



Reconstruction and analysis of the fallout deposit from the 1906 Vesuvius eruption: hazard implication for a violent Strombolian scenario

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After the 1631 AD sub-Plinian eruption, the Vesuvius activity was persistent, producing several violent Strombolian eruptions, such as those of 1660, 1707, 1767, 1771, 1794, 1822, 1906 and 1944 eruptions. The April 1906 eruption was the most energetic event of the last century and it significantly affected the north-eastern sector of the volcano up to a distance of several tens of km. As most of the violent Strombolian eruptions at Vesuvius, the main phases of this eruption were: i) lava effusion, ii) lava fountains, iii) gas-pyroclasts column, and iv) strong ash emission. Lahars were typically generated in post-eruptive phases. The 1906 eruption reached the climax during 7-8 April forming a column up to 11 km a.s.l. The 1906 Vesuvius fallout phase, from 7 to 8 April, was studied by using the 3D ash-fallout model FALL3D which is based on the numerical solution of an advection-diffusion-sedimentation equation. The input data of the model are wind profiles, total eruption mass, eruption column height, and bulk grain-size distribution. Wind data were obtained from historical chronicles and records from the local meteorological stations. The input parameters needed by the model were estimated through a best-fit between model simulation and field data. Nowadays, a sub-Plinian eruption (e.g., 472 AD, 1631 AD eruptions), even if less severe than that of 1906, could cause a significant damage due to tephra fallout on a densely inhabited area. The evaluation of hazard related to this scenario, regarded as the most probable at Vesuvius, may give a further contribution to the risk mitigation in the area.