



## **Modeling the spatial distribution of AD 79 pumice and surge deposits of Somma-Vesuvius within the Sarno River plain (Campania, Italy)**

Sebastian Vogel and Michael Märker

Heidelberg Academy of Sciences and Humanities c/o University of Tübingen, Rümelinstraße 19-23, D-72070 Tübingen, Germany

The explosive eruption of Somma-Vesuvius AD 79 that destroyed the ancient settlements of Pompeii and Herculaneum caused a caesura in the existence of an entire landscape. This is because the Sarno River plain was almost completely covered with pumice lapilli fallout and pyroclastic surge deposits that reach an approximate volume of  $3.6 \text{ km}^3$  of dense rock equivalent (Sigurdsson et al., 1985). To better understand the impact on the ancient Sarno River plain and the geomorphogenetic processes that took place during and after the eruption AD 79 a methodology is presented to model the spatial distribution of both the AD 79 pumice fallout and pyroclastic surge deposits. It takes into consideration the initial deposition of the volcanic material during the eruption as well as its subsequent remobilization and redistribution by processes of erosion, transport and accumulation. We hypothesize that the paleo-topography before AD 79 essentially controlled initial volcanic deposition and subsequent redistribution of the AD 79 pyroclastic material. Consequently, the applied methodology is based on a reconstructed high resolution pre-AD 79 digital elevation model (DEM) of the Sarno River plain, stratigraphical data of more than 1,200 core drillings and a classification and regression tree approach. The results show different spatial distribution patterns for both the AD 79 pumice fallout and the pyroclastic surges.

Keywords: Somma-Vesuvius, AD 79, pumice fallout, pyroclastic surge, stratigraphical drillings, classification and regression trees