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Cold season carbon loss in the Arctic

The objective is to improve the estimation of greenhouse gas fluxes in the Arctic and understand the spatial and temporal variability of the fluxes.

Arctic tundra exhibits a large spatial and temporal variability. A continuous record of CO_2 and methane (CH_4) fluxes from three eddy covariance (EC) towers within 1 km from each other, allowed us to describe the integrated dynamics of landscape type, vegetation development, moisture regime.

The amount of autumnal CO_2 emissions corresponds to the magnitude of growing season net ecosystem exchange (NEE), reducing variability in annual budgets due to landscape type. The combination of CO2 and CH4 fluxes shows that the Alaskan Arctic tundra has a net warming effect, and vary substantially in sites within the same grid cells used by model estimates.

Figure 1. Location of the three EC towers in Barrow, Alaska (Hashemi et al., in review).

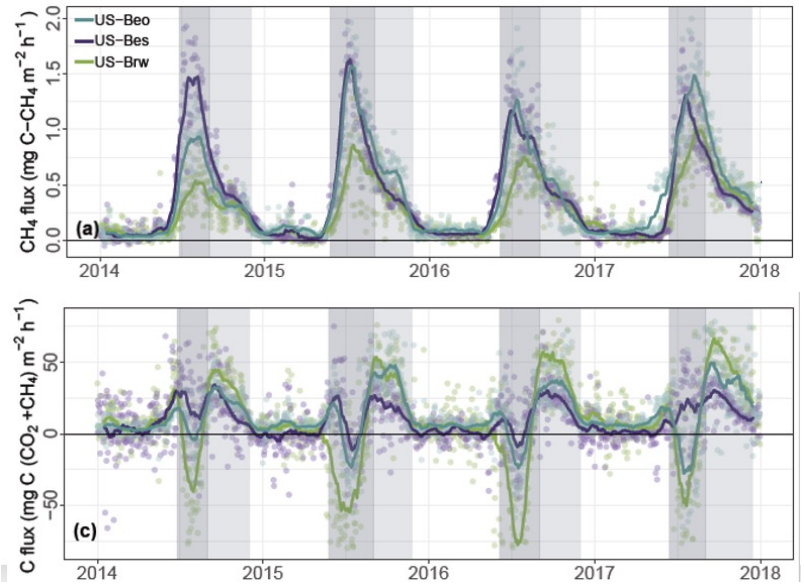

Figure 2. Yearly flux rates (daily average) of **(a.)** CH_4, and **(c.)** CO_2 + CH_4 (with CH_4 expressed as CO_2 equivalent) at the three EC sites. The darker shaded portion represents the growing season, while the lighter shaded portion represents the zero-curtain period (Hashemi et al., in review).

Data access: see Arctic Data Center, doi:10.18739/A2X34MS1B. (Donatella Zona, 2019).

INTAROS has received funding from EU's Horizon 2020 research and innovation programme - Grant Agreement No 727890