

Study reveals changeable tendency of soil organic carbon and total nitrogen in dryland

August 18 2022, by Li Yuan



Arid chaco. Credit: [Valerio Pillar](#), CC BY-SA 2.0

Carbon (C) and nitrogen (N) cycles play important roles in the prediction of climate change and ecosystem sustainability in the dryland. Climate change has threatened the nutrient balance of dryland

ecosystems; however, its impact on soil organic carbon (SOC) and soil total nitrogen (STN) in drylands, as well as SOC and STN variation, are still unclear.

Recently, a research team from the Northwest Institute of Eco-Environment and Resources of the Chinese Academy of Sciences (CAS) elucidated the dynamics of soil [organic carbon](#) and nitrogen and their relations to hydrothermal variability in dryland of northern China.

Their results were published in *Journal of Environmental Management*.

The researchers used the structural equation model, Adaptive Boosting Regressor, Gradient Boosting Regression, Extreme gradient boosting Regression and Random Forest Regression to explore the relationship between SOC or STN and hydrothermal variability, and to establish the prediction model of SOC and STN based on field experiment.

Results showed that climate factors in the dryland of northern China were the main factors affecting SOC and STN, and the precipitation in the growing season increased from 2000 to 2019, at a rate of 12.9 mm/decade. During the same period, the annual sunshine duration significantly decreased by 66 hr/decade.

Along with interannual hydrothermal variability, SOC showed a fluctuating upward trend at a rate of 0.04 g/kg/decade, while STN exhibited a fluctuating downward trend at 0.003 g/kg/decade from 2000 to 2019.

This study highlights that the dryland should be considered as a potential region for [carbon sequestration](#) under [climate change](#). In addition, more attention should be paid to STN monitoring in dryland in the future because the annual hydrothermal variance causes STN loss and reduces [soil fertility](#).

More information: Mingzhu He et al, Dynamics of soil organic carbon and nitrogen and their relations to hydrothermal variability in dryland, *Journal of Environmental Management* (2022). [DOI: 10.1016/j.jenvman.2022.115751](https://doi.org/10.1016/j.jenvman.2022.115751)

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