



The Monte Nuovo eruption: the only historical event of the Campi Flegrei caldera

Mauro Antonio Di Vito (1), Ilenia Arienzo (1), Salvatore Buononato (1), Lucia Civetta (2,1), Antonio Carandente (1), Massimo D'Antonio (2,1), Valeria Di Renzo (1), and Giovanni Orsi (1)

(1) Istituto Nazionale di Geofisica e Vulcanologia – Osservatorio Vesuviano, Napoli, Italy, (2) University Federico II of Napoli, Italy

The Monte Nuovo eruption, the last event of the Campi Flegrei caldera, has been reconstructed through geological, volcanological and petrological investigations, and analyses of historical documents. The eruption, lasted one week and characterised by three vents, included three distinct phases. The main vent (MV) was located in the present crater, whereas two minor vents were along the southern (SV) and north-eastern (NEV) slopes of the Monte Nuovo tuff cone. The sequence of deposits has been subdivided in 5 members named A through E.

The eruption began on September 29, 1538, at 7 p.m., and its first and main phase, lasted until the night of September 30. This phase generated almost continuous explosions mainly phreatomagmatic, producing pyroclastic density currents (pdc's) and minor short-lived, low eruption columns, which deposited members A and B. Member A, erupted in about 12 hours through the MV, forms the largest part of the cone. Phreatomagmatic explosions at the SV produced mainly pdc's which deposited Member B only in the southern sector of Monte Nuovo. Strombolian explosions at the SV and NEV deposited Member C over a narrow area. This activity was followed by a pause lasted two days.

The eruption resumed on October 3 at 4 p.m. and lasted until the next night. This second phase of the eruption was characterized by a discontinuous sequence of low-energy phreatomagmatic and magmatic explosions at the MV, which deposited Member D.

On October 6, at 4 p.m. explosive activity resumed and lasted few hours, mainly with low-energy magmatic explosions of a small dome, grown during the preceding two days, which produced Member E. During this phase 24 people died while climbing the slopes of the newly formed cone.

The juvenile products of the Monte Nuovo eruption are phenocryst-poor rocks containing alkali feldspars and subordinate clinopyroxene and Fe-Ti oxides. They are light-coloured pumice and dark scoria fragments, and represent the most evolved magma erupted over the past 15 ka at Campi Flegrei caldera. Their slightly peralkaline, K-phonolitic bulk composition is homogeneous throughout the entire stratigraphic sequence. Variation in Sr-isotope composition of whole rock and glass during the course of the eruption is interpreted as reflecting magma mixing between two magma batches.

In volcanic hazards assessment of the Neapolitan area, the Monte Nuovo eruption is considered as the low-magnitude type event among those expected in case of renewal of volcanism. The effects of such an eruption on the densely urbanised Neapolitan area, despite the small size, will be discussed.