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Paleomagnetic and magnetic fabric constraints for the structural evolution of polyphasic strike-slip shear zones: the example of the Canavese Zone (Western Alps, Italy)

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Rock's magnetic techniques combined with detailed geological mapping and structural analysis could provide spatial and temporal information for understanding both the kinematics and geodynamics evolution of regional-scale strike-slip shear zones. We present preliminary results on both petrofabric variation and the reconstruction of paleomagnetic rotation pattern of "tectonic blocks" defined by the intersection of different fault systems within a tectonic slice of the Adria microplate, known as the Canavese Zone. The latter is interposed between the inner sector of the Alpine accretionary wedge (i.e. the Sesia Zone) and the lower crustal Ivrea Zone, and consists of a Variscan basement, Early Permian granitoids and an Early Permian to Early Cretaceous volcanic and sedimentary succession involved and deformed in a polyphasic regional-scale strike-slip shear zone (i.e. the Insubric Line). Paleomagnetic analyses allowed quantifying the sense and amount of relative rotations between different "tectonic blocks" within the Canavese Zone, as well as their absolute rotation with respect to the stable Adriatic microplate. Our results show a complex spatial and temporal rotation pattern between the different "tectonic blocks", controlled by predominantly counterclockwise and few clockwise rotations, ranging from 40° to 160°, and indicating a complex tectonic evolution from Early Permian to Cenozoic. This complex tectonic evolution occurred since Early Permian, through the repeated reactivation of the main fault systems. This is shown by the spatial and temporal change in orientation of the axes of the anisotropy of magnetic susceptibility (AMS), during the different faulting stages which characterized the tectonic evolution of the Canavese Zone.