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Carbonatite seamount formation and first subaerial exposure of Fogo (Cape Verde Islands): results from apatite and pyrochlore (U-Th)/He dating

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Basal carbonatite intrusives at Fogo, Cape Verdes, are thought to be part of large sub-aqueous seamount complex that were uplifted prior to the sub-aerial eruption stage. Constraining the time of initiation of volcanic ocean islands provides crucial information on the geodynamics of plate movement. The Fogo carbonatites contains abundant apatites suitable for (U-Th)/He geochronology as well as accessory pyrochlore that can also be dated with (U-Th)/He. He ages of apatites from 4 samples have cooling ages of 3.5 - 4.5 Ma. Pyrochlore was identified in two samples. Multiple aliquots yield ages of 2.5 and 3.5 Ma. The difference between the apatite and pyrochlore ages would suggest that the latter either formed later, or its closure temperature is lower than that of AHe. The difference between the AHe cooling ages and the occurrence of the first Quaternary subaerial lava flows suggests that there was a long hiatus between the initial emplacement of the seamount complex and the subsequent shield basalt stage.