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Magnetic mineralogy analyses on greigite-bearing sediments with inconsistent magnetic polarity (Adana Basin, Southern Turkey)

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A paleomagnetic study has been carried out, in the framework of the VAMP (Vertical Anatolian Movement Project) project, on 4 stratigraphic sections and 1 site from the Adana basin in the southern margin of the Anatolian Plateau. About 300 standard cylindrical samples have been analysed for paleomagnetism and rock magnetism. All the sections have been deposited in the upper Messinian"lago-mare" post-evaporitic event, which occurred in the Mediterranean basin, during the reverse polarity Chron C3r. Paleomagnetic results, presented in this work, are in contrast with these data, showing both normal and reverse polarities along the sections. Standard magnetic mineralogy investigations, integrated with SEM analyses and FORC diagrams, show that magnetite and ferrimagnetic iron sulphides (greigite) are the main magnetic carriers. Moreover, we find an interesting correlation between the magnetic mineralogy of the sediments and the magnetic polarities, being magnetite the magnetic carrier in the normal polarity samples and greigite in the reverse ones. Reversal and fold tests demonstrate that normal polarity samples have been subjected to a pervasive magnetic overprint and acquired their remanent magnetization after bedding tilt. Whereas samples with a reverse polarity acquired their remanent magnetization before bedding tilt, but after syn-sedimentary soft deformation.
This work is proposed as a contribution aimed to improve the understanding of the relationship between the magnetic mineralogy and the remagnetization phenomena in order to avoid misinterpretation of magnetostratigraphic and paleomagnetic data.