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Upper Mantle and Crustal Origin of Olivine-Pyroxene-Kaersutite Megacrysts, and Peridotite Cumulates and Xenoliths From the Bandama Volcanic Complex (Gran Canaria, Spain)

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The Quaternary volcanic complex of Bandama is formed by a strombolian cone and a caldera of phreatomagmatic-collapse origin. It shows two lava flows of basanite composition and fall and base surge pyroclastic deposits. The lava flows have olivine and augite-diopside phenocrysts and as subordinate minerals spinel and magnetite. The pyroclastic deposits show olivine, clinopyroxene and kaersutite phenocrysts and megacrysts, peridotite cumulates (dunite, wehrlite, clinopyroxenite with olivine, clinopiroxenite) and xenoliths (dunite and lherzolite) containing olivine, augite-diopside, enstatite, spinel, magnetite, phlogopite, apatite and pyrrhotite-pentlandite. Taking into account the volcanological study and the microscopic, electron microprobe, microthermometric (fluid and melt inclusions) and bulk-rock analysis of the 26 samples, we conclude that the minerals which make up the megacrysts, cumulates and xenoliths display different characteristics between them and from the ratio to minerals of the lava flow. We interprete that these samples were originated under different thermobarogeochemical conditions and that the basanitic magma which gave rise to the Bandama complex ascended from upper mantle to the surface (-33 km to 0.5 km), trapping peridotite cumulates and xenoliths, and megacrysts of differents depths and genesis from the spinel stability field in the upper mantle to the oceanic crust (-27 km to -4.5 km).