	0.83	1855	27	1856	35	1856	22	100
Sample 039	26589	3084	0	0	93	1	0.1160	1.2245	5.4775	2.3423	0.3426	1.9967	0.85	1895	22	1899	33	1897	20	100
Sample 032	62577	7275	352	1	218	1	0.1163	1.9396	5.5179	2.9253	0.3443	2.1898	0.75	1899	35	1907	36	1903	25	100
Sample 055	25249	3118	0	0	87	1	0.1235	2.3891	5.8860	3.9650	0.3457	3.1644	0.80	2007	42	1914	53	1959	35	98
Sample 022	15112	1802	0	0	71	3	0.1192	1.2244	5.7763	2.3531	0.3513	2.0094	0.85	1945	22	1941	34	1943	21	100
Sample 066	31485	3921	0	1	101	1	0.1245	1.9510	6.4276	2.7549	0.3743	1.9450	0.71	2022	35	2050	34	2036	24	101
Sample 060	49298	6207	0	0	157	1	0.1259	1.5487	6.5213	2.7641	0.3756	2.2894	0.83	2042	27	2056	40	2049	25	100
Sample 131	28744	3682	0	0	74	1	0.1281	1.3661	6.6600	2.3651	0.3771	1.9307	0.82	2072	24	2063	34	2067	21	100
Sample 103	41839	5543	0	0	129	1	0.1325	1.1095	7.0718	2.1524	0.3871	1.8444	0.86	2131	19	2109	33	2121	19	99

Sample 086	3731	501	0	0	11	2	0.1343	3.0894	7.2004	5.3122	0.3888	4.3214	0.81	2155	54	2117	78	2137	49	99
Sample 143	27719	4893	0	0	54	2	0.1765	1.2293	12.0972	2.3407	0.4970	1.9919	0.85	2621	20	2601	43	2612	22	100
Sample 126	76029	13482	0	0	148	0	0.1773	1.1899	12.1999	2.3445	0.4990	2.0202	0.86	2628	20	2609	43	2620	22	100
Sample 145	58511	10589	0	0	112	1	0.1810	1.1825	12.6939	2.2403	0.5087	1.9028	0.85	2662	20	2651	41	2657	21	100

Sample: Eolic Barrier 4, 170-230 µm. Age accepted: (±5 % of discordance)

