derive quantitative parameters for the transport-sedimentation behavior of dilute density currents. Failure to recognize the non-magmatic origin of this deposits, or underestimate the intensity of these eruption could result in a misinterpretation of actual hazard.

2.1-O-11

Long-Term Discharge Rate in Step Diagram For Forecasting Caldera Volcanism

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Large explosive volcanism has often been dormant longer than ten thousand years but is a potential threat to give a severe damage into modern society. Due to this hazardous reason, an adequate and systematic tool is needed to assess a volcanic hazard from future large explosive eruption. The geologic tool is a realistic approach for the assessment. Changes of style, magnitude, timing and location at past eruption play an important role to give a plausible scenario of future eruption and its hazard. Precise measurements in eruption age and volume of ejecta at a volcano or a volcanic field are essential to analyze long-term discharge rate of erupted magma and its change, drawn as “step diagram.” The discharge rate curve at an actual volcano shows diverse patterns, and the curve gradient often changes in stage of volcano evolution. Careful observations in the change of discharge rate linked with change of magma property and evolutional stage are necessary. The average of long-term discharge rate in three Japanese calderas is amount of a few km^3 (DRE)/ky. A number and amount of eruption event, magma property and a total duration of volcanism are distinct in those calderas. Nevertheless, the similarity observed in discharge rate is fruitful to discuss the process of preparation for the large explosive eruption. Duration of smaller amount of discharge rate than total rate occurs between each large explosive eruption. Such duration is in the range of ca. 15,000 years in Towada, ca. 20,000 years in the Kuttara and ca. 60,000 years in the Aira. It could correspond to the period for accumulating a sufficient amount of magma in the magma chamber. This study was performed under the sponsorship of Japan Nuclear Energy Safety Organization (JNES) Fundamental Research Project on Nuclear Safety.

2.1-O-12

Fate and Hazards of Medium-Size Resurgent Calderas: the Case of Campi Flegrei, Ischia and Pantelleria Structures

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Assessment of time and space relationships among magmatism, volcanism, and resurgence of medium-size calderas is a necessary tool to formulate a general model for their dynamics which also permits to forecast their evolution.

To define a general hypothesis for the Campi Flegrei caldera, in a persistent state of unrest, the Ischia and Pantelleria medium-size resurgent structures, in variable stages of evolution, have also been investigated. In particular some parameters such as the structural and volcanological evolution, with emphasis on resurgence dynamics and coeval volcanism, and the evolution, present state and role of the magmatic system in resurgence, have been defined. For the Campi Flegrei caldera, the data collected during unrest episodes have also been taken into account, together with those from past eruptions. They corroborate the hypothesis that the unrest episodes are transient short-term events within the long-term deformation related to caldera resurgence. The geometry of the short-term deformation is strictly related to the structural setting of the caldera. The sub-surface processes have been dominated by joint degassing of two magmatic bodies, at 3-4 and 8 (or more) km depth, with the shallower formed by magma ascending from the deeper body. Both bodies contribute to the hydrothermal system, but the shallow magma is fluxed by the continuous upstream of CO_2-richer gas released by the deep body. The two-layer degassing magma allows explaining geochemical and petrological features of unrest and volcanism.

The joined interpretation of geological, geodetic, and geochemical data on the three calderas is an innovative approach that adds a time-perspective on how resurgent calderas behave. The proposed general hypothesis will help in long- and short-term volcanic hazards assessment and will support Civil Defence Authorities in elaborating actions devoted to volcanic risk reduction.

2.1-O-13

Analysis Of The LaMEVE Database On Global Quaternary Large Magnitude Explosive Volcanism.

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A database of Quaternary large magnitude explosive eruptions ($M \geq 4$) is under development as part of the VOGRIPA project on global volcanic hazards and risk. The database currently consists of 1929 entries from 481 Quaternary volcanoes. The database can be ap-