ECLOGITE-FACIES MAFIC OCEANIC AND CONTINENTAL CRUSTAL ROCKS FROM THE AKTYUZ AND MAKBAL COMPLEXES, TIANSHAN MOUNTAINS (KAZAKHSTAN & KYRGYZSTAN): GEODYNAMIC IMPLICATIONS

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The Late Paleozoic Makbal and Aktyuz Complexes in the western Tianshan Mountains of Kazakhstan and Kyrgyzstan consist of HP/UHP metasedimentary host rocks which enclose various high-pressure mafic blocks or boudins. These mafic rocks comprise rare eclogites, garnet amphibolites and newly discovered glaucophanite (glaucophane-garnet-omphacite bearing rock) in the Makbal complex. So far the Aktyuz and Makbal Complexes have been interpreted to predominantly consist of continental lithologies while the mafic rocks were considered as dismembered dikes intruding continental metasediments. This interpretation is mainly based on the geological relationship and bulk rock chemistry of the different rock types. It was further suggested that the Makbal and Aktyuz Complexes formed as tectonic mélanges.

In the present study we combined conventional geothermometry, P-T pseudosection modeling and major and trace element whole rock geochemistry for different mafic samples (eclogites, glaucophanite and garnet amphibolites) in order to shed light on both the metamorphic evolution and the protoliths of the mafic HP rocks in the Makbal and Aktyuz Complexes. Prograde to peak-pressure clockwise P-T paths of both rock types were modeled using garnet isopleth thermobarometry. The results suggest that the eclogite, glaucophanite and the garnet amphibolite samples experienced similar prograde P-T paths and slightly different peak metamorphic conditions between ~520 °C and ~560 °C at ~2.2 GPa to ~2.5 Gpa (at Makbal) and ~670 °C at ~ 2.1 GPa (at Aktyuz) corresponding to burial depths between 70 and 85 km. Whole rock major and trace element analyses and petrological evidence suggest that the different rock types at the Makbal and Aktyuz Complexes most likely originated from various precursor rocks. From the geological relationship and from bulk rock and isotope chemistry of the different rock types the Aktyuz Complex has been interpreted as a continental crustal fragment and the mafic rocks as intrusive and now dismembered dikes. The Makbal garnet amphibolites are believed to represent strongly retrogressed former eclogite-facies rocks that have never been eclogites *sensu stricto* due to an unfavorable alkali-poor bulk composition. The high-pressure mafic samples investigated in this study clearly originated from oceanic crust, which is in contrast with all previous studies suggesting a continental protolith for the mafic HP/UHP rocks.

The mafic high-pressure rocks are believed to represent incoherent segments of exhumed oceanic or continental crust. Juxtaposition of different mafic oceanic and continental crustal rocks is suggested to be due to buoyancy-driven exhumation of the metasedimentary host rock in the subduction channel where dismembered fragments of the subducted oceanic crust were captured in different depth supporting the tectonic mélange formation concept.