

Peak metamorphic temperatures in the Alpine tectonic wedge, south Cottian Alps, Italy

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In the south Cottian Alps, the metamorphic wedge of the Western Alps is widely exposed. It includes, from SW to NE, the Briançonnais internal border (Acceglio units), the ophiolitic Schistes lustrés nappes (Piemonte-Liguria Ocean) and the southern Dora-Maira units derived from the Briançonnais s.l. basement (Michard et al., 2022, and references therein). Located between the Acceglio and Dora-Maira units, the Val Maira-Sampeyre and Val Grana Allochthons (MGA) consist of a Permo-Triassic to Mid Jurassic “Prepiemonte”-type sequence detached from the Briançonnais s.l. basement. The peak metamorphic grade of these tectonic complexes evolves from blueschist- to coesite-eclogite (Brossasco-Isasca unit of Dora-Maira). Here we report new peak temperatures by carrying the RSCM geothermometry approach (see Lahfid et al., 2019) on most of the south Cottian transect with emphasis on the MGA and on the intervening mélange shear zones. T_{RSCM} values range from ~400 °C to >500°C, going from the most external Val Grana unit and overlying Queyras schists to the uppermost Dora-Maira unit. We present a new metamorphic map and profiles based on published and new data, including our new thermometric data. We note an overall fit between our T_{RSCM} results and those inferred from the mineral assemblages, where available. The thermal anomaly linked to the rifting evolution that gave birth to the Piemonte-Liguria Ocean was recognized in the poorly metamorphic Adriatic margin SE of the Periadriatic line (Beltrando et al., 2015), but cannot be evidenced in the studied Briançonnais-derived units due to their high metamorphic grade.

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