Coastal chemistry improves methane modeling

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Using a better modeling framework, with data collected from Mississippi Delta marshes, scientists are able to improve the predictions of methane and other greenhouse gas emissions. Credit: Matthew Berens/ORNL, U.S Dept. of Energy

Scientists at Oak Ridge National Laboratory are using a new modeling framework in conjunction with data collected from marshes in the Mississippi Delta to improve predictions of climate-warming methane and nitrous oxide emissions from soils in coastal ecosystems. Their work has been published in *Journal of Advances in Modeling Earth Systems*.

Underlying processes such as sulfur cycling and influences like salinity in these waterlogged wetland soils drive how quickly organic matter is broken down and how much is converted into methane, a gas 28 times more potent than carbon dioxide at warming the atmosphere.

"We developed this chemical reaction framework that includes a lot of different reactions," said ORNL researcher Benjamin Sulman. "This model established that methane fluxes from bubbles are highly variable and account for a large fraction of total fluctuations."

Incorporating these biogeochemical processes into the land module of the DOE Energy Exascale Earth System Model will depict global methane fluctuations more accurately.

More information: Jiaze Wang et al, Subsurface Redox Interactions Regulate Ebullitive Methane Flux in Heterogeneous Mississippi River Deltaic Wetland, *Journal of Advances in Modeling Earth Systems* (2024). DOI: 10.1029/2023MS003762

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