



Hydrogeological insights at Stromboli volcano and La Fossa cone (Aeolian Islands, Italy) from geoelectrical investigations coupled with CO₂ soil degassing and temperature measurements

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Finding the geometry of preferential fluid circulation in an active volcano is an important task in the purpose of evaluating the risks associated with phreatic or phreatomagmatic eruptions and possible volcano destabilization processes. Numerous profiles combining high resolution Electrical Resistivity Tomography (ERT), self-potential (SP), soil CO₂ flux and concentration and temperature measurements, covering large part of Stromboli volcano (14 profiles, 15.480 m) and the whole La Fossa cone (9 profiles, 19.000 m) of Vulcano Island, have been performed from May 2004 to October 2006. The results obtained from the different methodologies (using a maximum spacing of 20 meters) allowed to identify the main structural boundaries and associated fluid circulation structuring the shallow architecture of Stromboli volcano and La Fossa cone. The hydrothermal system has been clearly identified by very low values of the ERT and by CO₂ soil degassing, SP and temperature anomalies on both volcanoes. The results, obtained using this multidisciplinary approach for the first time through an entire volcanic edifice, reveal the very high potentiality of the adopted methodologies to determine preferential fluid flow pathways and main structural boundaries and, thus, to contribute both to structural modeling and to hazard evaluation.