



A Chronological Framework for Young (<100 ka) Ignimbrite Eruptions on Terceira, Azores

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Ignimbrite-forming eruptions are among the most hazardous volcanic phenomena, and small oceanic islands such as Terceira are especially vulnerable to these violent explosive volcanic events. Establishing a temporal framework for the past record of these eruptions is essential to understand the precise nature of associated volcanic hazards and to assess the likelihood of future eruptions of the same type. The island of Terceira, Azores, consists of four large volcanoes (Pico Alto, Santa Barbara, Guilherme Moniz, Cinco Picos) grouped along a basaltic fissure zone that transects the island from NW to SE. The island is noteworthy for voluminous production of peralkaline felsic magmas. Peralkaline trachyte and rhyolite magmas formed extensive lava flows and domes, but also erupted explosively to produce subplinian pumice-fall deposits and ignimbrites. The Lajes-Angra Ignimbrite, of comenditic trachyte composition and dated by the radiocarbon method at about 19,000-23,000 y BP, is the latest in a history of ignimbrite eruptions from the active Pico Alto volcano. At least five similar ignimbrite-forming eruptions pre-dating the Lajes-Angra Ignimbrite have been identified so far in the sequences of deposits exposed above sea level around Terceira. It is not yet known whether the earlier ignimbrites were all derived from Pico Alto, or whether some came from the two apparently extinct volcanoes Guilherme Moniz and Cinco Picos. Radiocarbon ages indicate that these eruptions occurred earlier than 30,000 y BP, and, therefore, present an age-dating challenge. We present first $^{40}\text{Ar}/^{39}\text{Ar}$ age determinations on anorthoclase crystals separated from pumice clasts from several of the ignimbrites. These dates both overlap the radiocarbon ages and ex-

tend to older ages, showing that the $^{40}\text{Ar}/^{39}\text{Ar}$ method can be applied to date volcanic deposits from at least some oceanic-island volcanoes less than 100 ka old. The preliminary data support a rather narrow period of ignimbrite volcanism from about 86 to 19 ka BP. This suggests an average time interval of about 12 ky between ignimbrite eruptions during this period. However, longer than average periods have passed without ignimbrite-forming eruptions, which, together with the c. 20,000 years elapsed since the most recent event, suggest that ignimbrite volcanism could still occur in the future, and may pose a threat to Terceira's 60,000 population.