Emplacement of the Helminthoid Flysch nappes during the subductioncollision transition

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Résumé

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Key words: Helminthoid Flysch; Ligurian Alps; Embrunais-Ubaye; Palaeothermometry; Thermochronology

The Helminthoid Flysch Nappe (HF) crops out in different areas of the Alpine-Apennines chains. This PhD thesis focuses on the Helminthoid Flysch of the Ligurian Alps and the Embrunais-Ubaye area, integrating the literature on the Helminthoid Flysch of the Prealps and the Northern Apennines to analyse the dynamic processes involved at larger scale. The HF units consist of carbonate and siliciclastic turbiditic deposits, whose ages vary from one unit to the other, going from the Late Cretaceous to the early Eocene. These deposits were sedimented in the Liguro-Piedmont Ocean and they are now located in an external position, at the top of the Alpine stack. Understanding the geological processes involved in the history of these nappes is a key point to understand the transition between subduction and continental collision.

Based on the existing literature, three main emplacement models can be defined. Gravity sliding is the first model that was proposed and is still supported by many authors. This model is not concerned with identifying the roots of the FH, which always stayed at the top of the nappe stack. The second model considered the HF as rooted below the non-metamorphic Adriatic units, in particular, in the Canavese area. The third model inferred that the HF were subducted together with other Liguro-Piedmont units, without reaching significant depth, thus as the uppermost portion of the accretionary prism. Hence, they were exhumed in kinematic continuity with the metamorphic units of the Liguro-Piedmont domain.
In order to discriminate which of the above emplacement mechanisms most likely acted on the HF at the subduction/collision transition, we combine field-related structural analyses at map-, meso- and micro-scale, with palaeothermometry (RSCM) and thermochronology, applying fission tracks and the U-Th/He methods on zircons. The results of these analyses will allow us to constrain the Tt path of the HF, relate it to a sequence of deformation phases, thus providing new data to discriminate between emplacement mechanisms.

*Intervenant

Mots-Clés: Helminthoid Flysch, Ligurian Alps, Embrunais, Ubaye, Palaeothermometry, Thermochronology