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Riassunti estesi

Conferenza A. Rittmann

Nicolosi (Catania) 29 | 31 Ottobre 2014

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Ornella Cocina e Eugenio Nicotra editors



25



**Istituto Nazionale di
Geofisica e Vulcanologia**

Sezione di Catania - Osservatorio Etneo



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Factors Controlling the Transition from Strombolian Explosions to Lava Fountaining at Mount Etna: a Mass- and Energy-Constrained Model from the 2013 Paroxysmal Activity

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A multidisciplinary approach based on image analysis of seismic signals, thermodynamics and mass balance has been here adopted to find quantitative relations between magma degassing at depth and the transition from Strombolian activity to lava fountaining for a set of paroxysmal eruptions occurred at Mt. Etna volcano in March-April 2013.

The image processing of the seismogram allows handling of a huge quantity of data, providing a tool for the simple extraction of numerical values. We propose a model based on the consideration that gas outbursts are a vehicle of the transfer of energy tracked by seismic signals during the uprising of magma. Thus, the simple assumption of a relation of proportionality between the energy of the seismic signal and the mass of exsolved gas allows us to interpret transitions of the eruptive style as due to the amount of undegassed magma recharging the feeding system. Changes of this recharge rate in the range of 1:20 control the evolution of the eruptive process, and are evidence for the limited area section of the feeding conduit. Being this transition process observed in volcanic regions worldwide, the model can be successfully applied to other basaltic volcanoes. Furthermore, the image analysis technique may be applied to other contexts in which the interpretation of seismograms is necessary.