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Age dependent variation of magnetic fabric on dike swarms from Maio Island (Cape Verde)

Mário Moreira (1,4), José Madeira (2), João Mata (3), and Patrícia Represas (4)

(1) Instituto Superior Engenharia Lisboa, Lisboa, Portugal (mmoreira@deea.isel.ipl.pt), (4) Universidade de Lisboa, CGUL - IDL, Lisboa, Portugal (prepresas@fc.ul.pt), (2) Universidade de Lisboa- GeoFCUL, LATTEX-IDL, Lisboa, Portugal (jmadeira@fc.ul.pt), (3) Universidade de Lisboa - GeoFCUL, CeGUL, Lisboa, Portugal (jmata@fc.ul.pt)

Maio is one of the oldest and most eroded islands of Cape Verde Archipelago. It comprises three major geological units: (1) an old raised sea-floor sequence of MORB covered by Jurassic(?)-Cretaceous deep marine sediments; (2) an intrusive "Central Igneous Complex" (CIC), forming a dome-like structure in the older rocks; and (3) a sequence of initially submarine, then subaerial, extrusive volcanic formations and sediments. Based on the trend distribution of 290 dikes, we performed magnetic sampling on 26 basic and one carbonatite dikes. Anisotropy of magnetic susceptibility (AMS) was measured to infer geometries of magmatic flow. Dikes were sampled in both chilled margins were larger shear acting on particles embedded in the magmatic flow is expected. Sampling involved 11 dikes (N=195) intruding MORB pillows from the Upper Jurassic "Batalha Formation" (*Bt fm*); 6 dikes (N=95) intruding the Lower Cretaceous "Carquejo Formation" (*Cq fm*), and 10 dikes (N=129) intruding the submarine sequence of the Neogene "Casas Velhas Formation" (*CV fm*). The studied hypabissal rocks are usually porphyritic, with phenocrysts of clinopyroxene and/or olivine set on an aphanitic groundmass. Dikes intruding *CV fm* trend N-S to NE-SW and plunge to SW. In *Bt fm*, dikes make $\approx$ 99% of the outcrops, span all directions and include frequent low dip sills. Dikes intruding *Cq fm* are shallow (mostly parallel to the limestone strata), dip 30^o- 40^o to the E, and trend N-S to NE-SW.

Bulk susceptibility of the 26 basic dikes presents an average value of k = 47 $\pm$ 26 ($\times 10^{-3}$) SI. The carbonatite dike intruding *Bt fm* has lower susceptibility: k = 4.6 $\pm$ 1.2 ($\times 10^{-3}$) SI. More than 80% of the dikes show normal and triaxial magnetic fabric. Anisotropy is usually low, with P' $<$ 1.08, but in *CV fm* dikes the anisotropy is higher and grows (up to P' $\approx$ 1.5) towards the centre of the volcano. Dominant magnetic fabric in *CV fm* is planar but in dikes from *Cq fm* and *Bt fm* it varies between oblate and prolate. Carbonatite dike shows low anisotropy (1.01 $<$ P' $<$ 1.06) and a slightly dominant planar fabric. Magnetic foliation is parallel or slightly oblique to the respective margins. Usually, when magnetic imbrication is observed the dihedral angle is small or the imbrications in both margins are scissored relative to the dike axis.

Magnetic lineation shows some interesting systematic behaviours. In *CV fm*, lineation changes from shallow or intermediate plunges ($\sim 45^o$) in southern dikes to more than 60^o in northern dikes (close to CIC). In *Cq fm*, lineation of N-S dikes has intermediate plunge ($\sim 40^o$) to the NE, while NE-SW trending dikes intruding the same formation in the south show shallower inclinations ($< 30^o$). Lineation always falls in E or NE sectors of the projections. In *Bt fm*, (southeast shore) lineations usually plunge more than 60^o.

Thermomagnetic magnetic behaviour of rocks from *Cv fm* dikes indicates the Ti-rich composition of the main oxide phase, while the rocks from *Bt fm* present either a single magnetite-rich phase, either two phases: titano-magnetite $300^o < T_C < 400^o$, and magnetite.

The differences between sites are related to the age of the enclosing formations. Sites from the younger *CV fm* present relatively homogeneous geometric orientations and magnetic fabrics, while the dense network of dikes and sills intruding the pillows of the oldest *Bt fm* is more heterogeneous. This difference, a consequence of the significantly larger age range of dikes on the *Bt fm*, reflects changes in stress field during dike emplacement, and modifications of magma chemistry inducing crystallization of different magnetic minerals.

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