GEOCHEMICAL CHARACTERISAZION AND EVOLUTION OF MONTE LUCCIA PRODUCTS FROM VULCANO ISLAND (AEOLIAN ARCHIPELAGO, ITALY)

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Vulcano Island (Aelioan Archipelago, Italy) is a composite structure consisting of four eruptive systems (Vulcano Primordiale, Complesso della Lentia, Cono di La Fossa and Vulcanello) and two polyphasic calderas, Caldera del Piano and Caldera di La Fossa. On the north-eastern side of Vulcano Island, a minor eruptive center, Monte Luccia, is located. The sequence consists of a shoshonitic lava at the base and a succession of more primitive products on top. According to field evidences, Monte Luccia products could be correlated to: i) the activity of Vulcano Primordiale (in this case the age of the sequence should range between 100 and 130 ka) or ii) the activity of a more recent, independent eruptive centre. To solve this question, the basal lava and the scoriae located on top were sampled, dated by U-series method, and analysed for major and trace elements. The two products belong to the orogenic alkaline series showing chemical and geochemical characters peculiar of the subduction related volcanism. The Ta/Th for the two rocks overlap with those of Vulcano Primordiale and Caldera de La Sommata. The Th/Hf, Ta/Yb La/Sm ratios from the lava and the scoriae products show different values, suggesting possible mantle heterogeneities, due to different mantle metasomatism, or different degrees of partial melting of the mantle source, or the existence of low pressure AFC processes with possible crustal contamination of Monte Luccia lavas by the prevulcanic basement (unita' calabridi) of the area. The (Th-230/U-238) activity ratios of the two products are also different, with the lava showing Th-230 excess relative to U-238. This high thorium content suggests either anhydrous partial melting of the mantle source or minerale-assemblage conditions in
the source such that the partition coefficient of thorium is lower than that of uranium. Nd-Sr-Pb data are necessary to further discriminate among these processes. Moreover, the investigated products seem to have been erupted at different times. The isochrone obtained for the lava, yield an best estimate of about 180 ka ± ?? (the unusual large error is due to the very low fractionation between U and Th in the different minerals), while the scoriae resulted younger (16 ± 2.2 ka ), suggesting again two different histories for the lavas and the scoriae of this volcanic centre.