

Hydrology affects carbon storage potential of prairie potholes

May 7 2013

Prairie potholes, the small, dynamic, unconnected ponds that dot central Canada as well as parts of the north-central United States, can store significant amounts of soil nutrients that can be transformed to carbon dioxide and other greenhouse gases. Scientists would like to better understand how these regions could contribute to climate warming, but there are challenges, given the large heterogeneity in greenhouse gas emissions over the prairie pothole landscape.

To help gain a better understanding of the factors that influence these emissions, Creed et al. measured fluxes of carbon dioxide, methane, and nitrous oxide from the soils in the prairie pothole region of central Canada, along with hydrologic properties such as soil moisture. They find that soil moisture was an important driver of the differences in [carbon dioxide emissions](#). Soil moisture controls occurred at multiple scales, from ridge to valley along individual potholes at the finest scale, and from the southern limit to the northern limit of potholes in Canada at the coarsest scale.

By integrating these soil moisture controls across fine-to-coarse scales, the authors were able to show the potential contribution of prairie potholes to warming changes across the region. Greenhouse gas emission was smallest in the drier south, where the largest emissions came from the lowland area at the land-water interface, while in the north, large emissions came from a broader area of the hill slope.

The authors conclude that if hydrologic factors are not taken into

account, studies could significantly underestimate or overestimate the potential effects of prairie pothole regions on warming.

More information: Hydrologic profiling for greenhouse gas effluxes from natural grasslands in the prairie pothole region of Canada, *Journal of Geophysical Research-Biogeosciences*, [doi:10.1002/jgrg.20050](https://doi.org/10.1002/jgrg.20050), 2013 [onlinelibrary.wiley.com/doi/10.../jgrg.20050/abstract](https://onlinelibrary.wiley.com/doi/10.1002/jgrg.20050/abstract)

Provided by American Geophysical Union

Citation: Hydrology affects carbon storage potential of prairie potholes (2013, May 7) retrieved 24 April 2024 from <https://phys.org/news/2013-05-hydrology-affects-carbon-storage-potential.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.