Geophysical Research Abstracts
Vol. 15, EGU2013-12723, 2013
EGU General Assembly 2013

Experimental investigation on the preferential erosion of biochar

Wolfgang Fister (1), Goswin Heckrath (2), Philip Greenwood (1), and Nikolaus J. Kuhn (1)

(1) University of Basel, Physical Geography and Environmental Change, Basel, Switzerland (wolfgang.fister@unibas.ch), (2) Aarhus University, Department of Agroecology, Aarhus, Denmark

The influence and effect of biochar on soil properties has been intensively investigated, particularly in the context of its potential to sequester carbon and mitigate the effects of anthropogenic climate change. One major question that remains unanswered concerns the erodibility and fate of biochar in the landscape. Since biochar has a lower bulk-density than soil, preferential erosion of biochar is most likely. However, until now, almost no actual data on the enrichment of biochar in in the eroded sediment or the net loss from fields exist. This important gap of knowledge could have profound economic implications for farmers committed to its use, since a high net annual loss of biochar by erosion could exceed any net annual economic gain. Most importantly, any positive gain for the environment largely depends on the amount of biochar that remains within the upper soil matrix. The overall objective of this study was to explicitly investigate the erodibility of biochar, if erosion events occur directly or soon after its application. I this way, the financial value of the eroded biochar and its cost-effectiveness, if applied to whole field scales, could be estimated.

The test site is located near Viborg in north Jutland, Denmark. Biochar was applied to the soil surface of three plots on a recently cultivated sandy field at concentrations equivalent to 1.5-2.0 kg m-2 and manually incorporated within the till-zone. Three consecutive 30 min. erosion simulations were conducted on each plot using the 2.2 m-2 Portable Wind and Rainfall Simulator. The preliminary results of this study showed that a fair amount of biochar can be eroded from the fields within the first rainfall events after biochar application to the soil. In order to provide guidelines for its application and post-application management to reduce the erodibility and net discharge of biochar from fields, further investigations are needed.