Oligocene-Miocene tectonics of the SW Alps and western Apennines coupled orogenic belts, as recorded by their internal and external syn-orogenic basins

Luca Barale¹, Piana Fabrizio¹, Bertok Carlo², d’Atri Anna², Irace Andrea¹, and Martire Luca²

¹Italian National Research Council, Institute of Geosciences and Earth Resources, Torino, Italy (luca.barale@igg.cnr.it)
²University of Torino, Department of Earth Sciences, Torino, Italy

The Oligocene-Miocene evolution of the westernmost part of the Northern Apennines was constrained firstly by Oligocene E-W regional sinistral shearing and then by Early Miocene shortening and Middle to Late Miocene NW-SE dextral transpression affecting the southern termination of the Western Alps arc (Maritime and Ligurian Alps) and the substrate of the Tertiary Piemonte Basin (TPB), which started to be incorporated, in the same time span, in the Northern Apennines belt

In other words, the dynamics accommodating the different motion of the WNW-directed Adria and SW Alps with respect to the ENE-directed Ligurian-Corso-Sardinian block also controlled the evolution of TPB and its Ligurian substrate since at least the Aquitanian, when a regional counterclockwise rotation began and a deep reshaping of the basin occurred, due to predominant NE-SW shortening concomitant with the Northern Apennines thrust fronts propagation (Burdigalian). On the other side, the infilling of the SW Alps foreland basin was partially controlled also by the resedimentation of non-metamorphic Cretaceous-Paleocene Ligurian units previously deposited along the Briançonnais-Dauphinois continental margin. The subsequent Late Burdigalian to Serravallian extension in the internal side of the SW Alps allowed the creation of accommodation space and the deposition of relevant thickness of sediments in the TPB, during the coeval progressive uplifting of Alpine crystalline and metamorphic units (e.g. the Argentera Massif and Dora-Maira Unit). This Alpine process constrained the shape and evolution of the TPB syn-orogenic sub-basins and their subsequent tectonic paths within the NW Apennines belt, while it was being built. The steps of this Alps-Apennines evolution have been clearly recorded by a set of regional scale, Oligocene to Pleistocene unconformities that can be continuously traced at surface in the southern part of the Piemonte region and in the subsurface of the western Po plain.

We thus remark that the evolution of the westernmost part of the Apennines can be studied largely referring to the Alpine geodynamics, since, although the Alps and the Apennines are two distinct geomorphologic and geophysical entities at the scale of the Western Mediterranean area, they share common synorogenic basins and consistent kinematic evolution in their junction zone of NW Italy.