Geophysical Research Abstracts
Vol. 12, EGU2010-6337, 2010
EGU General Assembly 2010

Shanderman eclogites from northern Iran, P-T path and Palaeotethys geodynamics from subduction to exhumation

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Shanderman eclogites and related metamorphosed ophiolitic rocks mark the site of closure of Palaeotethys ocean in northern Iran. Eclogitic mafic rocks have experienced 6 stages of metamorphism during subduction and subsequent exhumation. Mineral formed during prograde stages are preserved as inclusions in peak metamorphic garnet and clinopyroxene. The rocks have experienced amphibolite and blueschist facies metamorphism on their prograde path. They are metamorphosed in the eclogite facies at the peak of metamorphism. The eclogites has simple paragenesis of omphacite, garnet (pyrope-rich) and rutile. Based on textural relations, post peak stages can be divided into blueschist, amphibolite and greenschist facies. Pressure and temperature estimations on eclogite facies minerals (peak of the metamorphism) revealed average pressure of $\sim$15 (kbar) at a temperature of $\sim$600 °C. Pre-peak amphibolite and blueschist facies yield minimum pressures of 4-7 and 7kbar and temperatures of 459-598°C, and 454-504°C, respectively. Post-peak blueschist stages had minimum pressure of 7 kbar and temperature of 453 °C. Average pressure and temperature of post-peak amphibolite and greenschist stages were 5 kbar, 474 °C and 2-3 kbar and 273-321°C, respectively. The estimated pressures and temperatures for the evolution of eclogitic metabasites indicate a clockwise P-T path. This path shows subduction of the Palaeotethys oceanic crust, subsequent collision between the Central Iranian block and the Turan block and eventually exhumation of the high pressure rocks.