2010 Ocean Sciences Meeting
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Cite abstracts as **Author(s) (2010), Title, *Eos Trans. AGU, 91*(26), Ocean Sci. Meet. Suppl., Abstract xxxxx-xx**

Your query was:
kroeger

HR: 0830h
AN: **ED11A-03**
TI: Enhanced N2O Fluxes in Coastal Wetlands Due to Nitrogen Enrichment
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AB: The response of coastal wetlands to nitrogen loading could affect their greenhouse gas emissions, particularly of N2O. Nitrous oxide is 310 times more effective at trapping heat in the atmosphere on a molar basis compared to CO2 and is increasing in the atmosphere at a rate of 0.26% per year (IPCC 2007). The significance of coastal ecosystems as a N2O source is not well known. A week-long study on the release of N2O, and CH4, from a Spartina patens marsh (in Massachusetts) in response to nitrate additions (1.4 g N m-2) was conducted. The study tested the hypothesis that nitrate additions stimulate N2O fluxes, and explored what happens to CH4 fluxes after nitrate additions. Five research sites within a non-eutrophic Plum Island marsh located along the Rowley River in Northern Massachusetts were used to study gas fluxes. Platforms were used during sampling to minimize site disturbance and gas samples were collected using transparent chambers. All syringe gas samples were analyzed using gas chromatography. Flame ionization detection was used for CH4, electron capture detection was used for N2O, and Ficks law was used to calculate the fluxes. Our results showed that N2O emissions increased within minutes after site NO3- enrichment. These results suggest that nutrient loading may stimulate denitrification, potentially shifting wetland ecosystems from N2O sinks to sources, depending on the duration and extent of N loading. Furthermore, coastal wetlands sequester carbon from the atmosphere at a higher rate per unit area than any other ecosystem on earth. The enhanced N2O flux observed in our experiment had a positive global warming potential (GWP) of 23,786 µM per m2 per day CO2 equivalents, equal to about half of the -GWP of the CO2 sequestration rate of typical salt marshes. Thus, our results suggest that globally widespread and increasing anthropogenic nutrient enrichment of coastal ecosystems may result in an enhanced N2O flux to the atmosphere, and effectively offset a substantial portion of the carbon sequestration in coastal wetlands.
DE: [0322] ATMOSPHERIC COMPOSITION AND STRUCTURE /

Constituent sources and sinks
DE: [0442] BIOGEOSCIENCES / Estuarine and nearshore processes
DE: [0469] BIOGEOSCIENCES / Nitrogen cycling
SC: Education and Outreach (ED)
MN: 2010 Ocean Sciences Meeting

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