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## Volcanic spreading at Mt.Vesuvius: a new model for the assessment of volcanic hazard

**A. Borgia** (1), P. Tizzani (2), G. Solaro (2), G.P Ricciardi (2), F. Casu (3), M. Manzo (3), N. Fusi (4), G. Luongo (5), R. Lanari (3)

(1) EDRA, Rome, Italy, (2) Osservatorio Vesuviano, INGV, Naples, Italy, (3) IREA, CNR, Naples, Italy, (4) University of Milan Bicocca, Milan, Italy (5) University of Naples Federico II, Naples, Italy (andrea@borgia.net)

Vesuvius is one of the world's most studied volcanoes, because of its long historic record. However, no work has investigated the thesis that the load of Vesuvius onto its weak sedimentary substratum could induce gravitational spreading, a fact that is fundamental for assessing volcanic hazard. The spreading process generates volcano summit extension and basal compression; moreover, by varying the stress field on the substratum, volcanic spreading also appears to infuence the style of eruptions and the chemistry of the erupted products. We integrate geologic, structural, leveling and Differential SAR Interferometry data to show that Vesuvius began to spread onto its sedimentary substratum about 3,600 years ago. Moreover, we model the detected deformation with a solution of the lubrication approximation of the Navier-Stokes equations to show that spreading may continue for about 7,200 years more. Correlation of volcanic spreading with phases of the eruptive activity suggests that Plinian eruptions, which are thought to pose the major hazard, are less likely to occur in the near future.