

A key for deciphering the finite strain pattern in southwestern Alps: Insight from structural relationships between Helminthoid Flysch and Briançonnais Units (Marguareis Massif)

Edoardo Sanità ^{*1, 2}, Jean Marc Lardeaux ³, Michele Marroni ^{1, 4}, Guido Gosso ⁵, Luca Pandolfi ^{1, 4}

¹ Dipartimento di Scienze della Terra, Università di Pisa, Italia

² Dipartimento di Scienze della Terra, Università di Firenze, Italia

³ GéoAzur, CNRS Université de Nice-Sophia Antipolis, Francia

⁴ Istituto di Geoscienze e Georisorse, Italia

⁵ Dipartimento di Scienze della Terra, Università di Milano, Italia

We document a stack of Low- to Very Low-grade Helminthoid Flysch and Briançonnais Units in southwestern sectors of Marguareis Massif (Italian-French border, southwestern Alps).

We performed a geological mapping and micro- to map-scale structural analyses to unravel the finite strain pattern of the area.

The units, from the structurally highest to the lowest, are: the Marguareis Unit (MU, Briançonnais Domain), Helminthoid Flysch Unit (FH) tectonically overlaying onto the Cima del Becco Slice and Cabanaira Unit (BS and CU respectively, Briançonnais Domain). FH consists of Late Cretaceous basin plain to deep-sea fan coarse-grained turbidite deposits. MU, BS and CU show Meso-Cenozoic sedimentary sequences showing a transition from Triassic-Jurassic carbonates to middle Eocene siliciclastic turbidites.

Tectonic unit recorded pre-, syn- and post-stacking deformation events. FH recorded two pre-stacking events (D_{1FH} , D_{2FH}). D_{1FH} is testified by S_{1FH} slaty cleavage. D_{2FH} produced a S_{2FH} crenulation cleavage associated to southwestward-vergent F_{2FH} folds. MU recorded two pre-stacking deformation events (D_{1MU} , D_{2MU}). D_{1MU} is represented by a pervasive S_{1MU} slaty cleavage associated to southwestward-vergent isoclinal F_{1MU} fold systems. D_{2MU} produced a S_{2MU} crenulation cleavage and associated northeastward-vergent F_{2MU} fold systems. The Cima del Becco Slice shows structural features similar to those depicted in MU. CU recorded one pre-stacking event (D_{1CU}) testified by the S_{1CU} slaty cleavage and southwestward-vergent F_{1CU} fold system. The Late Eocene-Early Oligocene syn-stacking events are testified by unit-bounding shear zones showing southwestward shearing responsible both for thrusting of the Helminthoid Flysch onto the Briançonnais Units and for the km-scale F_{3MU} fold (D_{3MU}) associated to thrusting of MU onto FH. The whole stack recorded the same post-stacking events represented by a fold system with sub-horizontal axial plane and faults.

Keywords : Marguareis Massif, strain pattern, Helminthoid Flysch, Briançonnais, southwestern Alps