File Name	*207.0*	*206.0*	*206/204*	*f206c*	*U*	*Th/U*	*$^{207*}Pb/^{206*}Pb$*	*2σ*	*207*Pb/235U*	*2σ*	*206Pb/238Pb*	*2σ*	*RHO*	*$^{207*}Pb/^{206*}Pb$*	*2σ*	*$^{206*}Pb/^{238}U$*	*2σ*	*$^{207*}Pb/^{235}U$*	*2σ*	*Conc. %*
Sample 046	1935	96	0	0	110	1	0.0494	21.0612	0.1359	21.9024	0.0200	6.0120	0.27	166	492	127	8	129	27	98
Sample 024	11109	607	0	0	582	0	0.0547	2.8911	0.1629	4.0721	0.0216	2.8677	0.70	398	65	138	4	153	6	90
Sample 187	895	45	0	0	57	1	0.0500	10.0100	0.1908	10.9066	0.0277	4.3306	0.40	193	233	176	8	177	18	99
Sample 014	10264	496	53	5	372	1	0.0483	20.9548	0.2084	38.4855	0.0313	32.2805	0.84	116	494	198	63	192	70	103
Sample 038	1931	109	0	1	52	1	0.0565	23.2236	0.3303	25.2031	0.0424	9.7908	0.39	471	514	268	26	290	66	92
Sample 034	1913	100	0	0	50	2	0.0523	10.6802	0.3123	11.6374	0.0433	4.6221	0.40	300	244	273	12	276	29	99
Sample 039	8141	414	73	4	209	1	0.0508	16.0365	0.3097	23.3600	0.0442	16.9858	0.73	233	370	279	47	274	58	102
Sample 019	4208	217	0	0	108	1	0.0517	6.1181	0.3150	7.3480	0.0442	4.0696	0.55	270	140	279	11	278	18	100
Sample 044	33636	1753	234	1	835	0	0.0521	4.9559	0.3276	7.4744	0.0456	5.5952	0.75	291	113	287	16	288	19	100
Sample 056	5510	285	137	2	136	1	0.0516	9.5772	0.3263	13.1227	0.0458	8.9711	0.68	270	220	289	25	287	33	101
Sample 187	22704	1223	0	0	465	2	0.0539	1.6147	0.3827	2.5551	0.0515	1.9802	0.78	366	36	324	6	329	7	98
Sample 036	9361	502	0	0	206	2	0.0536	4.5913	0.3808	5.8639	0.0515	3.6477	0.62	353	104	324	12	328	17	99
Sample 194	6826	391	0	0	94	2	0.0573	3.1915	0.6056	4.3286	0.0766	2.9243	0.68	505	70	476	13	481	17	99
Sample 066	20758	1184	0	0	302	2	0.0570	3.1919	0.6119	4.2129	0.0778	2.7496	0.65	492	70	483	13	485	16	100
Sample 060	12586	719	0	0	178	1	0.0572	5.0569	0.6324	6.3632	0.0803	3.8624	0.61	497	111	498	19	498	25	100
Sample 180	4756	276	0	0	62	2	0.0581	2.4428	0.6482	3.4411	0.0809	2.4236	0.70	535	53	501	12	507	14	99
Sample 013	3918	228	0	0	55	1	0.0581	3.2197	0.6481	4.1043	0.0809	2.5454	0.62	533	71	502	12	507	17	99
Sample 016	14777	859	0	0	193	1	0.0582	2.7338	0.6961	3.8720	0.0868	2.7419	0.71	536	60	537	14	536	16	100
Sample 054	21662	1269	0	0	282	1	0.0586	3.4659	0.7024	4.6071	0.0870	3.0352	0.66	551	76	538	16	540	19	100
Sample 043	51593	3082	1395	0	669	0	0.0597	2.1438	0.7195	3.2859	0.0874	2.4902	0.76	594	46	540	13	550	14	98
Sample 059	5196	296	108	3	67	3	0.0570	11.9969	0.6869	14.5147	0.0874	8.1702	0.56	492	265	540	42	531	62	102
Sample 184	12877	756	0	0	252	2	0.0587	1.7206	0.7301	2.7541	0.0902	2.1505	0.78	556	38	557	11	557	12	100
Sample 033	12461	746	0	0	147	1	0.0599	2.4052	0.7922	3.4848	0.0960	2.5216	0.72	599	52	591	14	592	16	100
Sample 190	11206	690	0	0	205	1	0.0616	2.6145	0.8206	3.6633	0.0967	2.5660	0.70	660	56	595	15	608	17	98
Sample 041	18007	1092	0	0	211	1	0.0606	2.4909	0.8078	3.2649	0.0967	2.1107	0.65	626	54	595	12	601	15	99
Sample 057	32561	1943	1262	0	380	1	0.0597	1.6139	0.7976	2.5463	0.0970	1.9696	0.77	591	35	597	11	595	12	100
Sample 181	53929	3238	0	0	584	1	0.0600	1.3991	0.8077	2.2666	0.0976	1.7833	0.79	605	30	600	10	601	10	100
Sample 053	3013	182	0	0	35	1	0.0604	7.7458	0.8197	8.4570	0.0984	3.3947	0.40	619	167	605	20	608	39	100
Sample 065	8909	543	0	0	102	1	0.0610	3.4438	0.8304	4.3844	0.0988	2.7136	0.62	639	74	607	16	614	20	99
Sample 185	20692	1260	106	3	221	2	0.0609	8.6937	0.8307	10.3970	0.0989	5.7025	0.55	636	187	608	33	614	49	99
Sample 032	29719	1798	0	0	338	2	0.0605	3.4221	0.8294	4.6291	0.0994	3.1175	0.67	621	74	611	18	613	22	100
Sample 023	5568	338	0	0	63	3	0.0607	2.8515	0.8425	3.9275	0.1007	2.7008	0.69	628	61	619	16	621	18	100
Sample 184	52798	3186	0	0	550	0	0.0604	1.2428	0.8429	2.2172	0.1013	1.8361	0.83	616	27	622	11	621	10	100
Sample 018	18323	1155	0	0	205	1	0.0630	2.1418	0.8806	3.1496	0.1013	2.3093	0.73	709	46	622	14	641	15	97
Sample 193	43081	2657	0	1	434	0	0.0617	3.4860	0.8918	4.3915	0.1049	2.6708	0.61	663	75	643	16	647	21	99
Sample 189	68419	4271	0	1	670	0	0.0624	3.6264	0.9281	4.6063	0.1078	2.8404	0.62	688	77	660	18	667	23	99
Sample 190	16151	1000	0	0	157	1	0.0619	1.8243	0.9267	2.8387	0.1085	2.1749	0.77	672	39	664	14	666	14	100
Sample 186	16462	1054	207	1	266	1	0.0640	4.4333	0.9645	5.4527	0.1093	3.1745	0.58	742	94	669	20	686	28	97
Sample 067	4897	317	0	0	48	1	0.0647	6.8294	1.0252	8.8796	0.1149	5.6750	0.64	765	144	701	38	717	47	98

