Geophysical Research Abstracts
Vol. 12, EGU2010-2841-1, 2010
EGU General Assembly 2010

The interrill erosion of organic matter from sandy Shropshire soils

Elizabeth Armstrong (1) and Nikolaus Kuhn (2)

(1) Department of Environmental Sciences, University of Basel Switzerland , (2) Department of Environmental Sciences, University of Basel Switzerland

Global soils contain an estimated 1500GT of carbon, over twice that present in the atmosphere (IPCC). However the role of soils in the global carbon cycle is highly debated. Soil erosion redistributes OM over the landscape. This can occur at a range of scales from mass movement to interrill erosion. It has been well documented that interrill erosion occurring on clay rich stable soils causes sediment to become enriched in OM up to values of 6.2 (Mora et al 2007). However investigation on sandy soils with a lower tendency for aggregation is limited. Thus this investigation aimed to determine if OM erosion from sandy soils occurs in a similar fashion as from stable soils. Soil from both organic and conventionally farmed land from Shropshire UK were exposed to three simulated rainfall scenarios differing in intensity and kinetic energy at the sediment research facility university of Exeter. Eroded sediment was collected over periods of two to three hours. Using fractionation and loss on ignition the OM content of eroded sediment was calculated. Unlike the common belief that selective erosion will lead to sediment enrichment in OM it was found that this did not always occur. Only under low intensity low kinetic energy rainfall on soil from conventionally farmed land was enrichment found (1.46). Other scenarios showed little change in the OM content of sediment compared to bulk soil, or showed depletion (0.79, 0.81). It was evident that the temporal rate of erosion under the rainfall scenarios coupled with the subsequent formation of a soil crust developed along a continuum. It is this continuum that has been used to explain the differences in sediment OM enrichment values on the two soils under the different rainfall scenarios. Furthermore it is suggested that it is the difference in the development of this continuum (and thus cohesive soil crusts) on sandy soils and stable clay rich soils that will lead to the reported OM enrichment of clay rich stable soils in the literature that was less evident on the sandy soils used during this investigation.