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First results from paleomagnetic and paleothermal analyses on internal Tertiary deposits (Tuscan Unit) of the Northern Apennines Chain

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Paleomagnetic and paleogeothermal analyses have been performed on the Meso-Cenozoic successions of the Tuscan Unit (Northern Apennines), with the aim of providing new constraints to understanding the evolution of this internal portion of the Apennines chain. The study of the tectono-sedimentary evolution of Tuscan Unit's formations can provide pieces of information on the structural style and the amount of differential vertical and horizontal motion during the chain building.

Paleo-thermal analyses have been focused on both the Eocene continental platform escarpment deposits and the Oligocene foredeep basin sediments and allowed to derive values of maximum tectonic and/or sedimentary burial and to reconstruct burial and exhumation paths. A multi-method investigation (organic matter optical analyses and XRD analyses of clay minerals) have been performed to define the thermal evolution of the basins. Paleothermal data (vitrinite reflectance and illite content in mixed layers illite-smectite and related structural ordering) are cor-relatable with the immature to the mid-mature stages of hydrocarbon generation and indicate deep diagenetic correlation. These data are regularly distributed with thermal maturity decreasing from hinterland to foreland. Furthermore 1D thermal modeling indicates a corresponding reduction of tectono-sedimentary load undergone by sedimentary successions (ranging between 3.7 and 2.3 km).

Paleomagnetic methods have been used in the order to reconstruct the geodynamic evolution of the area and to quantify vertical axis rotations in the analyzed chain portion. The anisotropy of magnetic susceptibility of the Upper Cretaceous-Oligocene sediments shows a primary sedimentary magnetic fabric with a tectonic overprint. NW- SE orientation of magnetic lineation is indicative of SW-NE regional compression. Paleomagnetic data demonstrate a counterclockwise rotation, in agreement with the regional trend observed in this sector of Northern Apennines. The very high observed values of rotation observed in these deposits (up to 103°) may indicate that, beside the component related to the formation of the chain itself, this sector could have recorded the Corsica-Sardinian rotation. Data from this study can be used as valid constraints for the understanding of the Northern Apennines evolution in the more general framework of the Western Mediterranean area.