



Time spans of soil formation and late Pleistocene-Holocene climate changes in the Somma-Vesuvius volcano area, southern Italy

Fabio Scarciglia (1), Veronica Zumpano (2), Roberto Sulpizio (3), Fabio Terribile (4), Iolanda Pulice (5), and Mauro F. La Russa (1)

(1) Università della Calabria, Dipartimento di Biologia, Ecologia e Scienze della Terra (DiBEST), Arcavacata di Rende (CS), Italy (scarciglia@unical.it, Fax no. 0039 (0)964 493601), (2) Institute of Geography, Romanian Academy, 12 Dimitrie Racovita St., Sector 2, 70307 Bucharest, Romania, (3) Dipartimento Geomineralogico, Università degli Studi di Bari, Via E. Orabona 4, 70125 Bari, Italy, (4) Dipartimento di Scienze del Suolo, della Pianta, dell'Ambiente e delle Produzioni Animali (DISSPAPA), Università degli Studi di Napoli "Federico II", Via Università 100, 80055 Portici (NA), Italy, (5) Istituto di Metodologie per l'Analisi Ambientale, Consiglio Nazionale delle Ricerche (CNR-IMAA), C.da S. Loja, Zona Industriale, 85050, Tito Scalo (PZ), Italy

Time spans of soil formation and climate changes occurred during the late Pleistocene to the middle Holocene are investigated in a pedostratigraphic succession located in the piedmont of the Somma-Vesuvius volcano (Campania region, southern Italy) using a multidisciplinary approach. We focused on five well-known and well-dated primary tephra and four interlayered volcanic soils developed on and/or buried by them. The pyroclastic layers give detailed chronological constraints to the stratigraphy. From bottom to top the following tephra were identified in the field: Pomice di Base (22 ka BP), Pomice Verdoline (19 ka BP), Agnano Pomice Principali (12.26 ka BP), Mercato (8.9 ka BP) and Avellino (3.9 ka BP), all of them representing volcanic products of explosive eruptions of the Somma-Vesuvius, except the third one, sourced from the westerly Phleorean Fields. The four pedons were characterized in terms of morphological, physical, chemical, mineralogical and micromorphological features. Special attention was given to reconstruct the main soil-forming processes, paleoenvironmental and paleoclimatic conditions, degree of soil development and associated time ranges. Moreover, further tephra were identified in the field within some of above pedons. One of them was easily recognized and referred to the Agnano Monte Spina eruption (4.2-4.3 ka BP, Phleorean Fields provenance), whereas the others were not previously known in the Somma-Vesuvius stratigraphy. On the basis of SEM-EDS analyses (chemical composition and morphoscopic observations), coupled with their stratigraphic position and literature compositional databases, they were related to the Soccavo 4-5 and the Tufi Biancastri eruptions from the Phleorean Fields. This interpretation permitted to fix further age constraints for more detailed assessment of rates of soil formation and climatic interpretation. Major late Quaternary climatic phases are suggested by changes in the extent of development of andic properties, iron-oxide staining, silt-clay translocation, carbonate accumulation and soil microstructure, which are consistent with climate shifts since the upper Last Glacial Maximum to the Lateglacial and the early-middle Holocene climatic optimum.