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Magnetic susceptibility and geochemistry analysis of a Miocene fluviatile succession, J. Artsouma, Tunisia

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Introduction

In Tunisia, the Miocene succession is mostly constituted of detrital sediments deposited in a coastal and fluviatile setting. The studied section is located in Djebel Khechem el Artsouma, in the center of Tunisia. The present study includes magnetic susceptibility (MS) combined with geochemical analyses.

Geological setting

The stratigraphic succession of the studied section (CASTANY, 1951; YAÏCH, 1984) shows the following formations (Fig. 1):

The base of the Beglia Formation, corresponding to coastal sand accumulations is interpreted as a seaward stepping (Serravallian–Tortonian age). The transition between the Beglia and Saouaf formations, represented by red clayey sands rich in gypsum, corresponds to a landward stepping. The top of the Saouaf Formation (Serravallian–Tortonian age) is the result of a seaward stepping.

Artsouma section

The section is 45 m and 98 samples have been collected for MS and calcimetry. Out of these 98 samples, 19 have been selected for further geochemical analyses (major and trace elements).

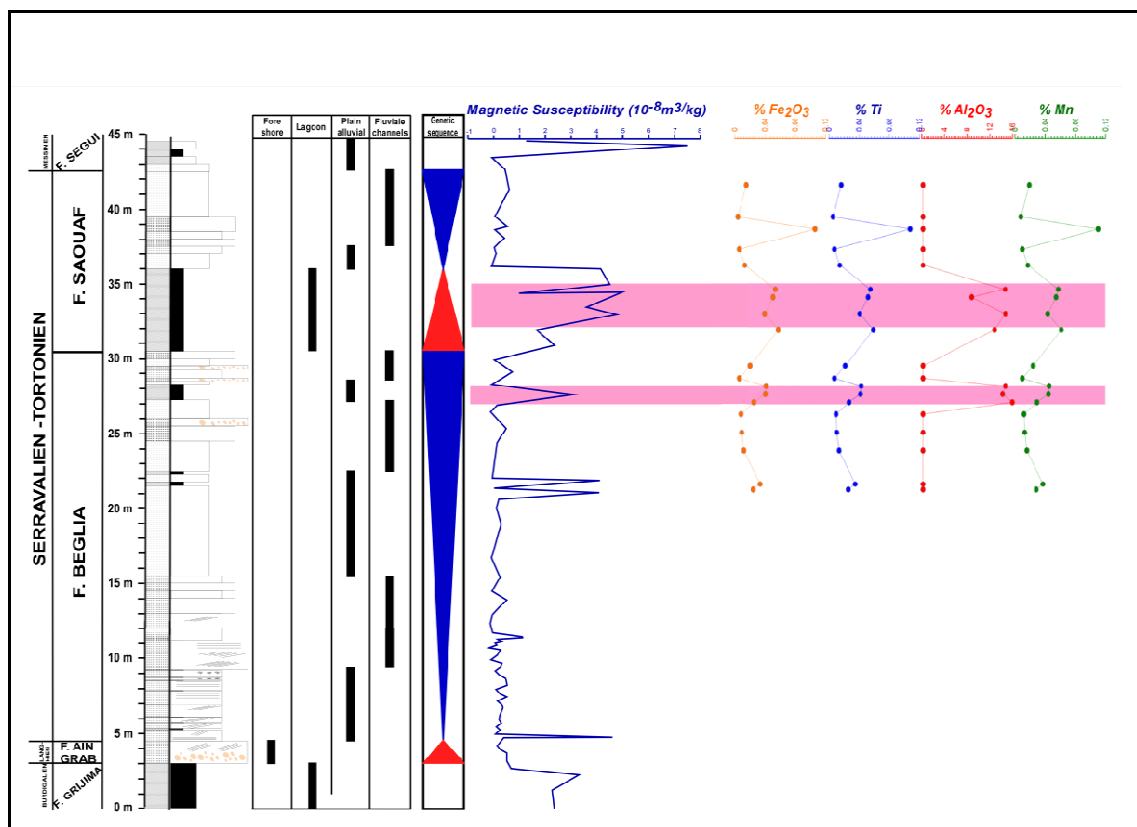


Fig. 1: Log, paleoenvironments, magnetic susceptibility and geochemical analysis of J. Artsouma, Tunisia.

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Magnetic susceptibility of the Beglia-Saouaf Formation transition: MS values are between $-1.36 \cdot 10^{-10}$ and $7.33 \cdot 10^{-8}$ m³/kg. The highest values are observed between 29 and 37 m, corresponding to the transgression phase at the base of the Saouaf Formation.

To be interpreted as related to lithogenic inputs, the magnetic susceptibility signal should show close relationship with other proxies such as selected major or trace elements. Although Zr ($r=0.28$), Rb ($r=0.35$), Ti ($r=0.40$) and Al₂O₃ ($r=0.49$) are considered as proxies for detrital inputs (RIQUIER et al., 2010) a positive correlation between these elements and the MS signal would be a good indicator that the MS signal is driven by detrital inputs. The highest MS values recorded at the base of the Saouaf Formation corresponding to clay layers are explained by the presence of iron oxides (Fe₂O₃, Mn, etc.).

References

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