EGU2020-2376
https://doi.org/10.5194/egusphere-egu2020-2376
EGU General Assembly 2020

Spatial distribution of soil organic carbon may be predominantly regulated by topography in a small revegetated watershed

Tonggang Zha[1], Haiyan Yu[2], Xiaoxia Zhang[1], and Yang yu[3]
[1]School of soil and water conservation, Beijing Forestry University, Beijing 100083, China. (zhtg73@bjfu.edu.cn)
[2]College of Environmental Science and Engineering, Tongji University, Shanghai 200092, China
[3]Department of Sedement Research, China Institute of Water Resources and Hydropower Research, Beijing 100038, China. (theodoreyy@gmail.com)

Understanding the spatial distribution and controlling factors of soil organic carbon (SOC) at different scales is essential for an accurate estimation of soil organic carbon stocks. Furthermore, this understanding is vital for evaluating the impact of soil management on both soil quality and climate change. This study was conducted in a Loess revegetated small watershed and the effects of the topography and vegetation factors on the content and distribution of SOC at different soil depths were evaluated. Soil profiles (0-200 cm; n = 122) were sampled that represent six vegetation types (i.e., natural mixed forests, artificial mixed forests, artificial forests with a single tree species, shrubbery, and grassland) and four topographic factors (i.e., elevation, slope gradient, slope position, and slope aspect). The following results were obtained: (1) The mean SOC of the 200 cm soil profile ranged from 2.34 g kg-1 to 5.70 g kg-1, decreasing with increasing soil depth. (2) The interactions between vegetation type and topography and soil depth significantly impacted SOC ($P < 0.05$). Significant differences in the SOC content ($P < 0.05$) were also found for slope gradient, slope position, slope aspect, and elevation for 0-200cm, 0-160cm, 0-120 cm and 0-200 cm, respectively. (3) The relative contribution of topographic factors to the SOC content exceeded that of vegetation type in entire soil profile. Topography was the dominant factor controlling the spatial distribution of SOC in the studied small watershed. Therefore, topographic factors should be considered more than vegetation types for an accurate estimation of SOC storage in a revegetated small watershed. This is particularly important for the complicated topography of the loess-gully region.