EGU21-762
https://doi.org/10.5194/egusphere-egu21-762
EGU General Assembly 2021

Soil carbon persistence governed by plant input and mineral protection at the regional and global scales

Leiyi Chen, Kai Fang, Bin Wei, Shuqi Qin, Xuehui Feng, Tianyu Hu, Chengjun Ji, and Yuanhe Yang
Institute of Botany, the Chinese Academic of Sciences, Beijing, China (chenly@ibcas.ac.cn)

Elucidating the processes underlying the persistence of soil organic matter (SOM) is a prerequisite for accurately projecting soil carbon feedback to climate change. However, the potential role of plant carbon input in regulating the SOM preservation over broad geographic scales remains unclear. Based on large-scale soil radiocarbon($\Delta^{14}C$) measurements from the Tibetan Plateau and International Soil Radiocarbon Database (ISRaD), we found that plant carbon input was the major contributor to topsoil carbon destabilization at the regional and global scales, despite the universal associations of topsoil $\Delta^{14}C$ with climatic and mineral variables as well as SOM chemical composition. By contrast, mineral protection by iron-aluminum oxides and cations became more important in preserving SOM in deep soils. These findings illustrate divergent controls of SOM persistence across soil layers, which provide new insights for constraining models to better predict multi-layer soil carbon dynamics under changing environments.