



The Corsica-Sardinia rotation in the Northern Apennines tectonic evolution: first paleomagnetic evidence

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In the last 30 years the origin of the Northern Apennines curvature and the amount and timing of CCW rotation of the Corsica-Sardinia block have been the focus of a large number of paleomagnetic investigations. In the Northern Apennines most of the paleomagnetic data were used to reconstruct the curved shape of the chain and most of the scientific debate was focused on the primary or secondary origin of the arc. Only in few cases, the CCW rotations observed in the northern part of the arc have been explained hypothesizing that the Northern Apennines belt was also involved in the CCW rotation of the Corsica-Sardinia block. This is mostly due to the fact that most of the paleomagnetic data from the Northern Apennines come from the external portion of the chain, which was deformed after the ending of the Corsica-Sardinia CCW rotations and were not involved in this process. Conversely, only few data were collected in the internal sector of the chain, which experienced and recorded a continuous deformation history since the beginning of convergence in the Late Cretaceous, and which were already incorporated in the orogenic wedge during the Corsica-Sardinia rotation.

In order to provide new data for the internal sector of the belt and to verify a possible influence of the Corsica-Sardinia rotation in the tectonic evolution of Northern Apennines, an extensive paleomagnetic sampling was carried out in the Tuscan Nappe succession. The Paleomagnetic results show that the internal sector of the Northern Apennines underwent huge counterclockwise (CCW) rotations. A different amount of CCW rotation was observed in the southern and northern arms of the arc, suggesting that a simple oroclinal bending model is not appropriate to explain the evolution of this sector of the arc, as was the case for the external part of the arc. On the basis of the observed paleomagnetic pattern, we propose a new tectonic model in which the Tuscan Nappe units in the southern area, were first rotated CCW during the Lower Miocene Corsica-Sardinia drifting and were later involved in the main phases of emplacement and translation of the Tuscan Nappe toward the outermost sector (Umbria domain) that concurred to the final curved shape of the Northern Apennines chain. Data from this study represent new evidences of the influence of the Corsica-Sardinia CCW rotation in the Apennines orogenic wedge deformation, in the general framework of the geodynamic evolution of the central Mediterranean subduction system.