

## *The Aosta sheet of the New Geological Map of Italy*

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The forthcoming “Foglio 90 Aosta” is located in the Aosta Valley, and comprises most of the metamorphic units belonging to the axial northwestern Alps exposed west of Aosta.

The fieldwork was performed by the CARG working group between 1996 and 2003, under the supervision of R. Polino (CNR-IGG) and F. Bonetto (Regione Autonoma Valle d'Aosta). Original field maps have been revised, after analytical work on representative bedrock samples, by R. Polino, S. Martin and M. Malusà between 2002 and 2006. Mapping of Quaternary cover sequences in the Dora Baltea basin was revised by F. Gianotti under the supervision of F. Carraro (University of Torino). Relevant scientific results are reported in peer-reviewed international publications (e.g. Malusà et al. 2005a, 2005b, 2009).

Units exposed on the NW side of the “Aosta” geological sheet consist of Cretaceous to Paleocene continental margin cover sequences (Sion-Courmayeur unit), overthrust along the SE-dipping Briançonnais Fault by Upper Paleozoic metasandstones and metaconglomerates (Houiller unit). The greenschist-facies Houiller metasediments are juxtaposed along the Internal Houiller Fault to a complex stack of blueschist to greenschist-facies basement units piled up in the Eocene, classically ascribed to the Gran San Bernardo nappe and chiefly consisting of micaschists and paragneisses intruded by granitoid rocks. The Ruitor, Leverogne and Grand Nomenon units, exposed on the southern side of the Aosta Valley, are bound by NW-dipping tectonic mélanges and lie onto blueschist facies ophiolites (Rovenaud unit) representing the footwall of the Entrelor shear zone. On the northern side of the Aosta Valley, the Flassin, Gran Testa and Fallere-Métailler units are juxtaposed, either along low-angle shear zones or high-angle brittle faults, to blueschist-facies ophiolites and polymetamorphic basement rocks (Aouilletta and Mont Mary units). Eclogite-facies ophiolites belonging to the Grivola-Urtier unit are exposed on the SE side of the study area.

The synmetamorphic tectonic setting, characterized by a double-vergence foliation pattern classically referred to as “Briançonnais fan”, is disrupted by a complex network of post-metamorphic faults. These structures exert a prominent control both on the exhumation history and on the geomorphological evolution of the study area. Differential exhumation of fault blocks, with throws up to a few kilometers, is documented by fission track data. Deep-seated gravitational slope deformations, developed as a surface response of nappe-stack exhumation, cluster along or at the intersection between major faults.

### References:

- Malusà MG, R Polino, M Zattin, G Bigazzi, S Martin, F Piana (2005a). Miocene to Present differential exhumation in the Western Alps: Insights from fission track thermochronology. *Tectonics*, 24, 1-23.
- Malusà MG, R Polino, S Martin (2005b). The Gran San Bernardo nappe in the Aosta valley (western Alps): a composite stack of distinct continental crust units. *Bull. Soc. géol. Fr.*, 176, 417-431.
- Malusà MG, R Polino, M Zattin (2009). Strain partitioning in the axial NW Alps since the Oligocene. *Tectonics*, 28, 1-26.