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Social and environmental impact of volcaniclastic flows related to 472 AD eruption at Vesuvius from stratigraphic and geoarcheological data

Mauro A Di Vito (1), Sandro de Vita (1), Ilaria Rucco (1), Monica Bini (2), Giovanni Zanchetta (2), Paola Aurino (3), Mario Cesarano (3), Carlo Ebanista (4), Mauro Rosi (2), and Giovanni Ricciardi (1)

(1) Istituto Nazionale di geofisica e Vulcanologia- Osservatorio Vesuviano, Napoli, Italy (mauro.divito@ingv.it), (2) Dipartimento di Scienze della Terra, Pisa, Italy, (3) Soprintendenza Archeologia, Belle Arti e Paesaggio per l'Area Metropolitana di Napoli, Italy, (4) Univesità degli Studi del Molise, Campobasso, Italy

There is a growing number of evidences in the surrounding plain of Somma-Vesuvius volcano which indicate that along with primary volcanic processes (i.e. fallout, pyroclastic density currents) the syn-eruptive and post-eruptive volcaniclastic remobilization has severely impacted the ancient civilizations, which flourished in the area. This represents an important starting point for understanding the future hazard related to a potential (and not remote) renewal of volcanic activity of the Campaniana volcanoes. We present geoarcheological and stratigraphic data obtained from the analysis of more than 160 sections in the Campanian plain showing the widespread impact of volcaniclastic debris flows and floods originated from the rapid remobilization of the products of the AD 472 eruption of Somma-Vesuvius, both on the environment and on the human landscape. This eruption was one of the two sub-Plinian historical events of Somma Vesuvius. This event largely impacted the northern and eastern territory surrounding the volcano with deposition of a complex sequence of pyroclastic-fallout and -current deposits. These sequences were variably affected by syn- and post-eruptive mobilization both along the Somma-Vesuvius slopes and the Apennine valleys with the emplacement of thick mud- and debris-flows which strongly modified the pre-existing paleogeography of the Plain with irretrievable damages to the agricultural and urban landscape.
The multidisciplinary approach to the study of the sequences permitted to reconstruct the palaeoenvironment before the eruption and the timing of the emplacement of both pyroclastic and volcanoclastic deposits. The preexisting landscape was characterized by intense human occupation, although showing strong evidences of degradation and abandonment due to the progressive decline of the Roman Empire. The impact of volcaniclastic flows continued for decades after the eruption as highlighted in the studied sequences by stratigraphic and archaeologic data. In fact the volcanoclastic flows emplacement continued at least until the following AD 512 eruption of Somma-Vesuvius, and likely contributed to the final decline of the Roman civilization in the area.