Geochemical characteristics and ion microprobe age of the mafic granulites from the Larsemann Hills, East Antarctica

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The mafic granulites in the Larsemann Hills play an important role in the understanding of the development of proterozoic high-grade gneiss from East Antarctica. Oriented distributed mafic granulite lenses, pods and occur in metapelitic and felsic neiss in the area. The geochemical characteristic of the rocks imply that they are chemically similar to mafic cumulate. They probably represent remnants of mafic dykes. It indicates that the mafic granulite was emplaced in the extensional environment. A combined cathodoluminescence (CL) and sensitive high-mass resolution ion microprobe (SHRIMP) single-zircon study has revealed a relict igneous zoning, metamorphic overgrowths. These new U-Pb SHRIMP zircon of the mafic granulites indicate that the basement rocks of the region are Mesoproterozoic in age. The crystallization ages of metavolcanic rocks were determined at c.1100Ma, Syn-tectonic enderbite give ages of c.990Ma, contemporaneous with metamorphic zircon growth at granulite facies conditions. No conclusive evidence of the mafic-felsic composite orthogneiss represents an Archaean basement complex to the metasedimentary sequence of the Larsemann Hills, Which based on the lithological similarity with mafic-felsic orthogneiss from the southeastern Rauer Group of the Archaean orthogneiss basement.

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The active margin of Gondwana in Peru – Isotopic and geochronologic constraints

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The basement underlying the Peruvian Andes is considered to consist of various blocks largely different in age and composition. The Eastern Cordillera is underlayin by old continental crust while the Western Cordillera and the Cretaceous Coastal Batholith are build upon young and juvenile arc crust. Initial $^{87}Sr/^{86}Sr$ and epsilon Nd values are in the range of 0.703-0.704 and +2 to +7, respectively, for the Western Cordillera, whereas the eastern Cordillera basement has Sr isotopic values as high as 0.716 and epsilon Nd values as low as –7. The Sr, Nd isotopic data are in perfect agreement with intial Hf isotopic compositions of dated zircon crystals. The lacking old continental basement underneath the Western Cordillera is tentatively interpreted to be a product of rifting-off of an Arequipa-type terrane during a Mesozoic, possibly Triassic, rifting period.

Preliminary U-Pb zircon ages from a variety of magmatic rocks from the Eastern Cordillera suggest a polyepisodic evolution with crust-forming events at 480, 320-330, and 240 Ma. These ages were obtained on calc-alkaline and S-type granitoid intrusions and high-grade gneisses along the La Oroya – Tarma – San Ramón transect, a granite to the east of Laguna de Junín and on the calc-alkaline Pataz batholith in the northen part of Peru (La Libertad). The involvement of Proterozoic crust is demonstrated by inherited zircon cores pointing to upper intercept ages of 1.3 Ga. Preliminary therobarometric data from metabasaltic rocks from the northern portion of the Eastern Cordillera yield PT conditions of ~ 700º C, 11.5 kb for the last major orogenic event.

We tentatively conclude that the eastern Cordillera represent part of the active continental margin of Gondwana in the early Paleozoic, which underwent rifting and departure of a continental domain during the Triassic and onto which younger and more juvenile terranes and material were accreted after this rifting, now forming the Western Cordillera basement.