



Transient, syn-obduction exhumation of Zagros blueschists inferred from P-T-d-t and kinematic constraints: implications for wedge dynamics

P. Agard (1), P. Monié (2), W. Gerber (1), J. Omrani (1, 3), M. Molinaro (4), L. Labrousse (1), B. Vrielynck (1), B. Meyer (1), L. Jolivet (1), P. Yamato (1)

(1) Lab. Tectonique, Univ. Paris 6, France, (2) Lab. Dyn. Lithosphère, Univ. Montpellier 2, France, (3) Geol. Survey of Iran, (4) Lab. Tectonique, Univ. Cergy Pontoise, France (philippe.agard@lgs.jussieu.fr)

We present the first quantitative results of the only known blueschist (BS) facies rocks present in Zagros (Hajiabad area). The BS crop out as five kilometre-scale bodies within the extensive coloured melange units, which mark discontinuously the Neotethyan suture zone. The BS were underplated below the Sanandaj-Sirjan zone and always crop out within a serpentinite-rich matrix which is likely to have facilitated their exhumation. P-T estimates using Thermocalc, Tweeku and Raman spectroscopy of carbonaceous material, point to HP-LT conditions around 11 kbars and 520-530°C, that is along a c. 15°C/km gradient. In-situ laser-probe ⁴⁰Ar-³⁹Ar radiometric age constraints on phengite cluster between 85 and 95 Ma, with a scatter up to 120 Ma. During the period 115-85 Ma, convergence velocities doubled (to c. 5-6 cm/a) and convergence obliquity was lower than 20° across the Neotethyan subduction zone below Iran. These age constraints for Zagros BS are also 5-10 Ma older than age constraints for the nearby HP-LT metamorphism in Oman. Syn-convergence exhumation of Zagros BS to depths < 15-20 km was in any case accomplished before 80 Ma. It is shown that their exhumation corresponded to a transient process coeval with high convergence velocities and obduction movements (c. 100-80 Ma). We propose that the mechanical coupling across the Neotethyan subduction below Iran was modified by this large-scale plate rearrangement, allowing for a temporary exhumation of Zagros BS. This process ceased at the end of obduction, when the subduction of the Arabian continental margin stopped.