Geophysical Research Abstracts
Vol. 18, EGU2016-4566, 2016
EGU General Assembly 2016

Zagros blueschists: Episodic underplating and long-lived cooling of a subduction zone

Samuel Angiboust (1), Philippe Agard (2), Johannes Glodny (1), Jafar Omrani (3), and Onno Oncken (1)

(1) Lithosphere dynamics dpt., GFZ Potsdam, Germany (samuel@gfz-potsdam.de), (2) ISTEP-UPMC, Paris, France, (3) Geological Survey of Iran, Tehran, Iran

Pressure-Temperature-time (P-T-t) trajectories of high-pressure rocks provide important constraints to understand the tectonic evolution of convergent margins. New field observations and P-T-t constraints for the evolution of the only known blueschist-facies exposure along the Zagros suture zone in Southern Iran are reported here. These blueschists, now exposed in tectonic windows under the Sanandaj-Sirjan zone (upper plate), constitute accreted fragments of the Tethyan domain during N-vergent Cretaceous subduction. Three units were identified in the field: from top to bottom, the Ashin unit (mafic and felsic gneisses), the Seghin complex (mafic tuffs and ultramafics) and the Siah Kuh massif (coherent volcanic edifice). Microstructural observations, P-T estimates and Rb-Sr deformation ages indicate that the Ashin unit possibly underwent burial down to 30-35 km and 550°C along a relatively warm P-T gradient (c. 17°/km) and was ultimately deformed between 85 and 100 Ma. The Seghin complex exhibits remarkably well-preserved HP-LT assemblages comprising lawsonite, glaucophane, aragonite, omphacite and garnet. P-T-t reconstruction indicates that this slice was subducted down to c. 50 km at temperatures of c. 500°C along a very cold subduction gradient (c. 7°/km). Deformation in the Seghin complex stopped at around 65 Ma, close to peak metamorphic conditions. Field relationships and estimates of the P-T trajectory followed by the Siah Kuh volcanic edifice indicate that this massif was lately subducted down to 15 km depth along the same very cold gradient.

This slice-stack represents a well-preserved field example (i) highlighting the existence of transient underplating processes juxtaposing pluri-kilometric tectonic slices along the subduction channel and (ii) imaging the discontinuous down-stepping of the active main subduction thrust with ongoing accretion. The Zagros blueschists also record an apparent cooling of the Zagros subduction zone between 90 and 65 Ma, most likely as a thermal response of a geodynamic perturbation towards the end of the Cretaceous.