



## **Subsoil C dynamics in tropical soils under different crop management on Jawa, Indonesia**

Erwin Prastowo (1), Pieter Grootes (1,2), and Marie Nadeau (2)

(1) Institute for Ecosystem Research, Christian-Albrechts University, Kiel, Germany (eprastowo@ecology.uni-kiel.de), (2) Department of Archaeometry, Museum of Natural History and Archaeology, Norwegian University of Science and Technology, Trondheim, Norway (marie.nadeau@ntnu.no)

Organic carbon (OC) in the subsoil is a key in anthropogenic CO<sub>2</sub> discussions considering its relation to the potential of carbon stabilization and sequestration in soils. In the frame of the DFG Research Unit FOR995, “Biogeochemistry of paddy soil evolution” we studied subsoil organic carbon dynamics down to ca. 1 m depth, using the natural <sup>13</sup>C and <sup>14</sup>C signal together with total organic carbon (TOC) measurements, in three different tropical soil types with paired paddy and non-paddy sites on Jawa, Indonesia. Soil types consisted of Andosols, Alisols, and Vertisols. The sites have different climatic conditions, soil processes, and hydrology. Organic (roots, seeds, leaves) and mineral remains (concretions) were collected on a 0.37 mm sieve by wet-sieving. Acid-alkali-acid treatments were employed to separate alkali-soluble humic acids, and insoluble humin fractions.

Generally, OC distribution patterns highly correspond with abundant plant remains. OC values range from 0.30 to 3.69% in the Andosol, 0.50 to 2.24% in the Alisol, and 0.20 to 0.90% in the Vertisol. Typically, OC values decrease along the depth with a concentration gap at ca. 0.15 to 0.30 m and at ca. 0.75 to 1 m. The extent of this gap is following the order Andosol>Alisol>Vertisol, implying less transported/accumulated OC in the upper layer (0.15 to 0.30 m) of Andosol than in the other two. C/N ratio has been always higher at the upper layer than at lower layers of subsoil, which indicates more stable OC at the deeper profile. In addition, the irregularity of OC distribution is high in Andosol, as expressed by coefficient of variation (CV) of ca. 80%. Conversely, CV values in Alisol and Vertisol are lower at ca. 39 and 40%. OC values were higher under non-paddy management than paddy management except for upper ca. 0.25 m of Andosol.

The organic carbon concentration in the subsoil relates to existing plant remains (seeds, roots, leaves) in particular layers. The extent of their dynamics much depends on soil processes which vary in different soil types.