

A Synchronous Alpine and Corsica-Sardinia Rotation

F. Speranza¹, M. Maffione¹, C. Faccenna², A. Cascella³, G. Vignaroli², and L. Sagnotti¹

¹ INGV, Roma, Italy

² Università di Roma 3, Italy

³ INGV, Pisa, Italy

We report on the paleomagnetism of 34 sites from lower Oligocene-middle Miocene sediments exposed in the Tertiary Piedmont Basin (TPB, northern Italy). The TPB is formed by a thick (~4000 m) and virtually undeformed sedimentary succession unconformably lying upon Alpine nappes decapitated by extensional exhumation, which in turn are tectonically stacked over the Adriatic foreland. Paleomagnetic directions from 23 (mostly Oligocene) sites yielding a primary magnetization were chronologically framed using new biostratigraphic evidence from calcareous nannoplankton. Our data, along with previous paleomagnetic results, show that the TPB rotated ca. 50° counterclockwise with respect to Africa in Aquitanian-Serravallian times. The rotation was likely driven by underneath nappe stacking, and was synchronous with (further) bending of the Alpine chain. Both the rotation magnitude and its timing are alike to those recently documented for the Corsica-Sardinia microplate. This reveals a common dynamics determining the formation of the western Alpine arc (or at least part of its curvature), back-arc spreading of the Liguro-Provençal Basin, and drift of the Corsica-Sardinia block. Paleomagnetic data also document that the Adriatic plate has undergone no paleomagnetic rotation since mid-late Miocene times. Anisotropy of magnetic susceptibility results from the paleomagnetic specimens suggest that the TPB, an enigmatic basin arising from a controversial tectonic setting, formed in an extensional regime characterized by a stretching direction ca. orthogonal to the main trend of the underlying chain.