

# The Avellino event: did a major volcanic eruption lead to mass migration in the Pontine Plain and Fondi basin during the Bronze Age?

Alessandri, L.<sup>1</sup>, Attema, P.A.J.<sup>1</sup>, Doorenbosch, M.<sup>2</sup>, Field, M.H.<sup>2</sup>, Sevink, J.<sup>3</sup>, Van Gorp, W.<sup>1</sup>, Van Leusen, M.<sup>1</sup>

<sup>1</sup> Groningen Institute of Archaeology, <sup>2</sup> Faculty of Archaeology, University of Leiden, <sup>3</sup> Institute for Biodiversity and Ecosystem Dynamics (IBED), University of Amsterdam

Contact information: M. Doorenbosch m.doorenbosch@arch.leidenuniv.nl tel +31715276473



university of  
groningen



Session: TH1-04

22nd Annual Meeting of the EAA

31st August-4th September 2016 Vilnius



During the Early Bronze Age, a giant eruption of Mount Vesuvius (Italy) buried a flourishing landscape of villages and fields in the plains to the north and east of the volcano under more than a meter of Tephra. Inhabitants of the closest sites such as Nola ('the Bronze Age Pompeii') could barely escape with their lives. Italian archaeological research since the 1980s has conclusively shown that the population of the Campanian plain did not fully recover for several centuries after this so-called 'Avellino Event'. Given the topography of central-southern Italy, the most likely refuge area will have been to the north, in the wetland coastal plains of Latium Vetus: the Fondi basin and the Pontine Plain. In these areas, long-standing Dutch research programs have recently been able to find the Avellino volcanic tephra layer, which can be used as a chronological marker. This means that archaeological and palaeoecological observations of the necessary high chronological resolution and quality can be made to identify changes occurring immediately after the eruption. A joint research program between Groningen and Leiden universities, in collaboration with Italian geologists and archaeologists, aims to demonstrate and document any significant impacts that would result from the presence of the postulated Early Bronze Age refugee population in South

Lazio. Because we feel that only the combination of different data can provide reliable answers, a careful design strategy has been built. This includes a detailed landscape and environmental reconstruction, by means of physical geographical and palaeoecological cores, an archaeological investigation of the differences and similarities in ceramic typology between *Latium Vetus* and Campania, petrographic and isotope analysis.



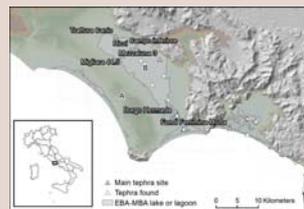
Central Italy, with hypothetical route taken by the Early Bronze Age refugee population.

The AV-tephra embedded in peat

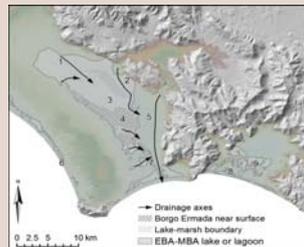


## Physical geography

Different Holocene depositional units in the Agro pontino contain the AV tephra, indicating the diversity of the environment during tephra deposition. The tephra has been encountered in peats, anaerobic clays, calcareous muds and levee clays. Our most recent studies revealed that both in the Agro Pontino and in the Fondi basin, a double tephra layer may be encountered. This generates the opportunity for future detailed palaeo-environmental reconstructions, using tephra layers as stratigraphic markers. Apart from these double tephra layers, tephra mineralogy shows a high similarity throughout the basin. However its elevation differs between the central Agro Pontino graben on the one hand and the southeastern gullies and Fondi system on the other hand. In the central Graben, the AV-tephra has been consistently found at a level of 2-3 m asl. Southeast of the near-surface Eemian marine deposits (Borgo Ermada formation), the coastal gullies contain the AV-tephra at depths around 2 m below sea level. It is hypothesized that the base level of the central lake was controlled by its outlet into the Amaseno River and not by sea level, whereas the southwestern gullies were connected to contemporary sea level. Because tephra preservation mostly occurs in environments without settlements, finding archaeology and Tephra in association proved difficult. Northern fluvial levee sites are promising for excavation.



Main Tephra finds in the AP and Fondi basin. A: Pleistocene marine terrace and beach ridges. B: Holocene lake and lagoon. C: Fondi basin. Main tephra sites indicated.



