



## **Human colonization and volcanic activity in the Eastern Campania Plain (Italy) between Early Bronze Age and 79 AD.**

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Archaeological and volcanological studies carried out in the Neapolitan area revealed that eruptions of Neapolitan volcanoes have interacted with human life since prehistoric times. In the past 10 kyr numerous high-intensity explosive eruptions occurred and caused damages and victims in the human communities living in the plain surrounding the Neapolitan volcanoes. These catastrophic events were interspersed by hundred to thousand years long periods of quiescence, usually exceeding a human life-time.

In particular since the Early Bronze Age, the Campanian Plain was densely inhabited due to favourable climatic conditions and soil fertility. The archaeological, volcanological and rock-magnetism multidisciplinary approach to the study of the sequences in archaeological excavations has permitted to reconstruct in detail the interaction among eruptions, deposition mechanisms of their products and settlements. In this work the Nola-Palma Campania case is presented in a very interesting, though poorly known, period of activity, included between the Vesuvian Pomici di Avellino (Early Bronze Age) and Pollena (AD 472) Plinian eruptions. Through this time-span the Plain was variably inhabited, crossed by long-lived roads and subject to agricultural exploitation. Volcanic eruptions caused significant breaks in the occupation of the area, but also maintained the plain's extraordinary fertility and thus favoured its development.

During this period at least eight other eruptions occurred: the Pomici di Pompei Plinian event (AD 79), two sub-Plinian to phreato-Plinian events, and five violent Strombolian to Vulcanian events. Thin and poorly developed to thicker and mature paleosols or erosional unconformities separate the variable pyroclastic deposits.

The Pomici di Avellino eruption was dominated by two phases: plinian and phreatomagmatic, respectively. The plinian phase dispersed fallout products across the Italian peninsula in a NE direction, covering hundreds of square kilometers with pumice and ash fallout deposits, while the phreatomagmatic phase generated dilute, turbulent pyroclastic density currents. This phase impacted the plain NNW of Vesuvius, from Naples to Nola, extending up to 25 km from the volcano. Across the northeastern sector several human settlements were covered by both fallout and PDCs deposits. The first discovered settlement lies close to the town of Palma Campania near Naples, which gave its name to the culture. The most spectacular example, several large houses belonging to a village, came to light at Croce di Papa, Nola. These sites all contain the same pottery, belonging to the Palma Campania culture, which dates to a late phase of the Early Bronze Age, and are characterized by exceptional evidence of the organic materials once present, in the form of impressions in the volcanic deposits. The analysis revealed that the village was firstly affected by accumulation of thick fallout deposits which mantled the huts, after partially filled by PDCs deposits. These currents were deviated and interacted with the structures despite the distance from the vent. They were deposited at a temperature of about 250 °C.

Almost all of the following eruptions interacted with human settlements in the Campanian Plain, and the related sequences retain many traces of people displacement during the eruptions, and land reclamation and re-utilization soon after them.

The accumulation during eruptions of large amount of loose material above the relieves surrounding Vesuvius, favoured the extensive generation of lahars, hyperconcentrated debris streams and flood flows.

Despite the variable kinds of hazards posed by volcanic and related phenomena, in the Campanian Plain humans have nevertheless found good reasons for settlement and development. These multidisciplinary approach permitted to obtain detailed data on the evolution of the area and the interaction between eruptions and settlements. These data are of paramount importance in defining the past phenomena and in evaluating the hazard of eruptions and related phenomena.