THERMAL, MECHANICAL AND CHEMICAL ALTERATIONS PROMOTED ON SEDIMENTARY ROCKS HOSTING DYKE BODIES

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This work is focused on flow and propagation of magma along thick Jurassic dykes and the effects of such intrusive processes on the magnetic properties of host sedimentary rocks, which are still poorly understood. Therefore, an exhaustive study of rock magnetic and petrography analyses were performed on dolerite rocks collected along several sections across the Foum Zguid (FZD - Southern Morocco) and Messejana-Plasencia (MPD - Iberia) dykes, complemented with several sections across the sediments hosting the FZD. The study has been completed with the evaluation of the magnetic fabric carried by these sedimentary rocks after laboratory application of sequential heating experiments.

The present study shows that: i) magnetic analyses of dolerite rocks are sensitive to low to moderate metasomatic processes and cooling rate underwent by ferromagnetic minerals; ii) intrusive processes at both dykes occurred for a brief period; iii) oblique magma flow regime, rising from SW to NE, is inferred for FZD; iv) sub-vertical magma flow episodes, without discarding some sub-horizontal magma flow regimes are inferred for MPD; v) variations of the bulk magnetic parameters and of the magnetic fabric observed for sedimentary rocks hosting FZD is strongly related with re-crystallization and Fe-metasomatism intensity, with newly formed hematite as the main product; vi) the magnetic fabric obtained for sedimentary samples near the contacts with FZD was acquired during the intrusion, and could reflect either flattening in the host rock due to the stress field induced during the intrusion or the materialization of microfractures; vii) the strong compression promoted during magma emplacement leads to bulk rotations for domains nearest the contact; viii) thermal experiments of AMS on sedimentary samples collected farther from the dyke and, thus, less affected by heating, indicate that 300–400°C is the minimum temperature needed to trigger appreciable transformations of the previous magnetic fabrics. Therefore, such changes in orientation should not be unequivocally interpreted as the result of a stress field.