



## **Peak-Temperature ( $T_p$ ) estimates with Raman micro-spectroscopy on carbonaceous material (RSCM) as a tool for distinguishing tectometamorphic regimes in the Tauern Window (Eastern Alps, Austria)**

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Raman micro-spectroscopy of CM in 201 samples from the eastern part of the Tauern Window reveal the overprinting of HP subduction metamorphism, post-nappe HT metamorphism and late orogenic crustal attenuation during exhumation. The following patterns of our CM data lend insight into this evolution, especially when considered in the context of the distribution of mineral parageneses, radiometric ages and structures in the Tauern Window: (1) a continuous increase in  $T_p$  (330-500°C) across nappe boundaries between two oceanic units (Valais, Piemont) in the NE part of the Tauern Window indicates that temperatures equilibrated after accretion and nappe stacking. The  $T_p$  gradient preserved in this area is ca. 10°C/km; (2) a higher  $T_p$  gradient (20-25°C/km) in the footwall of a major top-SE extensional shear zone affecting the same units at the E end of the Tauern Window reveals that the previously equilibrated  $T_p$  gradient was attenuated during doming and exhumation; (3) identical  $T_p$  estimates (500°C) - within error and for a given calibration (ref. below) - are recorded at the top and bottom of a moderately E-dipping basement nappe (Storz Nappe) within a foreland-dipping duplex (the Venediger Nappe Complex, VNC) forming the basement core of the Tauern Window. The  $T_p$  value at the top of this nappe occurs at the base of the attenuated  $T_p$  gradient described in (2), whereas the  $T_p$  at the bottom of the nappe is typical for high  $T_p$  values (530-640°C) in the core of the duplex that is exposed in a post-nappe dome (Hochalm) in the SE part of the Tauern Window. We interpret  $T_p$  values in the central part of the Tauern Window (530°C) that contain relict HP assemblages and are unaffected by doming as the maximum temperature of subduction-related metamorphism. Existing radiometric data in the area as well as from related units in other parts of the Tauern Window indicate that the thermal peak of HP metamorphism occurred at 38-40 Ma (Kurz et al. 2008, refs therein), followed by HT overprinting ("Tauern crystallization") at about 28-23 Ma (Liu et al. 2001) antecedent to rapid cooling and exhumation at 23-17 Ma (Scharf et al. 2011).