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CONTROL ID: 1797565

TITLE: Temporal variability of methane fluxes in the coastal methane hot spot on the East Siberian Arctic Shelf

ABSTRACT BODY: Among Arctic reservoirs, subsea permafrost, hydrates, and associated methane (CH4) deposits are the most worrisome due to high heat transfer from rapidly warming shallow Arctic seas. Destabilization of subsea permafrost results in increasing permeability for gaseous CH4 long preserved in seabed deposits within and beneath permafrost. This process manifests as extensive CH4 ebullition, driving significantly elevated CH4 aqueous concentrations. To investigate the temporal variability of bubble-induced fluxes and document bubble-borne CH4 releases from the study area, we conducted a sonar survey in the coastal area of the Laptev Sea in April 2012. Backscattering cross-sections of the bubbles emitted from 39 seeps were recorded, using a portable single-beam sonar mounted at the edge of a hole made in fast ice. Bubbles were also recorded using a submerged autonomous vehicle equipped with a high-speed, high-resolution digital video camera, and were observed visually through 1-day-old ice. Calibration of sonar data was performed in-situ using a gas tank deployed to the sea floor that emitted gas at known rates. Winter data showed high variability of bubble-induced fluxes in the study area, deviating towards higher rates observed in this area in summer.

CURRENT SECTION/FOCUS GROUP: Global Environmental Change (GC)

CURRENT SESSION: GC049. Environmental, Socio-Economic and Climatic Changes in Northern Eurasia and their Feedbacks to the Global Earth System

INDEX TERMS: 0428 BIOGEOSCIENCES Carbon cycling, 0490 BIOGEOSCIENCES Trace gases, 0702 CRYOSPHERE Permafrost, 4820 OCEANOGRAPHY: BIOLOGICAL AND CHEMICAL Gases.

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