Sample 025	6002	365	56	5	57	0	0.0608	16.8951	1.0031	19.2022	0.1197	9.1258	0.48	632	364	729	63	705	103	103
Sample 179	30411	1994	0	0	249	1	0.0656	1.4791	1.1677	2.5611	0.1291	2.0908	0.82	793	31	783	15	786	14	100
Sample 022	24876	1627	0	0	217	0	0.0654	2.0489	1.1678	3.1743	0.1295	2.4245	0.76	787	43	785	18	786	18	100
Sample 063	31901	2169	0	0	262	0	0.0680	2.5743	1.2924	3.8246	0.1379	2.8285	0.74	868	53	833	22	842	22	99
Sample 015	12612	853	0	0	102	1	0.0677	1.6108	1.3112	2.5621	0.1405	1.9925	0.78	858	33	848	16	851	15	100
Sample 021	13030	902	0	1	101	1	0.0692	3.4613	1.3903	4.3518	0.1457	2.6376	0.61	906	71	877	22	885	26	99
Sample 192	29251	2075	0	0	199	0	0.0710	1.3249	1.5194	2.3742	0.1553	1.9701	0.83	956	27	931	17	938	15	99
Sample 191	27905	2014	0	0	183	1	0.0722	1.4828	1.6043	2.5879	0.1613	2.1209	0.82	990	30	964	19	972	16	99
Sample 064	6039	440	0	0	41	1	0.0729	3.3745	1.6618	4.3659	0.1653	2.7702	0.63	1011	68	986	25	994	28	99
Sample 020	11565	857	0	0	76	1	0.0741	1.5927	1.7684	2.5738	0.1731	2.0218	0.79	1044	32	1029	19	1034	17	100
Sample 040	27600	2066	0	0	180	1	0.0749	1.8437	1.7952	2.7121	0.1740	1.9891	0.73	1064	37	1034	19	1044	18	99
Sample 061	17009	1225	109	3	110	0	0.0720	7.4761	1.7399	8.3811	0.1752	3.7881	0.45	987	152	1041	37	1023	56	102
Sample 035	41345	3261	0	0	242	0	0.0789	1.3311	2.1044	2.4241	0.1935	2.0259	0.84	1169	26	1140	21	1150	17	99
Sample 186	19258	1541	0	0	104	2	0.0800	1.4495	2.1606	2.5551	0.1958	2.1042	0.82	1198	29	1153	22	1168	18	99
Sample 188	6301	523	0	0	52	1	0.0831	2.2990	2.4300	3.5867	0.2121	2.7530	0.77	1271	45	1240	31	1252	26	99
Sample 011	11882	1263	0	0	50	2	0.1063	2.2113	3.9267	3.6375	0.2680	2.8882	0.79	1736	41	1531	39	1619	30	95
Sample 183	9028	968	0	0	31	3	0.1073	1.6597	4.6092	2.8496	0.3117	2.3164	0.81	1753	30	1749	36	1751	24	100
Sample 182	43493	5410	0	0	132	0	0.1244	1.1737	5.9450	2.2025	0.3466	1.8637	0.85	2020	21	1918	31	1968	19	97
Sample 189	47448	6106	0	0	231	1	0.1287	1.8107	6.4433	2.9942	0.3632	2.3846	0.80	2080	32	1997	41	2038	27	98
Sample 191	32075	4134	0	0	153	1	0.1289	1.4898	6.5657	2.5005	0.3695	2.0082	0.80	2083	26	2027	35	2055	22	99
Sample 055	42631	5449	0	0	128	1	0.1278	1.4396	6.6604	2.4175	0.3780	1.9421	0.80	2068	25	2067	34	2067	22	100
Sample 185	10860	1468	0	0	48	1	0.1352	1.6938	7.4373	3.0209	0.3990	2.5014	0.83	2167	30	2164	46	2165	27	100
Sample 037	15459	2767	0	0	35	1	0.1790	2.2402	12.4753	3.6773	0.5055	2.9161	0.79	2644	37	2637	63	2641	35	100
Sample 017	48851	8795	0	1	109	1	0.1800	1.6929	12.5812	2.5162	0.5068	1.8615	0.74	2653	28	2643	40	2649	24	100
Sample 045	80397	14533	0	0	179	1	0.1808	2.0136	12.6993	3.0218	0.5095	2.2531	0.75	2660	33	2655	49	2658	29	100
Sample 012	54613	10026	4049	0	120	1	0.1836	1.1525	13.0511	2.1407	0.5156	1.8040	0.84	2686	19	2680	40	2683	20	100

