Factors affecting soil ecological stoichiometry in ecologically fragile areas of China

October 12 2022, by Li Yuan

Qinghai-Tibet Plateau. Credit: sylvannus/Wikimedia Commons, CC BY-SA

Ecological stoichiometry plays an important role in revealing the

mechanism of biogeochemical cycle and its relationship with the structure, function, and process of ecosystems.

Soil is the foundation of terrestrial ecosystem, and soil ecological stoichiometry can promote an in-depth understanding of nutrient cycling, ecosystem dynamics, and biogeochemical cycle mechanisms.

Recently, researchers from the Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences (CAS) revealed the spatial pattern and its driving mechanisms of soil organic carbon (C), total nitrogen (N), and total phosphorus (P) stoichiometry along environmental gradients that covered a total length of about 4,300 km in typical ecologically fragile areas of China.

Related results were published in *CATENA* on Sept. 15.

The researchers found that C and N concentrations at 0 to 20 cm were significantly higher than that at 20 to 30 cm, but P did not differ significantly among depths. Soil C:N:P in the ecologically fragile areas was 51:4:1 to a depth of 30 cm, which was lower than the average global C:N:P (111:8:1).

C, N, and P in the ecologically fragile areas showed strong coupling relationships. The spatial pattern of C, N, and P stoichiometry along environmental gradients was variable.

Besides, the study also revealed that the contributions to explaining the soil stoichiometry was highest for climate (21.7%), followed by vegetation (8.9%), soil properties (6.4%), and topography (0.6%) to a depth of 20 cm, versus vegetation (35.9%), climate (5.3%), soil properties (3.3%), and topography (2.1%) at 20 to 30 cm.

The results provide new insights into the biogeochemical cycles of C, N,

and P as well as guidance for their impacts on ecological restoration in ecologically fragile areas.

More information: Yun Chen et al, Patterns and driving factors of soil ecological stoichiometry in typical ecologically fragile areas of China, *CATENA* (2022). DOI: 10.1016/j.catena.2022.106628

Provided by Chinese Academy of Sciences