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The magnetic susceptibility as tool for environmental and paleoenvironmental prospections: case study coast of Sfax, southern Tunisia

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Introduction

The use of the magnetic susceptibility for environmental purposes has gained a noticeable popularity. The use of this tool allows inferring the natural conditions as well as the human induced activity. The aim of this work is twofold. On the one hand, it follows the contamination of surface sediments of the coast of Sfax (Fig. 1) by polluting materials such as heavy metals. On the other hand, it records the variation of depositional environment during the late Holocene.

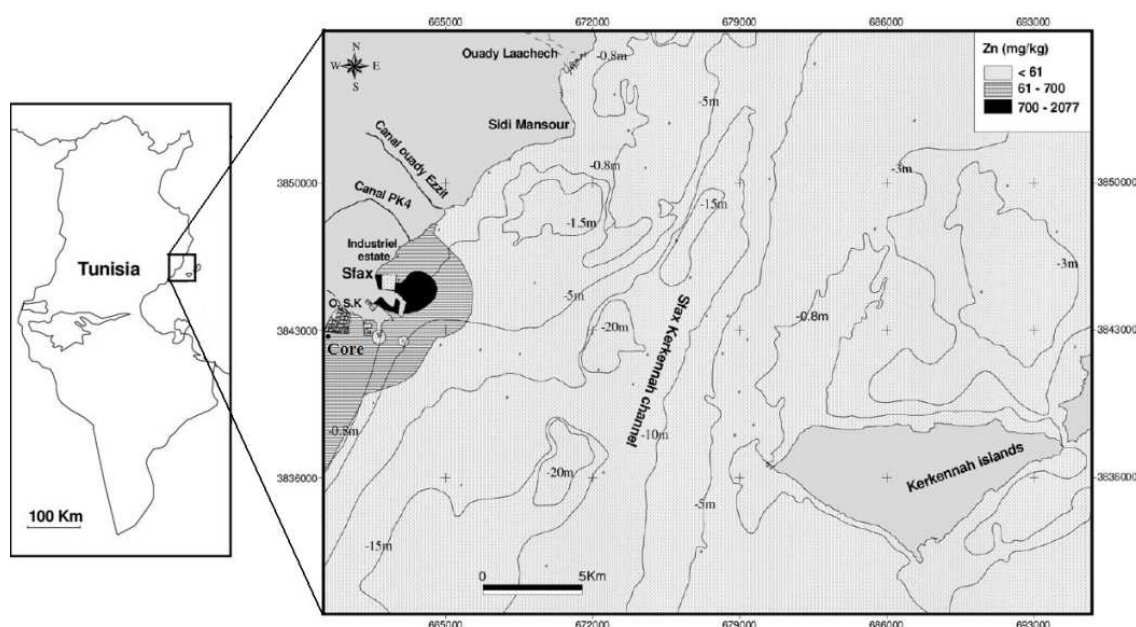


Fig. 1: Contamination of the coast of Sfax by zinc (GHANNEM et al., 2011).

Pollution of the coast of Sfax

The coast of Sfax has also witnessed ever increasing urbanising activities. Many studies (e.g., GHANNEM et al., 2011) have noticed the damage. The southern coast contains, in particular, a site of collecting wastes of the town of Sfax, the liquid and solid rejections of SIAPE, the basins of storage of the "margines" and the station of purification. The Tunisian government has taken serious measurements that heavily coasted on the national budget to clean the polluted northern coast of Sfax by funding the Taparura Project and the controlled zone of phospho-gypsum waste. But results of these remedial solutions are not guaranteed for sure. The first ten centimeters of the core are characterized by high values of magnetic susceptibility. These values are due the pollution of surface sediment with heavy metals. This contamination was recently discussed by GHANNEM et al. (2011).

Variation of the depositional environment during the late Holocene

Values of the magnetic susceptibility (Fig. 2) show also the transition from a marine depositional environment to a continental one. The marine domain (0 cm to 62 cm) is characterized by low values of the magnetic susceptibility; this domain records coarse sedimentary grain. Whereas the continental domain (62 cm to 154 cm) is characterized by high values of magnetic susceptibility. This high values are due the presence of red clays. Within these two different domains we find also minor oscillations indicating slight variability of the sea level and/or climatic change.

