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EP55A-1096 - Sediment Provenance of the Magallanes-Austral Basin ~ 51° S Using Kernel Density Estimates from Detrital Zircon U-Pb Ages and Sandstone Composition to Analyze Tectonics and Erosion Activity



Friday, 17 December 2021



16:00 - 18:00



Convention Center - Poster Hall, D-F

Abstract

The Magallanes-Austral retroarc foreland basin has undergone tectonic changes due to its location inboard of the Chilean trench and Southern Patagonian Andes. We examined sediment provenance to discern tectonic changes at two study sites, Sierra Baguales and Cerro Castillo. Paleocene to Miocene formations studied include: Dorotea, Cerro Dorotea, lower Río Turbio, upper Río Turbio, Río Guillermo/Río Leona, Estancia 25 de Mayo and Santa Cruz. From west to east, the Jurassic to Miocene Patagonian Batholith and Paleozoic metamorphic basement complexes, the Jurassic hinterland fold-and-thrust belt, and the Cretaceous fold-and-thrust belt contributed sediment to these formations. We used an SEM to analyze polished sandstone thin sections to create BSE images and EDS maps for petrographic point counting. We calculated kernel density estimates from previously acquired and published detrital zircon U-Pb ages. Pronounced zircon U-Pb age clusters from both sites include 25-0 Ma, 40-25 Ma, 136-80 Ma, 175-136 Ma and 420-250 Ma. Paleocene to mid Eocene formations tend to be more quartz-rich and lithic-poor than the upper Oligocene to mid Miocene formations. Since Paleocene units contain more quartz and higher proportions of zircons aged 420-250 Ma, we suggest this sediment originated from the East Andean Metamorphic Complex, Metasedimentary Basement Complex and Patagonian Batholith. Paleocene formations have a primarily mixed and dissected arc provenance consistent with the interpretation that the Patagonian Batholith was exposed during the Paleocene to mid Eocene due to erosion of the volcanic cap and/or less volcanic activity. Late Eocene to Miocene units have detrital zircon ages ranging primarily from 65-0 Ma, indicating the magmatic arc was the main

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sourcing of the Patagonian Batholith and metamorphic basement complexes, assuming the lithics are syndepositional. Differences in sandstone composition and concentration of zircon age populations indicate a significant tectonic event occurred between the Paleocene units and Eocene-Miocene units. The change in provenance aligns well with the passage of the Aluk-Farallon slab window.

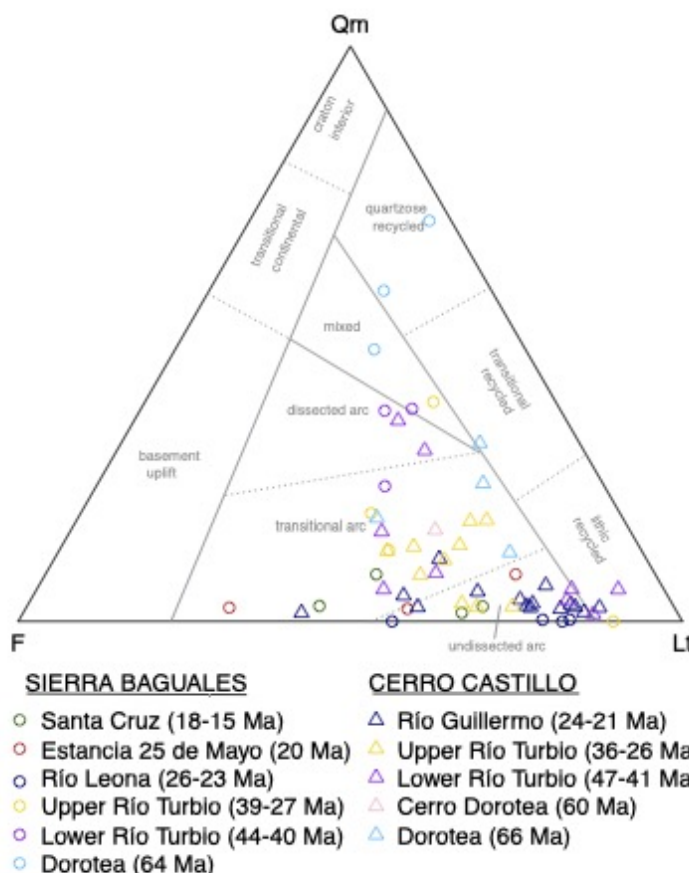


Figure 1. QmFLt ternary diagram showing tectonic provenance for Sierra Baguales and Cerro Castillo in the Magallanes-Austral Basin after Dickinson and Suczek, 1979. Qm-monocrystalline quartz; F-feldspar; Lt-total lithics

Authors

B

Sarah E Brown
Scripps College

Presenting Author

B

Sofia T Barth
Union College

Authors

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Oberlin College

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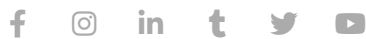
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Omonde Sitou Akakpo¹, Jennifer Gifford², Dennis W Powers³ and Robert M Holt³, (1)University of Mississippi Main Campus, Geology and Geological Engineering,

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Harisma Harisma, Kyoto University, Department of Geology and Mineralogy, Kyoto, Japan, Hajime Naruse, Kyoto University, Division of Earth and Planetary Sciences, Kyoto, Japan, Takafumi Hirata, Geochemical Research Center, The University of Tokyo, Tokyo, Japan and Hisashi Asanuma, The University of Tokyo, Geochemical Research Center, Tokyo, Japan

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