

$^{40}\text{Ar}/^{39}\text{Ar}$ thermochronology across a blueschist-to-Barrovian transition zone, Sivrihisar Massif, Turkey

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It is well known that high pressure - low temperature (HP-LT) rocks occur only at convergent margins but processes and rates operating during subduction, collision, and exhumation of these domains still remain unclear. The Sivrihisar Massif (west-central Turkey) contains well-preserved exposures of a deeply exhumed subduction zone and may provide important insights about exhumation mechanisms and processes that occur during a transition from subduction to collision. The Sivrihisar Massif is a part the Tavşanlı Zone, a belt that consists of continental margin and shallow marine sediments with oceanic crust that were metamorphosed and deformed during closure of the Neo-Tethys Ocean in the Late Cretaceous (Okay et al., 1998). The massif is ~150 km long and is comprised of meters to kilometers scale continuous layers of blueschist facies metabasalt, quartz-phengite schist, marble, quartzite, and calc-schist. These units contain centimeter to meter scale lawsonite eclogite pods that record metamorphic conditions up to 24 kbar and ~580 °C (Whitey and Davis, 2006). In the SE part of the Sivrihisar Massif, HP-LT units are juxtaposed with medium temperature and pressure (MP-MT) rocks (Barrovian sequence). Here, the HP-LT unit is comprised of interlayered fibrous marble, blueschist, and rare quartz-phengite schist. The fibrous texture of marbles continues over a kilometer long north-south section and disappears towards the MP-MT rocks, which consist of non-fibrous marble, micaschist, amphibolite, quartz-rich schist, and quartzite. The high-T end of the Barrovian sequence was intruded by a late kinematic Eocene granitoid. Foliation in the HP-LT units strikes NW-SE and gently dips north, whereas the MP-MT units reveal a more complex pattern due to intense folding. Lineation, however, remains consistent in both units and plunges NE. Preliminary $\text{Ar}^{40}/\text{Ar}^{39}$ spectra from white mica in the HP-LT rocks have plateau ages of 87-81 Ma. White mica ages in the Barrovian zone are younger (63-57 Ma). In the transition zone, spectra are complex and may represent analysis of a mixed population of muscovite and phengite.

References:

- Okay, A.I. et al., 1998, *Tectonophysics*, v. 285, p. 275–299
Whitney, D.L., and Davis, P.B., 2006, *Geology*, v. 34, p. 473–476