

Middle Oligocene extension in the Mediterranean Calabro-Peloritan belt (southern Italy):
Insights from the Aspromonte nappes pile

[T. Heymes](#), [J.-P. Bouillin](#), and [A. Pêcher](#)

LGCA, UMR CNRS/UJF 5025, Université Grenoble 1,
Grenoble, France

[P. Monié](#)

Géosciences Montpellier, UMR 5243, Université Montpellier II,
Montpellier, France

[R. Compagnoni](#)

Dipartimento di Scienze Mineralogiche e Petrologiche, University of Turin,
Turin, Italy

Abstract

[1] The Calabro-Peloritan belt constitutes the eastward termination of the southern segment of the Alpine Mediterranean belt. This orogenic system was built up during the convergence between the Eurasian and the African plates, roughly north-south directed since the Upper Cretaceous. It was subsequently fragmented during the opening of the western Mediterranean basins since Oligocene times. The curved shape of the Calabro-Peloritan belt was acquired during the opening of the Tyrrhenian basin since the Tortonian. The origin, kinematics, and significance of the Calabro-Peloritan tectonic pile are still debated. Our data in the Aspromonte Massif of southern Calabria reveal an Alpine history marked by two main superimposed kinematic regimes. A first phase corresponds to the piling up of basement nappes with a top-to-the-SE vergence, i.e., in a direction orthogonal to the belt trend and toward the Adriatic foreland. This external vergence is similar to what is observed in both northeastern Sicily and northern Calabria. In Sicily, the age of nappe piling is Alpine, as evidenced by pinched slices of Mesozoic sediments. In the Aspromonte Massif, thrusting age is less constrained. Our data suggest remnants of late Hercynian structuration before the Alpine stacking. A second phase corresponds to the thinning of the continental crust, dated at around 30 Ma by both geochronological and stratigraphical data. This extension is mainly localized on two low-angle detachment contacts, with top-to-the-NE displacement. The lower one corresponds to the reworking of the former main nappe contact. The upper one is a large detachment fault cutting across the pile from upper sedimentary levels down to metamorphic basement. Extension of similar Alpine age and similar internal vergence has been already recognized in other parts of the Calabro-Peloritan Arc, i.e., in the basement nappes of northeastern Sicily and in the ophiolitic units of northern Calabria. Coming back to the original geometry and position of the Calabro-Peloritan belt, before its bending and the opening of the Liguro-Provençal and Tyrrhenian basins, we evidence a homogeneous Oligocene NE-SW extension all along the Calabro-Peloritan segment of the Alpine Mediterranean belt. This tectonometamorphic history is best explained within the framework of the continuous Tertiary westward dipping subduction of the Tethyan oceanic domain below