



New, high-precision P-T estimates for Oman blueschists: Implications for obduction, nappe stacking and exhumation processes

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The formation and the nappe stacking of the Oman blueschists and eclogites cropping out below the obduction nappe of the Semail ophiolite has been the matter of harsh debate during the last five years, partly due to the lack of P-T data.

We bring new metamorphic and tectonic constraints on the central, yet ill constrained Hulw unit, sandwiched between the Ruwi-Quryat low grade units (~ 10 kbar, < 300 °C) and the As Sifah eclogites ($P_{\max} \sim 23$ kbar; $T_{\max} \sim 600$ °C). TWEEQU multi-equilibrium thermobarometry, using both compositional mapping and spot analyses, and Raman spectroscopy of carbonaceous material yield a high precision P-T path for the Hulw and As Sheikh units and demonstrate that they shared a common P-T history in four stages: (1) a pressure decrease from 10-12 kbar, 250-300 °C to 7-9 kbar; 300-350 °C; (2) almost isobaric heating at ~ 8 -10 kbar from 300-350 °C to 450-500 °C; (3) a pressure decrease at moderate temperatures (~ 450 -500 °C); and (4) isobaric cooling at ~ 5 -6 kbar from 450-500 to 300 °C. No significant pressure or temperature gap is observed across the upper boundary of the Hulw unit, the so-called “upper plate-lower plate” discontinuity.

The combination of tectonic and P-T data allows to precise the stacking chronology of the three main metamorphic unit groups composing the Saih Hatat window (i.e. the Ruwi-Quryat, the Hulw-As Sheikh and the Diqdah-As Sifah units). Our results

strengthen the view that the tectonic and metamorphic data are conveniently accounted for by a simple, N-vergent continental subduction of the passive Arabian margin below the obduction nappe along a cold P-T gradient ($\sim 7 \text{ }^\circ\text{C.km}^{-1}$)