

Abstract Preview - Step 3/4- print version -

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Polar program: None

Title: Biogeochemistry at the early stages of ice formation: insights from PIPERS

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Text: The PIPERS cruise on N. B. Palmer into the early winter Ross Sea took place between April and June 2017. PIPERS was a unique opportunity to investigate biogeochemistry of pack ice during early stages of ice formation. We will present insights of the dynamics of sympagic microalgae assemblages, nutrients, particulate organic carbon and 2 potent greenhouse gases (carbon dioxide and nitrous oxide) during early ice growth. The comparison of CO₂ fluxes over consolidated and unconsolidated ice show that 1) sea ice acts as a source of CO₂ for the atmosphere 2) largest fluxes occur at the earliest sea ice growth stages (i.e. frazil ice, unconsolidated grey ice, pancake ice). Large fluxes are due to ongoing active rejection of impurities, high porosity of highly saline/high temperature young ice, and the absence of snow. Overall, snow appears to restrict CO₂ fluxes. In some cases, fluxes over snow appears to be nil or even opposite to fluxes over bare ice. Therefore, while snow is often view as a transient buffer for air-ice gases fluxes, the role of snow appears to be more complicated. The new measurements of CO₂ fluxes over young ice carried out during PIPERS potentially allow to complete a budget of CO₂ fluxes over Antarctic pack ice by filling a significant gap.

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