S2 – Tectonic cycle distribution for eolian (E) and marine (M) barriers (B1, B2, B3, B4) of Southernmost Brazilian Coastal Plain

		B1M		B1E		B2M		B2E		B3M		B3E		B4M		B4E		All zircons	
Tectonic Cycle	Interval Ma.	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Andean	0 - 40	1	0.4%	1	0.4%	7	4.0%	9	4.3%	8	4.5%	7	3.7%	8	3.4%	6	3.5%	47	3
Late to Post Gondawanides-Andean	230 - 40	2	0.8%	11	4.7%	15	8.6%	14	6.8%	14	7.9%	18	9.6%	15	6.4%	15	8.7%	104	6
Gondwanides	380 - 230	16	6.7%	23	9.8%	8	4.6%	18	8.7%	14	7.9%	13	6.9%	17	7.2%	14	8.1%	123	8
Famatinian	500 - 380	7	2.9%	9	3.8%	11	6.3%	18	8.7%	9	5.1%	10	5.3%	10	4.3%	8	4.7%	82	5
Pampean	541 - 500	38	16.0%	26	11.1%	17	9.8%	9	4.3%	8	4.5%	8	4.3%	18	7.7%	13	7.6%	137	8
Neoproterozoic cycles	1000 - 541	124	52.1%	114	48.7%	61	35.1%	81	39.1%	82	46.3%	84	44.7%	111	47.2%	63	36.6%	720	44
Mesoproterozoic cycles	1600 - 1000	26	10.9%	23	9.8%	24	13.8%	21	10.1%	17	9.6%	18	9.6%	12	5.1%	14	8.1%	155	10
Paleoproterozoic cycles	2500 - 1600	15	6.3%	21	9.0%	22	12.6%	30	14.5%	21	11.9%	24	12.8%	37	15.7%	29	16.9%	199	12
Archean cycles	4000 - 2500	9	3.8%	6	2.6%	9	5.2%	7	3.4%	4	2.3%	6	3.2%	7	3.0%	10	5.8%	58	4
																		1625	100

Paraná Lava Flows and/or Early Andean	140 - 120	0	0.0%	1	0.4%	1	0.6%	1	0.5%	3	1.7%	1	0.5%	2	0.9%	4	2.3%	13	1
*Greenville Cycle**	1300 - 900	34	14.3%	29	12.4%	31	17.8%	25	12.1%	20	11.3%	18	9.6%	15	6.4%	21	12.2%	193	12

S3 – U-Pb probably distribution