



Discrimination of mélanges forming process through the analysis of magnetic fabric: examples from Northern Apennine mélanges (NW Italy)

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Chaotic rock bodies and mélanges commonly occur in subduction complexes and convergent margin settings throughout the world where their origin can be associated to tectonic, sedimentary and/or diapiric processes and their mutual superposition (polygenetic mélanges). In these settings, a strong morphological similitude of their mesoscale block-in-matrix fabric exists between mélange formed by the different processes and their mutual temporal and spatial superposition (i.e. polygenetic mélanges). In fact, commonly the final mélange fabric records only the latest and more pervasive process of their formation, making problematic the recognition of their original forming process and thus their temporal and spatial tectonic evolution. This is particular true for polygenetic mélange types. We present the results obtained by the comparison between magnetic and mesoscale structural fabrics of non-metamorphic tectonic, sedimentary and polygenetic mélanges in the Late Cretaceous to Early Miocene External Ligurian Units in Northern Apennines (NW Italy). Our findings show that the magnetic fabric data reveal peculiar configurations of maximum AMS axes orientation, depending on the predominant mélange-forming process. Tectonic mélanges show: (i) mainly oblate ellipsoids with steep magnetic foliation consistent with the S-C fabric and/or mélange foliation, and (ii) a magnetic lineation, showing a good correlation with the intensity of the reworking related to tectonic shearing and the structural position of the mélanges within the accretionary complex. On the contrary, sedimentary mélanges show oblate ellipsoids with sub-horizontal magnetic foliation commonly related to the primary depositional fabric and subsequent burial overprinting. Polygenetic mélanges, are characterized by the occurrence of magnetic subfabric, which represent the result of the superposition of different forming processes and/or tectonic events. In conclusion, our results show that magnetic fabric investigations of different mélange types remarks the potential of AMS method to distinguish the process of formation (tectonic, sedimentary and diapiric) and/or their mutual superposition, and thus to better define and understand the tectonic evolution of the geodynamic setting of mélange formation