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Paleomagnetic constrains in the reconstruction of the recent stratigraphic evolution of the Po delta

Annamaria Correggiari (1), Luigi Vigliotti (1), Alessandro Remia (1), Luisa Perini (2), Lorenzo Calabrese (2), and Paolo Luciani (2)

(1) Istituto di Scienze Marine CNR ISMAR, Via Gobetti 101, 40129 Bologna, Italy (anna.correggiari@bo.ismar.cnr.it), (2) Servizio Geologico, Sismico e dei Suoli Regione Emilia-Romagna Viale della Fiera 8, 40122 Bologna, Italy

The delta and prodelta deposits are characterized by a complex stratigraphic architecture that can be approached with several multidisciplinary tools. We present an example from the Po delta system characterized by alternating phases of rapid advance and abandonment of its multiple deltaic lobes that has been investigated through: (1) a review of historical cartography extending back several centuries; (2) integrated surveys of VHR seismic profiles recorded offshore of the modern delta from water depths as shallow as 5 m to the toe of the prodelta in about 30 m; and (3) sedimentological and geochronological data from precisely positioned sediment cores. Within this well known stratigraphic framework we have acquired seismic data and sediment cores in the area of the post roman Po delta system. However a precise dating of the recent evolution of depositional delta lobes is difficult because of the lack of suitable dating methods. To constrain the emplacement timing of the Renaissance lobes a paleomagnetic studies was carried out on a sedimentary sequence representing a seismic facies well correlated in the cores by whole core magnetic susceptibility profile. Forty eight samples were collected from a core section (RER96-1) characterized by a fine grained lithology suitable for paleomagnetic investigations. The characteristic remanent magnetization (ChRM) of the sediments has been obtained by applying an AF cleaning between 10 and 30 millitesla. The results have been compared with the directions recorded by the historical lavas of the Etna and Vesuvius. The combination of the trends observed in the declination and inclination suggests that the results can be compatible with the directions of the secular variation of the earth magnetic field occurring during the XVII century. This allow to date the sismic unit as representative of the beginning of the new delta following the Porto Viro avulsion made by the Venice Republic in 1604 AD. This delta history reflects the forcing of high-frequency climate change, autocyclic avulsions, and anthropogenic factors, acting on variable, but typically short, time scales. By using multidisciplinary methods of investigation is possible to detect the sedimentary response forced by anthropic impact at centennial/decadal time scale.