

Title: Study of the Saldanha Massif (MAR, 36 degrees 34 ' N): Constrains from rock magnetic and geophysical data

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Abstract: We present a study of the magnetic properties of a group of basalt samples from the Saldanha Massif (Mid-Atlantic Ridge - MAR - 36degrees 33' 54" N, 33degrees 26' W), and we set out to interpret these properties in the tectono-magmatic framework of this sector of the MAR. Most samples have low magnetic anisotropy and magnetic minerals of single domain grain size, typical of rapid cooling. The thermomagnetic study mostly shows two different susceptibility peaks. The high temperature peak is related to mineralogical alteration due to heating. The low temperature peak shows a distinction between three different stages of low temperature oxidation: the presence of titanomagnetite, titanomagnetite and titanomaghemite, and exclusively of titanomaghemite. Based on established empirical relationships between Curie temperature and degree of oxidation, the latter is tentatively deduced for all samples. Finally, swath bathymetry and sidescan sonar data combined with dive observations show that the Saldanha Massif is located over an exposed section of upper mantle rocks interpreted to be the result of detachment tectonics. Basalt samples inside the detachment zone often have higher than expected oxidation rates; this effect can be explained by the higher permeability caused by the detachment fault activity.

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