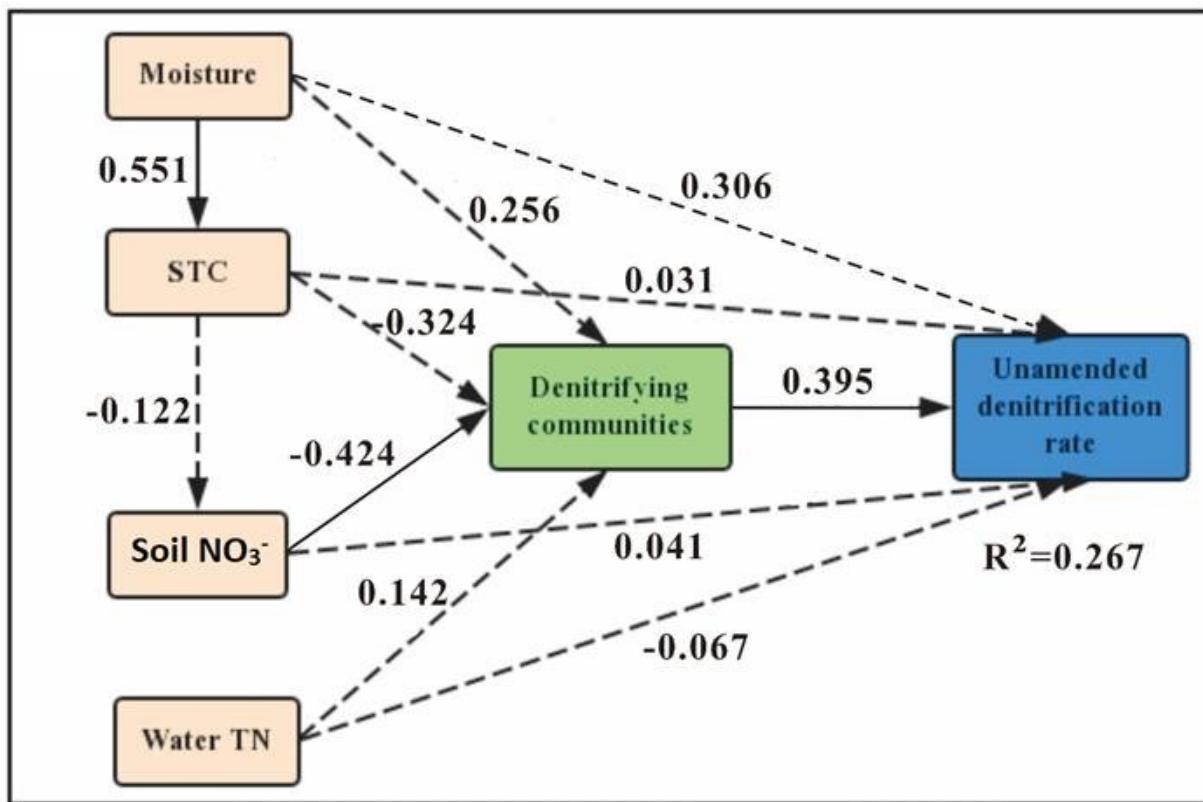


How environment and microorganisms regulate soil biogeochemical processes in Tibetan wetlands

May 18 2020, by Zhang Nannan



Soil moisture and N and C availability could impact wetland denitrification process both directly and indirectly through their effects on denitrifying communities. Credit: MA Lin

The Tibetan Plateau, known as the "third pole" of the world, contains abundant and diverse wetlands. These wetlands provide a number of important ecological services, some of which are regulated by several nitrogen (N) and carbon (C) biogeochemical processes such as denitrification, organic matter decomposition and methane emission. However, the underlying pathways of the effects of environmental and biological factors on N and C biogeochemical processes in Tibetan wetlands remain unclear.

In order to reveal the roles of [environmental factors](#) and microorganisms in regulating soil biogeochemical processes in Tibetan wetlands, the Wetland Ecology Group led by Prof. Liu Guihua from Wuhan Botanical Garden investigated the N and C cycling rates (potential nitrification, net nitrication, potential denitrification, unamended denitrification, methane production, and methane oxidation) in soils collected from 36 wetland sites on the high-altitude and remote Tibetan Plateau.

This study demonstrated that all the measured N and C cycling rates did not differ significantly among the wetland types. Soil physicochemical properties (e.g., moisture, C and N concentration) explained a large amount of variance in most of the N and C cycling rates.

Microbial abundance and diversity were also important in controlling potential and unamended denitrification rates, respectively. Path analysis further revealed that [soil moisture](#) and N and C availability could impact wetland C and N processes both directly and indirectly.

This work also indicated that several biogeochemical processes in Tibetan wetlands were nitrogen-limited. Therefore, a slight disturbance by anthropogenic activities (e.g., wastewater discharge and N deposition) may greatly alter the N and C cycling processes and even ecological functions of Tibetan wetlands.

Hence, researchers suggest that more attentions should be paid to the ecological risks of these fragile wetlands.

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Relevant research results have been published in *Environmental Science & Technology*, titled "Environmental factors and microbial diversity and abundance jointly regulate soil nitrogen and carbon [biogeochemical processes](#) in Tibetan wetlands."

More information: Lin Ma et al. Environmental Factors and Microbial Diversity and Abundance Jointly Regulate Soil Nitrogen and Carbon Biogeochemical Processes in Tibetan Wetlands, *Environmental Science & Technology* (2020). [DOI: 10.1021/acs.est.9b06716](https://doi.org/10.1021/acs.est.9b06716)

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