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The earliest open conduit eruptive centre of the Etna volcano: evidence from aeromagnetic and geological data

D'Ajello Caracciolo F.¹, Nicolosi I.¹, Branca S.¹, Ferlito C.², Chiappini M.¹

¹Istituto Nazionale di Geofisica e Vulcanologia, Roma, Italy, e-mail: francesca.caracciolo@ingv.it

²Dipartimento di Scienze Biologiche, Geologiche e Ambientali, Università di Catania, Italy

Mount Etna is a basaltic composite stratovolcano formed through a complex geological evolution during the past 500 ka in eastern Sicily [1]. One of the main steps in the geological history of Etna volcano occurred around 129 ka ago [2] as consequence of the westward shifting of the main shallow feeder system from the coast to the central portion of the present Etna edifice in the Val Calanna area. In these conditions geophysical investigations, particularly potential field methods, proved to be efficient in delivering information about magma chambers, dikes and sills complex locations and geometry, representing the only tool to investigate through the basaltic carapace of recent products.

Starting from a new high resolution aeromagnetic survey acquired over the entire Mount Etna during 2012 by D'Ajello Caracciolo et al. [3], we highlighted a low magnetized area of about 28 km² located in Val Calanna (Fig. 1), where Ferlito and Nicotra [4] recognized a small outcrop interpreted as the uppermost portion of a volcanic plumbing system. We integrated the available multidisciplinary data to image the subsurface geometry in the framework of Etna volcano evolution history. The new magnetic anomaly dataset was previously used to model the pre-volcanic surface morphology and to highlight some sub-volcanic structures [5]. This finding sheds a new light on the evolution of Mount Etna volcano pointing out the evidence that the tectonic conditions leading to an open conduit volcano had been active also in the geological past.

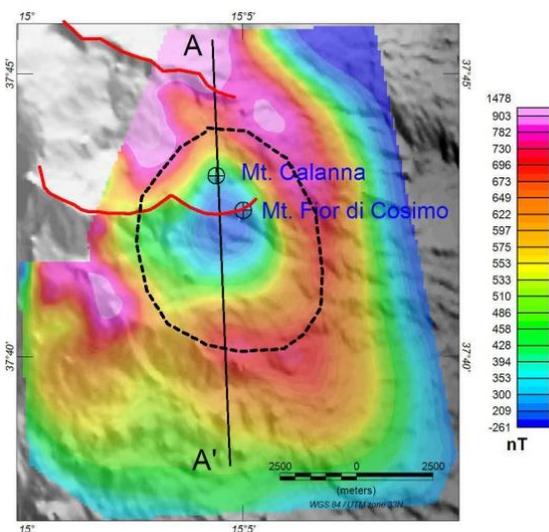


Figure 1: Intensity map of Reduced to magnetic pole Val Calanna Area anomaly. Red lines: Valle del Bove rims. Black dashed line: maximum areal

extension of the altered, non magnetic, sub volcanic body of Val Calanna area.

References:

- [1] Branca S. et al. (2011) Ital. J. Geosci. 130 (3), 306-317, doi: 10.3301/IJG.2011.13
- [2] De Beni E. et al. (2011b). Ital. J. Geosci. 130 (3), 292-305. doi: 10.3301/IJG.2011.14
- [3] D'Ajello Caracciolo F. et al. (2014) J. Volc. Geotherm. Res., 277, 36-40, doi: 10.1016/J.jvolgeores.2014.03.008
- [4] Ferlito C. and Nicotra E. (2010) Boll. Volcanol., 72, 1191-1207
- [5] Nicolosi et al. (2014) Scientific Reports. Doi: 10.1038/srep05293

