

Cambrian magma genesis and Jurassic overprinting of a basement orthogneiss from Tierra del Fuego, Chile

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Conventional U-Pb dating of zircon grains of a granodioritic orthogneiss from the basement of the Magallanes basin of Tierra del Fuego yielded two discordia lines with upper intercepts at 549 ± 6 Ma and 529 ± 7.5 Ma. We interpret these ages as two different growth phases of zircons within the same magma. The lower intercept was fixed at 162 Ma by Rb-Sr dating of the mineral pair apatite-K-feldspar which indicates a Sr homogenization at 161.6 ± 4.5 Ma. This age is equivalent to the age of the volcanic rocks which cover the basement, and which form part of the Jurassic silicic Large Igneous Complex of Patagonia. This volcanic province is connected with the possible mantle plume which produced the opening of the Atlantic Ocean and the destruction of Gondwana. Obviously, this thermal event not only affected the Sr-system, but also produced some lead loss in the zircon grains.

Both zircon ages are typical for phases of the Pampean orogeny sensu Aceñolaza and Toselli, which can be traced from Northwest Argentina through Central Argentina and Southwest Africa to the Ross orogen of North Victoria Land in Antarctica and to Australia. The presented Early Cambrian age of magmatism may help to explain Tierra del Fuego as the "missing link" between these Early Paleozoic orogenic cycles following the proto-Pacific margin of Gondwana.