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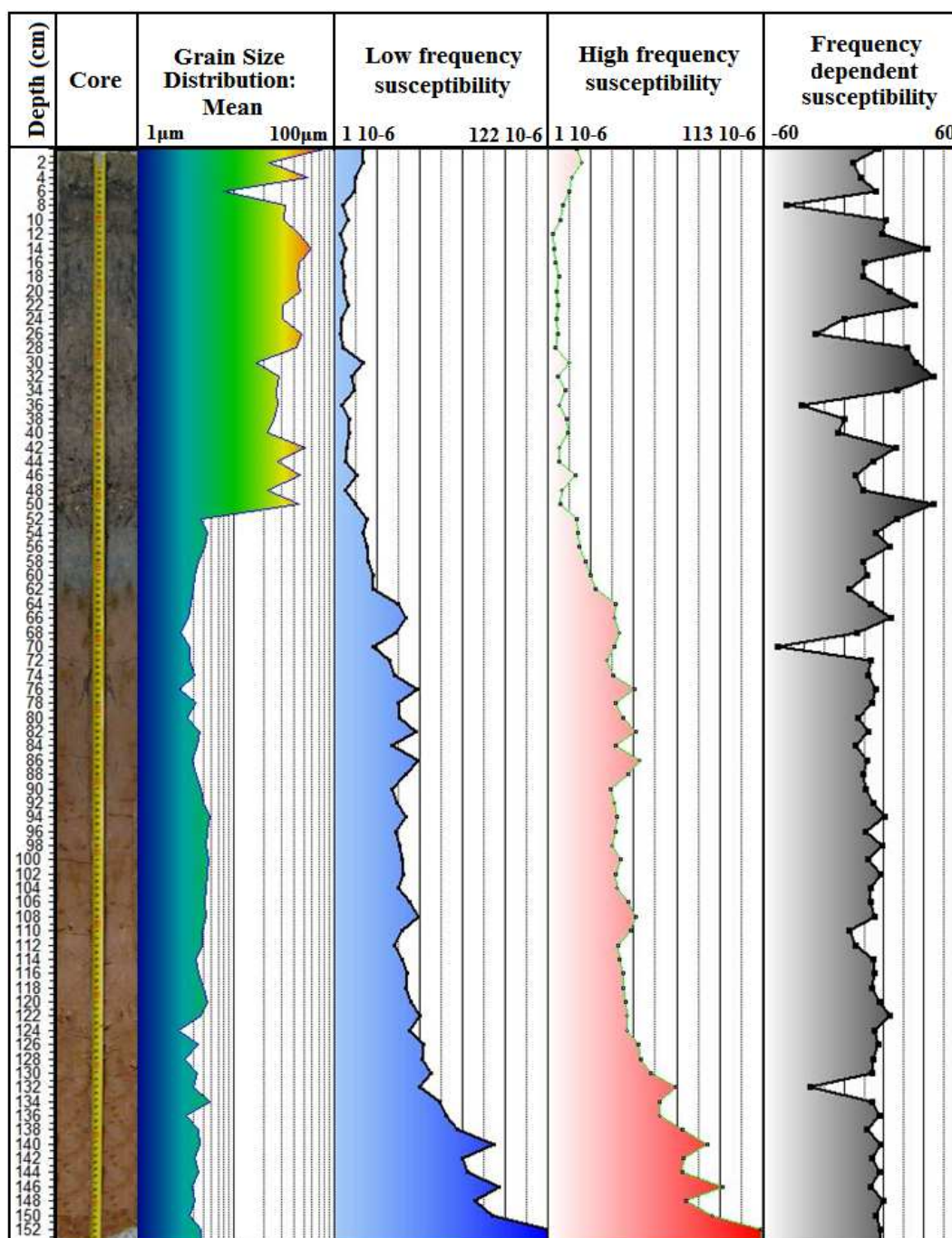


Fig. 2: Record of the mean of the grain size, low frequency magnetic susceptibility, high frequency magnetic susceptibility and independent frequency magnetic susceptibility along a core collected from the coast of Sfax.

References

GHANNEM, N., AZRI, C., SERBAJI, M.M. & YAICH, C. (2010): Spatial distribution of heavy metals in the coastal zone of “Sfax–Kerkennah” plateau, Tunisia. *Environmental progress and Sustainable Energy*, 30 (2). doi: 10.1002/ep.

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