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Micromorphology as a tool to unravel the origin of Andosols in the Seaca-TăMountains, Romania

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The Seaca-Tătarca volcano erupted 7.3-6.2 Ma ago as result of a simultaneous volcanic activity in the South-Gurghiu Mountains (Seghedi et al., 2004). The purpose of this research was to characterise and interpret the properties of Andosols that occur today in this area.

Seven soil profiles situated along a topo-climosequence on the western slope of the volcano have been sampled and studied in detail. The microscopic study of these, macromorphologically, relatively homogenous profiles permitted to detect two types of parent material.

There is a *recent material* characterised by a fine granular or subangular blocky microstructure with a fine granular intrapedal microstructure; a colour of the groundmass that is dark brown to brown; the b-fabric is distinctly undifferentiated, which presumes, that it does not contain crystalline components. The second material appears to be a remnant of past weathering cycles. This *relict material* has a stipple-speckled b fabric, which suggests that the groundmass is composed of randomly arranged domains of oriented clay (Stoops, 2003). It has mainly a subangular blocky microstructure; the colour of the groundmass is yellowish, it contains strongly weathered saprolite-like rock fragments and it is rich in typic disorthic nodules of iron oxides and hydroxides.

The uniformity of the surface horizon characteristics, composed of recent materials, indicates that the rejuvenation of the old volcanic landscape is probably at least partly caused by windblown input of dust or loess originating from frost-shattered volcanic

materials. The source area was most probably the pumice-rich reworked counterpart of the Fâncel-Lăpuşna caldera, situated less then ∼10 km from the Seaca-Tătarca.

The relict soil material occurs in two forms within the climo-toposequence: (1) in situ, as a buried horizon and (2) as a mixture with other, more recent constituents. Latter material is the main solum composing material in the lower members of the climo-toposequence. Characteristics such as reworked papules of crystalline clays and secondary iron oxides and hydroxides, oriented fine material coatings around coarse mineral and organic grains are indicative of at least some transport. In order to explain the mode of superimposition of soil parent materials, two main hypotheses were examined: (1) mudflow and (2) glacial mode of deposition. The mudflow option could not be maintained as locally the superimposed material was found in top slope positions. It is concluded that glacial erosion, transport and deposition can explain the spatial distribution of the parent materials of the studied Andosols. If the hypothesis of glacial rejuvenation of the Andosol area is accepted, then the extension of glaciated areas during the Last Glaciation could have been larger than what is concluded from the geomorphological studies of the Carpathians.

References

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