



## **The Azores plume influence on the SASC-Great Meteor and MAR: the importance for the Portuguese Extension of the Continental Shelf Project (PECSP)**

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The Southern Azores Seamount Chain (SASC) is a group of large seamounts located south of the Azores Plateau and east of the Mid-Atlantic Ridge (MAR) and part of the natural prolongation of the Azores land mass. The SASC, including the Great Meteor Seamount (aprox. 1000km south of São Miguel), is rooted on a flat, gently SE dipping Terrace, surrounded by steep scarps with almost 2000 m high.

Only a few studies from the 70-80's discuss the geologic and/or geodynamic evolution of this region based on scarce bathymetry and geophysical data. Wendt et al. (1976) presented geochemical data and K-Ar ages on three basalt from the Great Meteor Seamount (<16Ma old), later analyzed for Sr-Nd-Pb isotopes by Geldmacher et al. (2006). Given the rarity of geochemical data, the origin of the seamounts and the regional evolution of this large area of the Atlantic, remains largely unknown. During the preparatory work of the PECSP, the EMEPC promoted three oceanographic campaigns to the SASC (2007, 2008 and 2009) with multidisciplinary teams. Within these cruises, more than 120 samples were dredged or collected with the Luso ROV (rated to 6000m depth) although less than 50 were suitable for major and trace elements analysis, for Sr-Nd-Pb-Hf isotopes and for K-Ar radiometric dating.

Early studies relating the SASC with the New England Seamounts can be refuted by geophysical data and kinematic models presented by Gente et al. (2003) and, also by our new isotopic data, which shows that isotope ratios are clearly distinct from New England (Ribeiro et al., in prep). However, the analyzed SASC basalts display isotope ratios that overlap the Azores isotopic signature. Two new K-Ar ages (unspiked Cassinot-Gillot technique on fresh separated groundmass and/or plagioclase microlites) on the seamounts show coeval volcanism at Plato Seamount SE flank ( $33.4 \pm 0.5$  Ma) and at Small Hyeres Seamount ( $31.7 \pm 0.5$  Ma). The SASC basalts erupted on the Terrace through an oceanic crust with 26Ma and 43Ma, respectively, at the time of eruption. Contemporaneous with this activity, the basalts erupted on-axis at the MAR between the Hayes FZ and the Azores, correspond to E-MORB with an radiogenic isotopic signature trending towards the Azores (Dupré and Bougault, 1985; Jenner et al., 1985). The similarity between the SASC and the Azores mantle source can be explained by the impingement of the long-lived (aprox. 85Ma) Azores plume beneath the Nubian Plate, as argued by Gente et al. (2003), which also influenced the MAR evolution.

Our study endorses the genetic link between the Azores Archipelago and the SASC to the Azores plume, contributing to better constrain the temporal-spatial evolution of this region of the north Atlantic, which is enclosed by the Azores Platform. Moreover, the new data gathered within the PECSP contributed to constrain the boundary of the Azores Platform submarine elevation according to the provisions of article 76 of UNCLOS.

Wendt et al. (1976) Deep-Sea-Research 23; Geldmacher et al. (2006) Lithos 90; Dupré and Bougault, (1985) DSDP82; Jenner et al., (1985) DSDP82; Gente et al. (2003) G3, 4