



Serreta Submarine Eruption 1998-2001, Azores: a new compositional end-member?

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The Azores platform, where the Eurasian, Nubian and American plates meet, comprises nine volcanic islands extending to both sides of the Mid-Atlantic Ridge (MAR). East of the MAR, the plate boundary between Eurasian and Nubian plates is defined by the Terceira Rift, interpreted as an intra-oceanic spreading system where the Islands of S. Miguel, Terceira and Graciosa emerge as well and the submarine D.João de Castro Bank, separated by deep avolcanic zones [1, 2].

Submarine and subaerial lavas from the Terceira Rift are characterized by small-scale elemental and isotopic variations, and several distinct compositional end-members have been identified [2,3] supporting the concept of significant mantle source heterogeneity. A recent submarine eruption (1998-2001) occurred ~4-5 NM WNW of Terceira Island, at the Serreta Ridge where lava balloons were observed floating at the surface [4]. In 2008, an oceanographic cruise was conducted to the Serreta ridge to investigate the site of the 1998-2001 eruption, map the seafloor, identify vent location, and characterize possible products of eruption [5]. An ROV from the EMEPC (Task Group for the Extension of the Continental Shelf) was used in this survey providing high-definition video footage and fresh lava samples. Three survey ROV dives (D15, D16, D17) were made on the Serreta ridge. D15 and D17 dives were located on the southern wall of the crater, whereas D16 explored the central and northern areas of the crater floor.

Sr-Nd-Pb isotope compositions of representative samples from the Serreta submarine ridge are presented for the first time. On the $^{208}\text{Pb}/^{204}\text{Pb}$ vs. $^{206}\text{Pb}/^{204}\text{Pb}$ diagram Serreta samples plot on a linear array with the remaining Terceira rift samples. However, these results show that Serreta submarine volcanics lay on the most depleted end of the Terceira Rift array. Radiogenic isotopes also show that samples from the central and northern wall of the crater are distinct from the younger southern wall sector. These small-scale isotopic heterogeneities match the spatial distribution of the volcanic products and time-scale interpretation of the different volcanic events [5].

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