

A new approach to understanding the geological evolution of the Canary Islands: A detrital zircon study of Fuerteventura beach sand

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The Canarian Archipelago contains seven islands proximal to the African continent and High Atlas Mountains. The origin and magmatic duration of these islands has been a contentious issue for several decades. This particular archipelago is unique because three of the islands (Fuerteventura, La Palma, La Gomera) have been reported to contain uplifted portions of the intrusive complex, potentially exposing the earliest phases of the islands growth. There are numerous published K-Ar and Ar/Ar dates for this early magmatic activity on the oldest island, Fuerteventura, ranging from 68 Ma to 25 Ma (Le Bas et al., 1986; Muñoz et al. 2005) but the veracity of these dates is uncertain due to a pervasive greenschist facies metamorphic overprint.

In order to better understand Fuerteventura's early magmatic history, we have conducted a U-Pb detrital zircon study of sand samples from three locations proximal to the intrusive complex. A U-Pb detrital zircon age study is an efficient method to evaluate the early growth history of the island since most of the uplifted complex consists of zircon-bearing rocks (granite, syenite, nepheline syenite, gabbro, anorthosite, carbonatite) and the U-Pb system is largely immune to low grade metamorphism.

A total of 260 zircon grains were secured in an epoxy mount and analyzed using in-situ U-Pb Laser Ablation Inductively Coupled Plasma Mass Spectrometry (LA-MC-ICPMS). The U-Pb detrital zircon ages from this study range from the Early Oligocene- Early Pliocene (33.7-3.8 Ma). There are several new features of Fuerteventura's early magmatic history revealed from this study: 1) Oligocene detrital zircons (33.7-24.4 Ma) dominate the

northern part of the complex, 2) there are four peaks of magmatic activity (25.7, 21.0, 16.7 and 4.4 Ma), 3) magmatic activity in general youngs from north to south, and 4) a previously unrecognized period of Late Miocene and Early Pliocene intrusive rocks (6.5-3.8 Ma) must exist in the southern part of the island.

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