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Record of high-pressure overprint in metamorphic soles of the Tavşanlı zone, Western Anatolia

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Large obducted ophiolites correspond to the emplacement of dense oceanic lithosphere on top of a continent and thereby provide insights into rheological and thermal coupling between plates or fluid budgets. Obducted ophiolites thrust onto the continental margin of the Anatolide-Tauride block (Western Anatolia, south of the Izmir-Ankara suture zone) are dated through their metamorphic sole at ca. 90-95Ma and derive from the same intra-oceanic Neotethyan subduction. We herein focus on the metamorphic soles of the Tavşanlı zone, which show a variable high-pressure low-temperature (HP-LT) overprint of the initial amphibolitic metamorphic conditions (Önen & Hall, 1993; Dilek & Whitney, 1997; Okay et al, 1998). Systematic sampling was done in both the already studied areas as well as new locations. PT conditions were estimated at 8 kbar and 700°C for the amphibolitic stage with the assemblage hornblende + plagioclase ± garnet ± epidote. The HP-LT metamorphic overprint reached incipient blueschist to blueschist facies PT conditions. Development of the characteristic assemblage glaucophane + lawsonite yields PT estimates of >6-7 kbar and 300°C. The high-pressure stage is similar to the one observed for the underlying accretionary-complex unit of the Tavşanlı zone (Plunder et al, this meeting). This HP overprint was not observed in other obduction contexts such as Oman or New Caledonia but was documented in Fransciscan Complex amphibolites (Wakayabashi, 1990). The record of two metamorphic events can be understood as: (1) rapid cooling of the subduction zone after initiation and the exhumation of the metamorphic sole; (2) reburial after or during exhumation of the amphibolite initially welded at the base of the ophiolite. Several observations (i.e. lack of tectonic contact between the ophiolitic body and the metamorphic sole, PT estimates,...) point to cooling as the most likely hypothesis. Metamorphic soles allow to highlight: (1) the dynamics of obducted material and the evolution of the interplate coupling during subduction and obduction and, based on the available geochronological data, (2) the timing of hanging-wall thermal reequilibration of a young and hot subduction zone to <10 My.

Dilek, Y., Whitney, D.L., 1997. Counterclockwise P-T-t trajectory from the metamorphic sole of a Neo-Tethyan ophiolite (Turkey). Tectonophysics 280, 295–310.

Okay, A.I., Harris, N.B.W., Kelley, S., 1998. Exhumation of blueschists along a Tethyan suture in north-west Turkey. Tectonophysics 285, 275–299.

Önen, A.P., Hall, R., 1993. Ophiolites and related metamorphic rocks from the Kutahya region, north-west Turkey. Geological Journal 28, 399–412.

Plunder, A., Agard, P., Chopin, C., Okay, A.I., 2013. Tectono-metamorphic evolution of the Tavşanlı zone, (Western Anatolia): implications for mechanical coupling during subduction/obduction processes. EGU General Assembly 2013, Abstract 8404.

Wakabayashi, J., 1990. Counterclockwise P-T-t paths from amphibolites, Franciscan complex, California: relics from the early stages of subduction zone metamorphism. The Journal of Geology, v. 98, p. 657-680.