Diagenesis, deformation mechanisms and architecture of the fault zones in the extensional Neogene basins of the northeast Iberian Peninsula.

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The faults limiting the Vallès and Penedès basins affect Hercynian crystalline rocks, Triassic, Jurassic and Cretaceous carbonates, and Miocene carbonates, evaporites and detrital rocks. These faults generate gouges, cataclasites, breccias and pseudotachylytes. The main cements are calcite, quartz, laumontite, muscovite, chlorite, albite and iron oxides, depending on the PT conditions. We have established four tectonic events that gather different deformation phases.

Applying geothermobarometers in neoformed chlorites and K-white micas, we have established the PT paths from Hercynian to Neogene. We have observed how the faults have controlled the thickness and distribution of sediments during the first Mesozoic rifting.

Dolomitization and karstification are two widespread diagenetic processes that are recurrent through time and are clearly related to faults.

Trace elements together with radiogenic and stable isotopes of the calcite cements in veins have allowed us to constrain the origin and regime of fluids and the fluid pathways through time.

Isotope characterictics of the Bon Accord oxide body, Barberton greenstone belt, South Africa

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The Bon Accord oxide-silicate body (BAOS) in the the Barberton greenstone terrane is associated with ultramafic igneous rocks. It initially attracted interest because of its extreme whole rock NiO enrichment (>30%) and very unusual mineralogy: In the 1960s, de Waal[1-5] described several new minerals, including the Ni end-members of magnetite (ferroan trevorite) and olivine (liebenbergite). De Waal[6] identified five zones in the semi-circular body, with an increase in hydrous phases from a massive central portion (mainly containing nepouite and trevorite) to the schistose rim. On the grounds of petrographic information, he proposed that the BAOS represents an altered Archean meteorite.

Tredoux and co-workers[7] re-examined samples of the BAOS body (sadly no longer *in situ*) in the 1980s, concentrating on its geochemistry. They rejected the meteorite model in favour of a terrestrial model, because of (a) similarities between chromites in the BAOS and those in the host ultramafite, (b) the possibility that this host rock is potentially associated with the basal part of the Jamestown ophiolite[8] and thus would not have been at surface in the Archean, (c) the high concentrations of platinum-group elements (PGE) which are usually relatively low in Ni-rich irons, and (d) positive (unmeteorite-like) trends of PGE patterns[7] of many of the BOAS samples.

Radiogenic isotope ratios point to extensive, and variable, degrees of disturbance[7], but the U-Pb and Sm-Nd data hint at an Archean (3.5 Ga) age. The Cr isotopes, when normalized to a terrestrial standard, yield a value of 1, within analytical error, which points to a terrestrial source for the material.

[1] De Waal (1969) *Am. Min.* 54, 1204-1208; [2] De Waal (1970) *Am. Min.* 55, 1842-1208; [3] De Waal (1971) *Am. Min.* 56, 1077-1081; [4] De Waal (1972) *Am. Min.* 57, 1524-1527; [5] De Waal (1973) *Am. Min.* 58, 733-735; [6] De Waal (1978) *Mineralisation in metamorphic terranes (ed: WJ Verwoerd), Geol. Soc. of South Africa,* 87-98; [7] Tredoux, de Wit, Hart, Armstrong, Lindsay & Sellschop (1989) *J. Geophys. Res.* 94 (B1), 795-813; [8] De Wit, Hart & Hart (1897) *J Afr Ea Sci* 6, 681-730.

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