

### Subproject: Impact of snow cover on the inorganic carbon dynamic within sea ice

Actual field dates: 3 – 25 May 2015

Field site: Station Nord

Number of man-days in the field: 22

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#### Summary:

The main focus of our 3 weeks fieldwork at the Villum Research Station (VRS, North Greenland) was to estimate the impact of the snow cover on the inorganic carbon dynamic within sea ice and on the air-ice exchanges of CO<sub>2</sub>.

Air-ice CO<sub>2</sub> fluxes were measured using the chamber of accumulation. Over snow, no CO<sub>2</sub> fluxes were detected while, when the snow was manually removed, a release of CO<sub>2</sub> was measured (about about 1 mmol m<sup>-2</sup> d<sup>-1</sup>). To characterize the snow cover, we measured snow thickness, temperature, density and salinity and samples for total alkalinity (TA), total dissolved inorganic carbon (TCO<sub>2</sub>) and 18O were collected. The snow cover presented a strong temperature gradient, from -15°C at the surface of the snow (close to the atmospheric temperature) to sub-zero temperature at the snow-ice interface. Periodically, we could find a salty layer of slush at the snow-ice interface. Due to this thick snow cover, the underlying sea ice was nearly isothermal (temperature ranged from -2 to -0.5°C) with higher salinity in the top layer, dropping to minimum values at the bottom. Samples from first year sea ice (FYI) were collected on 13 different locations around the VRS to characterize the first year sea ice and how both glaciers located on each side of the VRS could influence the sea ice cover. Finally, 2 different floe of multiyear sea ice (MYI) were sampled. It will be the first time that data on the inorganic carbon dynamic will be reported on MYI and we will be able to compare both FYI from MYI.

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#### Photos:

Fig.1: Map of the VRS station and the different sea ice sampling site. Credit:

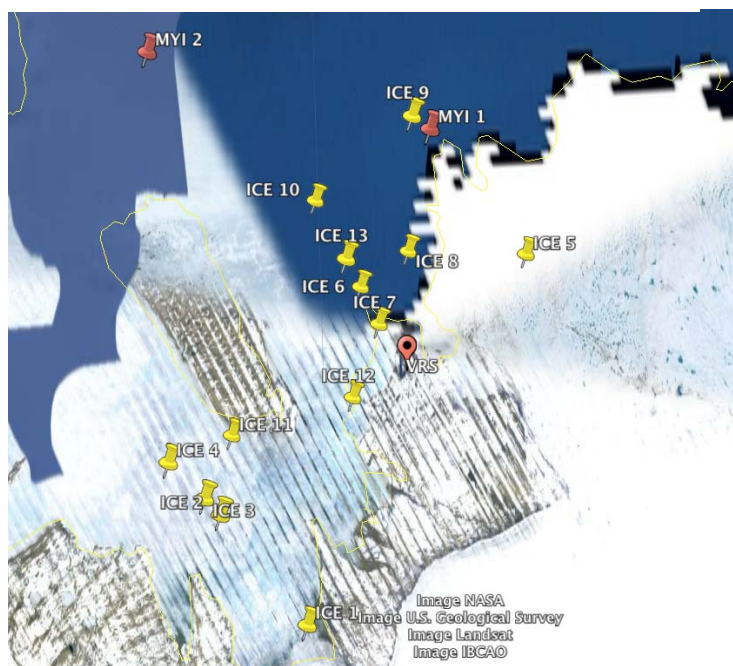


Figure 1



Figure 2

Fig. 2: Trying to drill through 3.5m of Multi Year Ice.

Credit: Nicolas-Xavier Geilfus

Fig. 3: CO<sub>2</sub> fluxes on sea ice, once the snow is removed. Nicolas-Xavier Geilfus

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**Participants:**

Nicolas-Xavier Geilfus

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**Acknowledgements:**

Arctic Science Partnership



Figure 3