Geophysical Research Abstracts
Vol. 16, EGU2014-1510, 2014
EGU General Assembly 2014

Permian hornblende gabbros in the Chinese Altai not from the Tarim mantle plume

Bo Wan
Institute of Geology and Geophysics, Chinese Academy of Sciences

In the Chinese Altai, on the northern side of the Erqis fault, the ∼10-m-wide Qiemuerqieke gabbro is composed almost entirely of hornblende and plagioclase. Its relative crystallization sequence is olivine, hornblende, plagioclase, and it shows a narrow compositional range in SiO_2 (48.7–50.2 wt%), MgO (6.33–8.54 wt%), FeO (5.27–6.46 wt%), Na2O (3.06–3.71 wt%), and K2O (0.26–0.37 wt%). These contents result in a high Mg# value (68–72) and a low K2O/Na2O ratio of ∼0.1. It has (87Sr/86Sr)i ratios of 0.70339–0.70350, εNd(t) values of 4.8–6.0, and zircon εHf(t) of 11.4–15.8; these values demonstrate a mantle-derived source, and a whole-rock δ18O of ∼6.7‰ suggests a mantle wedge origin. The presence of magmatic hornblende suggests a relatively high water fugacity, and the crystallization temperature (715–826 °C) calculated using Ti-in-zircon thermometry is considerably lower than that of a normal mafi c melt but consistent with an origin from a water-bearing magma.
The gabbro has a secondary ion mass spectrometry zircon U-Pb age of 276.0 ± 2.1 Ma, which is coeval with the 275 Ma mantle plume in the northern Tarim craton, but the Qiemuerqieke petrological and geochemical data do not indicate an abnormally high mantle temperature or a deep mantle signature, which would commonly characterize a mantle plume source. Our results integrated with published data support a model of juvenile crustal growth by a subduction-related process.