

Title: Petrology and volcanology of the Roccamonfina volcano

Tutor: Prof. Lorenzo Fedele

Co-tutor: Prof. Paola Petrosino

Research program

Despite being the very first among the Italian volcanoes of the Roman Magmatic Province investigated in detail by the pioneering work of Appleton (1972), the Roccamonfina volcano deserved much less scientific attention with respect to the other Campanian volcanic districts like the Mount Somma-Vesuvius and the Campi Flegrei. The Roccamonfina was the first volcano in which younger products belonging to a “low potassium series” (i.e. a shoshonitic, leucite-free series) were found associated with older leucite-bearing ultrapotassic rocks. This feature was successively recognized for many other districts of the Roman Province, with the most relevant exception represented by the Somma-Vesuvius, where an opposite trend of increasing silica undersaturation with time has been observed (e.g. Conticelli et al. 2010 and references therein).

The Roccamonfina is a composite volcano made up of lava and pyroclastic deposits erupted during three main periods of activity, which preceded, accompanied and followed the formation of a polyphased summit caldera (e.g. De Rita and Giordano 1996). The general stratigraphic sequence, the styles of volcanic activity and the compositional variability of the feeding magmas were defined mostly during the early petrographic, petrological and volcanological investigations in the late XX century (e.g. Giannetti and Luhr 1983; Luhr and Giannetti 1987; Cole et al. 1992; De Rita and Giordano 1996; Giordano 1998).

In addition, the least evolved rocks of the Roccamonfina volcano have been studied to investigate the genesis of Italian potassic and ultrapotassic magmatism (e.g. Beccaluva et al. 1991;; Conticelli et al. 2007). Nevertheless, except for a paper by Conticelli et al. (2009), no specific work has been addressed to investigating the petrological-volcanological evolution of the volcano, mostly as far as the very first phases of activity are concerned. Moreover, age determinations of the volcanic deposits have been mainly carried out (mostly using the K-Ar method) on the products of the largest eruptions, i.e. the Brown Leucitic Tuff (350 ka; Rouchon et al. 2008; Scaillet et al. 2008) and the White Trachytic Tuff (331-230 ka; Rouchon et al. 2008).

The present research program is part of the CARG project for the redaction of the geological map of Italy at the 1:50.000 scale, and namely for the sheet 417 “Teano” (Scientific coordinator: Prof. Vincenzo Morra), covering the eastern half of the Roccamonfina volcano. The aim is to perform a detailed petrological, volcanological and geochronological investigation of the volcanic products of the Roccamonfina, in order to better define the overall volcanological and magma-genetic evolution of the

volcano.

Proposal for a PhD position

The proposed PhD project is focused on a petrological and volcanological study of the Roccamonfina volcano. The work program will start with the study of the available literature and with field work aimed at recognizing the main volcanic deposits and precisely defining their stratigraphic relationships. This will be followed by a detailed sampling, covering the entire period of activity of the volcano. The collected rock samples will be then investigated by means of petrographic, mineral and glass chemical and whole-rock major- and trace elements and radiogenic isotopes geochemical analyses. Most of these will be performed using the instrumental facilities at the DiSTAR, where the PhD student will have the possibility to acquire technical skills in numerous different types of analytical methods, including polarized light optical microscopy, scanning electron microscopy, SEM-EDS microanalysis, X-ray Fluorescence geochemistry and mass spectrometry isotope geochemistry. Training courses of the DiSTAR PhD will be also available for the PhD student at the host University for improving knowledges on different topics of the Earth Science disciplines.

The ideal candidate should have a strong background in volcanology, petrology and geochemistry, and a sincere inclination to both field and laboratory activities. Good knowledge of the English language, both spoken and written, is also a fundamental requisite, such as to allow a period of visiting fellowship at a foreign institution for at least five months. During this, the PhD candidate will not only learn how to interact and collaborate with local researchers and research groups, but will also have the opportunity to further develop some specific aspects of the research program, acquiring experience in additional analytical methods (e.g. EMPA, LA-ICP-MS, Ar-Ar and/or U-Pb geochronology).

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