Sedimentary units in the Agro Pontino. 1: Fluviodeltaic plain. 2: Aerobic lake / peat marsh. 3: Anaerobic lake. 4: shallow Pleistocene subsurface. 5: Young Amaseno deposits. 6: Coastal lagoons. 7: infilled tributary streams. 8: Fondi coastal lagoons. 9: Fondi dissected streams

AV-tephra in different sedimentary settings: a: Migliara 44.5, b: Campo Inferiore, c: Mezzaluna d: Ricci, e: Tratturo Caniò, f: Borgo Ermada. Arrows indicate location of Tephra layer



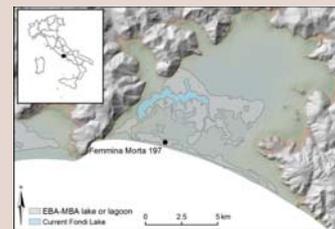
## Palaeoecology



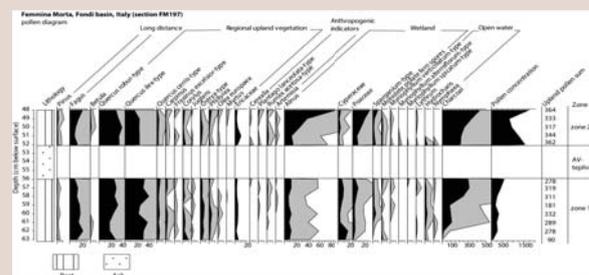
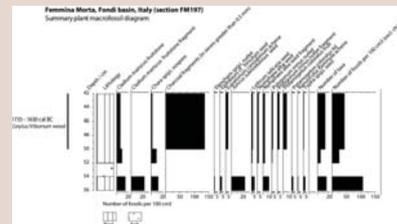
FM before the ash deposition? A swamp dominated by *Cladium mariscus*



After: *Eupatorium cannabinum*



Double ash-layer at Femmina Morta.



The first results of Femmina Morta, a site in the Fondi basin with a double tephra layer, show that the tephra fallout has affected the local vegetation, the regional vegetation seems unaffected. Human activity influenced the landscape. This started before the AV eruption. These (preliminary) results show no effect of a possible increase in population after the Avellino eruption of the Vesuvius.



## Archaeology

In February 2014, a team of speleologists discovered the entrance of La Sassa Cave, in the municipality of Sonnino. In the inner portion of the cave (room 3, 4), large quantity of impasto sherds and animal bones were found, together with few human bones. The potsherds can be dated to the Middle Bronze Age, sub-phase 2 (around 1550-1400 BCE). In a small lateral branch (room 2) a human femur was found just on the surface. The femur was radiocarbon dated at 4000±35 (GrA-64828, 2619-2462 calBC, IntCal13, 95.4%, OxCal 4.2), in the Copper Age. An excavation in July 2016 led to the discover of a large quantity of human bones in room 2 (MNI: 4). The bones were out of their anatomical connection and no grave gifts have been found yet. In room 1, hundreds of Middle Bronze Age ceramic sherds were collected, unfortunately in already disturbed contexts, together with few human bones (MNI:1). At the moment, the funerary use is certain only for the Copper Age. In the Bronze Age, only cultic activities took place in the cave. The excavation is carried out in collaboration with the University of Tor Vergata (prof. Mario Federico Rolfo).



Map of La Sassa cave (Sonnino)



Middle Bronze Age ceramic sherd from room 1



A cluster of human bones in room 2

## Future research

Landscape reconstruction: further reconstruction of the EBA delta, lake and lagoon will be carried out; tephra distribution, granulometry and provenance in the Agro Pontino and Fondi basin will be investigated; basinwide tephra geochemistry of different tephra layers. More detailed palaeobotanical analysis and dating of the Femmina Morta core (including both tephra-layers) will take place. Other sites, both in the Fondi Basin and the Agro Prontino, will be investigated.

More archaeological excavations are planned in Ancient Bronze Age settlements in the Pontine Plain, to check the presence of imported ceramics or style influences from Campania. Besides, a second excavation campaign is planned at La Sassa cave, either to collect all the human bones and to check the presence of AV ashes in the contexts. Sr analysis on skeletal remains are planned to establish good local Sr ratio signatures. The results will also be checked against the Campanian signatures, trying to find direct proof of the presence of immigrants.