

## **The Campanian Ignimbrite Eruption, Heinrich Event 4, and the Middle/Upper Palaeolithic Shift in Europe: a High- Resolution Investigation of Their Potential Interference**

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The Campanian Ignimbrite (CI) eruption (Phlegraean Fields Caldera) was the largest volcanic eruption in the Greater Mediterranean area over the past 200,000 years (at least 200 km<sup>3</sup> DRE). Ash layers correlated with CI have been found in sediments of the eastern Mediterranean Sea (Y5) and East Europe, from Italy to the former USSR. The recent dating of the CI eruption at 39,490-39,170 yr B.P. draws attention to the coincidence between this volcanic catastrophe and the suite of coeval biocultural modifications in Old World prehistory, here termed the European Late Pleistocene (ELP) shift. These included the Middle to Upper Palaeolithic cultural transition and the supposed change from Neanderthal to "modern" Homo sapiens anatomy, a subject of continuing investigation and controversy. The first results of our investigations show that: (1) at several archaeological sites of peninsular Italy, and possibly south-east Europe as well, a distinct tephra layer corresponding to the CI is regularly interbedded between the last documented Middle Palaeolithic and the earliest appearance of unquestionable Upper Palaeolithic assemblages; (2) at the same sites the CI tephra coincides with a interruption of occupation, several millennia long; (3) in the GISP2 Greenland ice-core, Lago Grande di Monticchio (LGM, southern Italy) lacustrine sequences, and KET 8003 Tyrrhenian sea-core, a large volcanogenic sulphate signal (375 ppb, at 40,062 yr B.P.) to be correlated with the CI eruption and/or CI tephra layer occurs just before a sharp climatic shift which coincides with the onset of Heinrich event 4 (HE4). The concurrence of the CI eruption, Palaeolithic site abandonment and beginning of HE4 suggests that the overlapping of CI eruption and HE4 climatic impacts induced ecosystem crisis on a fairly large scale human systems included and well beyond the direct-impact zone. Moreover, the co-occurrence of the CI eruption and onset of HE4 probably corroborates the positive climate-volcanism feedback supposed for other high magnitude eruptions (e.g. Toba about 74 Ka).

Without obviously claiming for the CI an overall evolutionary relevance within the ELP shift, on the available data we nevertheless suggest that it deserves careful consideration as a contributing factor to the regional expression or re-orientation of cultural and population change. Furthermore, the position of CI in continental and marine successions throughout the Mediterranean and in Greenland ice-cores can be used as a tool for the correlation and precise chronological calibration of several paleoclimatic records and events (e.g. GRIP and GISP2 ice-cores, LGM, age of both HE4 and the  $^{10}\text{Be}$  peak). The identification of CI in these records allows an examination of both climatic conditions and regional cultural configurations immediately before the CI eruption; this in turn will provide substantial data for modelling the climatic impact of this catastrophic eruption within the framework of a human-ecosystem model.