

Petrographic and geochemical characterization of the Emile Baudot Seamount lavas: Insight into the western Mediterranean Cenozoic magmatism

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The Valencia Trough is one of the several extensional basins developed during the Cenozoic in the central and western Mediterranean area, whose origin is linked to back-arc extensional processes related to the convergence between Africa and Eurasia plates. The Valencia Trough formed as consequence of the clockwise rotation of the Balearic Promontory with a hinge close to the Algerian Coasts. Its opening is associated with a poorly investigated submarine igneous activity, in connection with a volumetrically minor mildly alkaline sodic activity onshore the Valencia area (Picasent and Cofrentes) and in the Columbretes Islands.

This work represents the first comprehensive petrographic, geochemical and isotopic characterization of 14 volcanic rock samples dredged from the slopes of the Emile Baudot Seamount (southeast of the Balearic Promontory), along the western margin of the South Balearic-Algerian Basin. Petrographic and semiquantitative mineral chemical analyses (SEM) highlighted the presence of porphyritic lavas, in which phenocrysts of clinopyroxene, olivine and plagioclase are hosted in a hypocrySTALLINE to holohyaline groundmass, made of microliths of plagioclase, clinopyroxene, olivine, opaque minerals and apatite, plus volcanic glass. Amphibole antecrysts are also observed in several samples. Olivine gabbroic to melagabbroic cumulate fragments are occasionally found in the lavas.

The geochemical compositions of the volcanic products span over a wide range, with the most altered and palagonitised shards being characterized by low SiO₂ coupled with high MgO, CaO and P₂O₅. On the other hand, the least altered samples mostly fall in the basanite field (CIPW normative olivine > 10 vol%). The mildly alkaline rocks of the Emile Baudot seamount also have high TiO₂ and Al₂O₃, representing slightly fractionated magma based on the Mg#, Cr and Ni contents, resulting from olivine and clinopyroxene fractionation. The high Na₂O (up to 4 wt%), typical of mafic magmas emplaced in intraplate settings, well fits the literature analyses of the Valencia Trough volcanic rocks and, in general, the youngest phase of anorogenic magmatism