

Metamorphic temperature variation across the Yuli belt: a clue about exhumation of high-pressure rocks?

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We applied Raman spectra of carbonaceous material (RSCM) geothermometer to estimate peak metamorphic temperatures of pelitic and psammitic schists across the Yuli belt, eastern Taiwan. The analyzed samples mainly consist of phengitic mica, quartz, chlorite, and albite, with accessory graphitic carbonaceous material, titanite, zircon, and tourmaline. In samples from the Juisui Schist and Chinshuichi Plantation units (both containing high-pressure allochthonous blocks), garnet, ilmenite, and paragonite may occur and albite tends to be porphyroblastic. Serpentinite and metabasite pods occur in these units, whereas the neighboring metasedimentary units lack such rocks and porphyroblastic phases. The yielded metamorphic temperatures reveal a systematic variation in spatial distribution across the Yuli belt. In the Wanjung and Juisui areas, peak temperatures of the four schist units are in the range of 430-510°C, 410-470°C, 560-620°C and 420-450°C, from west (structurally upper) to east (lower), respectively. In the Chinshuichi area, temperatures of the two units are in the range of 540-560°C (structurally lower) and 400-450°C (higher), whereas the temperatures of the low-grade Slate unit (Chulai Formation) bordering the Yuli belt in the east are 330-340°C. The high-pressure Juisui Schist and Chinshuichi Plantation are apparently warmer than their neighboring units in each area, although boundaries of the units are poorly exposed or characterized. The spatial distribution of metamorphic temperatures requires a structural explanation. Possible interpretations include doming, extension, or extrusion, and the inferred structures and processes may shed new lights on the exhumation of high-pressure metamorphic rocks in the Yuli belt.

Keywords: metasedimentary rocks, thermobarometry, carbonaceous material, exhumation, high-pressure metamorphism