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Ground Surge and Pyroclastic flow deposits of the 79 A.D. Vesuvius eruption: new field and laboratory data on the fine and ultra-fine ash

Daniele Morgavi ¹; Mauro A. Di Vito ²; Arianna Francioni ¹; Antonio Costa ³; Stefano Giovagnoli ⁴; Diego Perugini ¹

¹Dept. of Physics and Geology, Uni. of Perugia, Pg, IT

²Istituto Nazionale di Geofisica e Vulcanologia, Via Diocleziano 328, Napoli, IT.

³Istituto Nazionale di Geofisica e Vulcanologia, Via Donato Creti 12, Bologna, IT

⁴Dipt. di Scienze Farmaceutiche, Uni. of Perugia via del Liceo 1, Pg, IT

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The Pompeii eruption is particularly famous in the eruptive history of the Mt. Somma-Vesuvius due to the deadly destruction of many urbanised area such Pompeii, Herculaneum, Stabiae and the partially demolition of towns like Misenum, Neapolis, Surrentum, Nuceria and Salernum. The eruption probably started in the early morning of the 24th of October 79 A.D. with the development of a high column and the consequent accumulation of several pumice layers up to 2.8 meters in total in the southeast section of the volcano. With the column collapse, several pyroclastic flows reached the cities of Pompeii and Herculaneum. This work is focused on the stratigraphic succession of Villa Regina, an ancient Roman villa located in the town of Boscoreale, about one and a half km north of Pompeii. We divided the volcanic sequences into air fall deposits, ground surges and pyroclastic flows. The air-fall pumice accumulation was interrupted three times by ground surge activity. On the top of the fall deposits are present a series of massive fine grained pyroclastic flow predominantly of fine ash less than 4 mm with a total thickness of more then 3 meters. The last meter is composed of a well-bedded fine-grained ash layer rich in accretionary lapilli. Our investigation, concentrate on sheading a new light on the morphology, dimensions, and grain-size distribution of the fine and ultra-fine (< 37 micron) ash that composes the ground surge, pyroclastic flows and accretionary lapilli via Scanning electron microscope (SEM), manually and laser grain size analyses.