D/H ratios in *n*-alkanes as a proxy for paleoclimatic changes in a Brazilian lacustrine rift sequence

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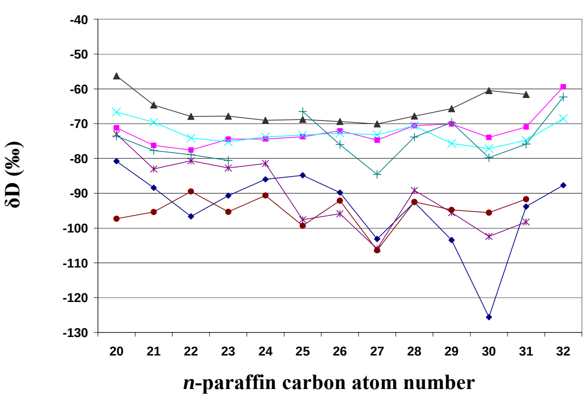
Meteoric water is considered the main hydrogen source for primary producers (Schiegl and Vogel; 1970), and fossil hydrocarbons can preserve most of their source D/H signature throughout geologic time (Santos Neto and Hayes, 1999; Li *et al*., 2001, Dawson *et al*., 2004), and even during catagenesis (Schimmelmann *et al*., 2006).

Examination of *n*-alkanes from organic extracts of representative core samples of an early Brazilian Cretaceous paleolake sediments showed that δD_{SMOW} of *n*-C_{20} to *n*-C_{32} varied mostly between ≈ -60‰ to -100‰ (Fig. 1). Spikes up to -125‰ probably are related to coelution of compounds.

The cyclic fluctuations of δD in *n*-alkanes are significant, correlative to inorganic indicators of environment changes, and largely independent of secondary exchanges. This suggests that D/H ratios are reflecting periods of more and less water evaporation, during the lake evolution, and can be an useful proxy for paleoclimatic studies.

Figure 1: Graph showing the δD (‰) variation for the n-paraffins ranging from 20 to 32 carbon atoms



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Emplacement of the Monchique alkaline massif (SW Portugal): Microstructures and magnetic fabric constraints

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The Monchique massif aged of Upper Cretaceous ($^{40}Ar/^{39}Ar$ 72.7±2.7 Ma, Valadares *et al*., 2005) covers an area of 80 km^2 and has an east-west elongate shape. This massif is composed by two principal units: the central one corresponding to a coarse grained nepheline syenite and a marginal unit represented by a heterogeneous syenite. The central unit contains large crystals of alkali feldspars, nepheline (25% to 40%), pyroxene, biotite and sphene. The marginal unit has a variable granulometry and is poorer on nepheline (10 to 20%) (Gonzalez-Clavijo & Valadares 2003). Gomes & Pereira (2004) considered this massif as an intrusion in an antiform structure and controlled by a NE-SW shear zone.

All the thin sections display microstructures typical of magmatic or submagmatic state and no microstructures indicate of strain developed under near-solidus conditions were observed. Preliminary studies of Anisotropy of Magnetic Susceptibility (AMS) were carried out measuring 102 oriented core samples from 12 sites, using an Agico Kappabridge (KLY-4S), at the Geology Dep., Porto University. The high average bulk susceptibility ($23.83E^{-3}$ SI) together with previous paleomagnetic works (Gomes & Pereira, 2004) indicates that magnetite controls the magnetic behaviour. Magnetic anisotropy magnitude (Kmax/Kmin) is quite low, 1.065 on average. AMS fabric patterns show subvertical magnetic foliations associated with subhorizontal magnetic lineations. They have both a tendency to display NE-SW trends on the east and west sectors of the massif, passing to an E-W trend on the centre of the massif, drawing a sigmoid shape. Considering the AMS fabric as magma flow indicators, we propose that Monchique massif is a subvertical intrusion and that the steeply dipping magnetic foliations related to gentle dipping lineations represent an E-W trending of the magmatic flux controlled by a NE-SW left strike slip fault.

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