U-Pb perovskite ages of kimberlites from the Rosário do Sul cluster: Southern Brazil

R.V. CONCEIÇÃO[1], C. LENZ[2], C.A.S. PROVENZANO[3], A. SANDER[3] AND F.V. SILVEIRA[3]

[1]UFRGS-Brazil; (rommulo.conceicao@ufrgs.br)
[2]UFS-Brazil, (crislenz@yahoo.com.br)
[3]CPRM-Brazil, (carlos.provenzano@cprm.gov.br; andrea.sander@cprm.gov.br; fvsilveira@gmail.com)

The age of the Rosário do Sul kimberlitic magma is first presented here. The Rosário do Sul kimberlitic cluster is located in the southwestern part of the Rio Grande do Sul state (Southernmost Brazil). This cluster is composed of many pipes, dikes and sills intruding the Paraná Basin sedimentary rocks. The Rosário do Sul kimberlites are composed of macrocrystals and fenocrystals of olivine in a fine grained matrix which consist of serpentine, phlogopite, carbonate, spinel, perovskite, apatite and zircon. Xenoliths of peridotitic rocks of variable sizes were found (1 mm to 5 cm) immersed in the matrix. The dating of the kimberlite has been conducted using perovskite, which is found in the matrix and do not show any inheritance records, which relates it to a primary magmatic origin. *In situ* LA-ICP-MS analyses were performed at the Isotopic Laboratory at UFRGS in a Neptune equipment. Zircon standard GJ-01 was used, due to the absence of perovskite standart in the LGI. The laser was set up to produce a 30 μ diameter spots with a ~0.5 mJ/pulse output energy. The data reduction was performed using an Excel spreadsheet program from the University of Brasília, Brazil. The ages were plotted in a Concordia Diagram, which yield lower intercept U-Pb ages of 128 ± 5 Ma (MSWD of 3.4). This age is very close to that of the Parana Flood Basalts, which is assumed as ~130 Ma. Such new data suggest a very complex and heterogeneous mantle and the occurrence of a great geothermal variation underneath South America, on the region of Parana Flood Basalts.

Contrasting roles of continental and oceanic arcs in the growth of continents

K.C. CONDIE[1]* AND A. KROENER[2]

[1]Dept of Earth & Environmental Science, New Mexico Tech, Socorro, NM 87801 USA (*correspondence: kcondie@nmt.edu)
[2]Institut für Geowissenschaften, Universität Mainz, 55099 Mainz, Germany (kroener@uni-mainz.de)

Oceanic arcs (OAs) are commonly cited as the primary building blocks of continents, yet there are many lines of evidence that continental arcs (CAs) are more important in this regard. Modern OAs are mostly subducted and lithosphere buoyancy considerations show that OAs with crust <20 km thick should completely subduct. Analysis of terranes indicates that <10% of post-Archean accretionary orogens comprise accreted OAs, whereas CAs comprise 40-80%.

OA felsic igneous rocks are depleted in incompatible elements compared to upper continental crust (UC) and have lower La/Yb and Sr/Y ratios, whereas those produced in CAs are similar in composition to UC. Nd and Hf isotopic ratios suggest that accretionary orogens comprise 40-65% juvenile crustal components and that >50% of these components are produced in CAs.

These observations present a paradox: older continental crust is necessary for the production of new continental crust. As indicated by Th/Yb, Nb/Yb, and Nb/Yin greenstone volcanics, CAs did not become widespread until after the late Archean. Prior to 2.5 Ga, OAs may have been more difficult to subduct due to a hotter mantle, and together with oceanic plateaus, they may have contributed to the construction of Archean continents. After this time, however, the production site of continental crust shifted to CAs, and most OAs were subducted.