Geophysical Research Abstracts
Vol. 19, EGU2017-2432, 2017
EGU General Assembly 2017

Compositon of sediments transported by the wind at different heights

Antonela Iturri (1), Roger Funk (2), Martin Leue (2), Michael Sommer (2), and Daniel Buschiazzo (1)

(1) Institute for Earth and Environmental Sciences of La Pampa, National Council for Research and Technology (INCITAP, CONICET-UNLPam), cc 186, 6300, Santa Rosa, Argentina (antonelaiturri@conicet.gov.ar), (2) Institute of Soil Landscape Research, Leibniz Centre for Agricultural Landscape Research (ZALF), 15374, Müncheberg, Germany.

Wind erosion (WE) is one of the most important degradation process of soils in arid- and semiarid environments in the world, affecting soil properties and adjacent ecosystems, including human health. Estimations about the amount of eroded soil are available in Argentina and in the world, but the quality of the eroded sediments, particularly the sorting effects in agricultural soils, has been scarcely studied. The trend of the different mineral and organic soil compounds, which enrich in different size classes, can define height distribution profiles. Therefore, the uppermost 2.5 cm of four agricultural loess soils that differ in granulometric composition were used for WE simulations in a wind tunnel. Particles with a diameter smaller than 10 μm (PM10) were collected with a laboratory dust generator. The bulk soil and all the sediment samples were characterized by the granulometric composition, the soil organic carbon (SOC) content and the mineral and organic functional groups. Despite different texture, the soils were subjected to similar sorting processes in height, but differed depending on their granulometry. There was a separation between coarser and finer soil particles in coarser textured soils, while finer textured soils were more homogeneous in all heights. This correlated with the preferential transport of Si-O from quartz and C-H, C=O and C-C from soil organic matter (SOM), which were transported in larger and/or denser particles at lower heights. O-H from clay minerals and C-O-C and C-O from polysaccharides, carbohydrates and derivatives from SOM were transported in higher heights. Despite similar SOC content in the bulk soils, both the amount and composition in the PM10 fractions was different. The SOC transported at higher heights was mostly composed of polysaccharides, carbohydrates and derivatives associated with clay minerals. The SOC in PM10 fractions of coarser-textured soils was dominated by labile C-H groups. According to the determined height distribution profiles, it can be deduced that WE may affect both soil quality and the soil C balance due to the sorting effects during transport.