

Subproject: Greenhouse gas exchange over the Arctic Marine waters – focusing on CO₂ and CH₄ (GRAM)

Actual field dates: 18.-31. May 2016 in Nuuk and 27. July – 25. August on Amundsen
Field site: Godthåbsfjorden and Baffin Bay
Number of man-days in the field: 52

Summary:

The specific objective of the field campaigns in spring 2016 were to investigate to which extent surface fluxes of GHG's in the coastal marine system are influenced by sea spray. The original plan was to carry out measurement of CO₂ and water vapor fluxes as well as fluxes of sea spray over Nuuk Fjord, but due to instrument failure, we did not measure CO₂ fluxes over the Nuuk Fjord. Only sea spray fluxes were measured which gave us experience in sea spray flux measurements and some insight in sea spray flux processes at coastal sites. Both upward and downward sea spray fluxes were found. At a low measurement height (here 3.5 meter) and in an area with ship traffic (the site is close to Nuuk) it is likely we find downward fluxes of locally produced anthropogenic particles. Furthermore, we might see the effect from downward flux of larger sea spray particles at this low height. However, it is not possible to determine from the field experiment in Nuuk Fjord, if a connection between sea spray fluxes and CO₂ fluxes is present in Arctic environments. Thus we also participated in a cruise on Amundsen in Baffin Bay where both CO₂ and sea spray fluxes were measured. We are still analyzing the data from Baffin Bay.

Photos:

Photo 1: Credit: Bjarne Jensen/ Ida Rosendahl
Caption: Location of the measurement mast for the Nuuk field campaign indicated by the arrow. The measurement site is located just South-West of Nuuk

Figure 2: Caption: The location of the Nuuk measurement mast is indicated by the red marking. The black line indicates the shortest distance to land within the wind directions accepted for flux sampling.

Photo 3 Credit: Bjarne Jensen/Ida Rosendahl
Caption: The experimental setup for the Nuuk campaign.

Photo 4: Credit: Google Maps, September 2016.



Photo 1

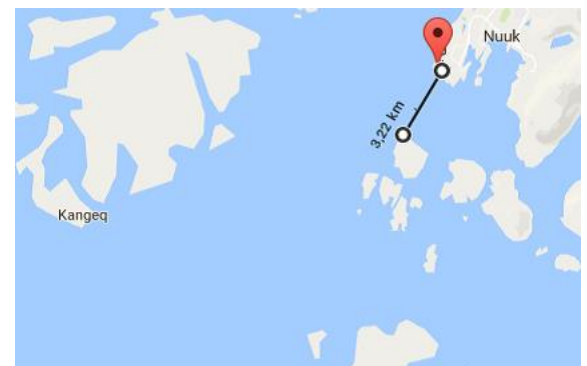


Figure 2



Photo 3

Caption: The expedition route for Amundsen leg 2B starting in Qikiqtarjuaq and ending in Kugluktuk. Wind speed started to reach 4 m s⁻¹ around the Petermann Glacier, which is located at the most northern point seen on the map.

Photo 5: Credit: Ida Rosendahl

Caption: The position of the measurement mast in the bow of Amundsen.

Participants:

AU: Ida Rosendahl, Master student, ARC, Bjarne Jensen, Technician, ENVS, Lise Lotte Sørensen, PI, ARC (not in Field)

UoM: Tim Papakyriakou

GINR: Carl Isaksen

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Photo 4



Photo 5