Geophysical Research Abstracts
Vol. 20, EGU2018-588, 2018
EGU General Assembly 2018

Reconstructing paleogeography of proro-Japan in the late Paleozoic: evidence from provenance study of the Permian Akiyoshi Accretionary Complex

Xiaojing Zhang (1), Makoto Takeuchi (2), and Hao-Yang Lee (1)

(1) Institute of Earth Sciences, , Academia Sinica, Taiwan (xjzhang@earth.sinica.edu.tw), (2) Department of Earth and Planetary Sciences, Graduate School of Environmental Studies, Nagoya University

The Japanese Islands are mainly composed of Upper Paleozoic to Cenozoic accretionary complexes. The Akiyoshi Belt, as part of proto-Japan, is the oldest accretionary terrane of southwest Japan and comprises a lithologically heterogeneous assemblage of unmetamorphosed Carboniferous to Permian rocks. The paleogeography of the Akiyoshi Belt is still not well established. It was proposed to initially develop along the southeastern margin of the South China Block, while some others argues for a North China Block origin.
The main component of the Akiyoshi Belt is the Upper Permian Nishiki Group that mainly consists of sandstone, mudstone, felsic tuff and a minor amount of chert and conglomerate. We employ multiple methods, which includes sandstone petrography, detrital garnet composition and detrital zircon U-Pb dating and Hf isotope analysis to investigate the likely sources of these terrigenous deposits and to reconstruct the paleogeographic link between the proto-Japan and the East Asian continent. The Nishiki Group sandstones are mostly highly immature and change from feldspathic litharenite, through lithic arkose to arkose. Major source rock types include felsic and mafic volcanics, plutonics, sedimentary and metamorphic rocks. Garnet geochemical composition results shows that spessartine-rich almandine garnets and almandine garnets dominated assemblages in the lower unit changed to grossular-andradite garnets dominated assemblage in the upper unit. It suggests that their source rocks changed from intermediate-acidic igneous rocks and low-medium grade metasediments to metasomatic rocks such as skarns. Detrital zircons of the Nishiki Group are mostly Early to Late Permian ages (294 – 254 Ma) with minor Cambrian to Devonian ages. Their Hf isotope composition of the dominant Permian ages in four samples is characterized by positive εHf(t) values in a narrow range (+6.6 to +15.5), which is compatible with Hf isotope composition of Permian igneous rocks in the Jiamusi-Khanka massif. Only three Permian detrital zircons yield negative εHf(t) values (-12.5 to -4.2). When the results are combined with previous provenance studies of the Permian strata in eastern China including south China, north, we suggest the Akiyoshi Accretionary complex was derived from a contemporary volcanic arc along the eastern margin of Greater South China which extended from South China Block to Jiamusi-Khanka Block. It is most likely the clastic rocks of the Akiyoshi Belt was deposited close to the Jiamusi-Khanka Block. The change in sandstone composition and garnet chemical composition caused by a progressive uplifting and denudation of the Permian volcanic arc.