

PERMIAN GRANITES AND MIGMATITIC GNEISSES IN TIERRA DEL FUEGO AND ANTARCTIC PENINSULA : THE HIDDEN SOURCE OF COEVAL DETRITAL ZIRCONS IN METASEDIMENTARY UNITS OF THE REGION?

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SHRIMP U-Pb zircon ages on cordierite-sillimanite-garnet migmatitic gneiss from the basement of the Meso-Cenozoic infill of the Magallanes Basin at Punta Baja, Tierra del Fuego, reveal the presence of populations of Cambrian igneous zircons and of low (< 0.02) Th/U Permian (267 ± 3 Ma) metamorphic zircons. Additionally, Permian (257 ± 2 Ma) zircons characterize an S-type granite from the buried basement of Tierra del Fuego. This indicates that a Permian high-grade metamorphic and anatectic ($P=2-3$ kbar; $T=730-770^{\circ}\text{C}$) event affected the neighbouring Cambrian plutonic rocks and/or the sedimentary rocks derived from them, to form the gneisses and the granite. Similar metamorphic zircon ages (258 ± 3 Ma) and Th/U ratios (< 0.08) have been obtained by previous authors from metamorphic zircons from a migmatized paragneiss at Adie Inlet, Antarctic Peninsula, in which the detrital igneous Cambrian zircons present may have been derived from the dated Cambrian plutons from Tierra del Fuego, as no Cambrian granitoids are present in the Antarctic Peninsula. Recent paleogeographic reconstructions bring the two mentioned localities, Punta Baja and Adie Inlet, very close together during the Middle Jurassic, and the age data presented here suggest they already formed a continuum during the Permian metamorphic and partial melting event, which occurred in thickened crust with high geothermal gradient. Cambrian/Ediacaran plutonic rocks are also known from the basement of northwestern Argentina, the Sierra de la Ventana, the Cape Fold Belt in South Africa, and the Ross Orogen in Antarctica. The finding of late Precambrian gneiss, early Jurassic plutons and mid Jurassic volcanic rocks on the Pirie Bank in the Central Scotia Sea, suggest a similar geological history to that of Tierra del Fuego and that this and maybe other large tracts of the Central Scotia Sea with assumed continental character may have been continuous with Patagonia before break-up.

The unconformity separating the gneiss from the overlying Middle Jurassic Tobífera Formation in Tierra del Fuego and Antarctic Peninsula indicates that ca. 10 km of continental crust were eroded in the time gap represented by the unconformity. Frequent conglomerate beds in Permian to Triassic widespread clastic units in southern Patagonia and Antarctic Peninsula were probably derived from this eroding crust, in the time span continental glaciations occurred in southwestern Gondwanaland. Projects FONDECYT 1095099 and Anillo Antártico ACT 105 support the research.

Keywords: Permian, metamorphism, paleogeography