

# **U-Pb and Lu-Hf isotopic constraints on the Provenance of Permian Detritus in Metasedimentary Rocks of Southern Chile And Livingston Island, Antarctica**

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The provenance of sedimentary rocks has been revolutionised through the application of isotopic methods, in particular U-Pb detrital zircon dating. Such studies reveal not only the age spectrum for the source of the zircon, but invariably a young age component that places significant constraints on, or redefines, the time of deposition. In many cases this young age component is derived from a magmatic source that is coeval with deposition. Laser ablation, multi-collector ICP MS Lu-Hf analyses of previously U-Pb dated zircon can further constrain isotopic sources. The Hf isotope signature of an individual zircon age component will provide a characteristic signature of the protolith and information as to crustal residence time, thereby enabling more refined correlations and reconstructions.

Within the Late Palaeozoic accretionary wedge of the western margin of South America and Antarctic Peninsula there are significant packages of metasedimentary rocks that lie outboard of the southern Patagonian Batholith. Hf isotopic data has been determined for Permian-age detrital zircons from 4 sandstone samples in a N to S transect from 50°S to 60°S. In all samples the dominant  $\varepsilon_{\text{Hf}}$  values are between -5 and -10. This indicates that the source for these Permian zircons has had a significant crustal residence time and that they are not derived from a juvenile magmatic arc. Other grains record more enriched Hf isotope signatures indicating derivation from older crustal sources. This similarity in Hf isotope signatures, together with the U-Pb age spectra, is consistent with the premise that the Antarctic Peninsula was side by side with Patagonia during the Jurassic, receiving detritus from the same source.