



## **Organic matter in volcanic ash soils under forest and paramo along an Ecuadorian altitudinal transect**

Femke H. Tonneijck, Klaas G.J. Nierop, Jacobus M. Verstraten

Institute for Biodiversity and Ecosystem Dynamics (IBED)-Earth Surface Processes and Materials (ESPM), Universiteit van Amsterdam, Nieuwe Achtergracht 166, 1018 WV Amsterdam, The Netherlands.

Contact information: f.h.tonneijck@uva.nl / Fax: +31 20 5257431 / Phone: +31 20 5257450

Volcanic ash soils along an altitudinal transect intersecting the upper forest line in Guandera Biological Station in Northern Ecuador accumulate vast amounts of carbon which is typical of this soil type. Generally, soils currently covered by forest have fulvic properties while those under páramo (tropical alpine grasslands) develop melanic properties. This vegetation effect on soil formation is believed to be associated with differences in organic matter composition. However, the organic matter present in the mineral soils bears hardly any chemical resemblance to the current vegetation or its litter, not even when soils supposedly were covered by forest and páramo for millennia. Soil organic matter was characterised by a strong degradation of the ligno-cellulose complex and a large accumulation of aliphatic components. The accumulation of aliphatic moieties coincides with an excellent preservation of the solvent extractable *n*-alkanes and *n*-alcohols. This preservation was evidenced by large carbon preference indexes (CPI's) and, consequently, a typical plant-derived signature. Although well-preserved, the *n*-alkanes underwent  $\beta$ -oxidation yielding *n*-methyl ketones in a somewhat different distribution. From top to bottom of the profile, and therefore with time, the composition and (microbial) degradation of the lipids were in the same order of magnitude implying their significant value as biomarkers.