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Mafic ash emission activity at Vesuvius

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An important activity of ash emission characterized by the fine fragmentation of tephri-phonolitic magma has been recently described at Vesuvius. This type of activity has been overlooked in the past, even if it can pose significant problems for emergency planning and hazard assessment.

Several eruptions of this type have occurred after the Avellino plinian eruption (3700 BP). The deposits of these events are mainly formed by thick sequences of thinly laminated coarse and fine ash, interlayered with minor lapilli beds, suggesting an activity characterized by periods of continuous ash emission alternated with episodes of violent strombolian activity. The sedimentological, compositional and textural features of these ash deposits suggest that both magmatic and phreatomagmatic fragmentation were alternatively involved in the eruptions, posing important questions on the main parameters which control this type of activity.

We present the results of a study carried out on the products of two eruptions: 1) the AP3 eruption, an event occurred between the two Plinian eruptions of the 3700 BP Avellino and the AD 79 Pompeii Pumice, characterized by evidence of magma-water interaction; 2) a minor Middle Age event (AS1a), occurred immediately after the 512 AD subplinian eruption and characterized by deposits with "dry" sedimentological features and clear evidence of magma-driven fragmentation. The study includes a descriptive and quantitative analysis of the clast morphology, elaborated through Principal Component Analysis and Cluster analysis, aimed at defining the fragmentation mechanism and the transport and depositional features, while reconstruction of the Crystal Size Distribution (CSD) and Vesicles Size Distribution (VSD) of the ground-

mass of juvenile fragments allowed to draw inferences about timing and dynamics of magma ascent and degassing.