



UNIS

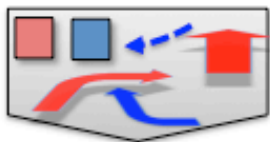
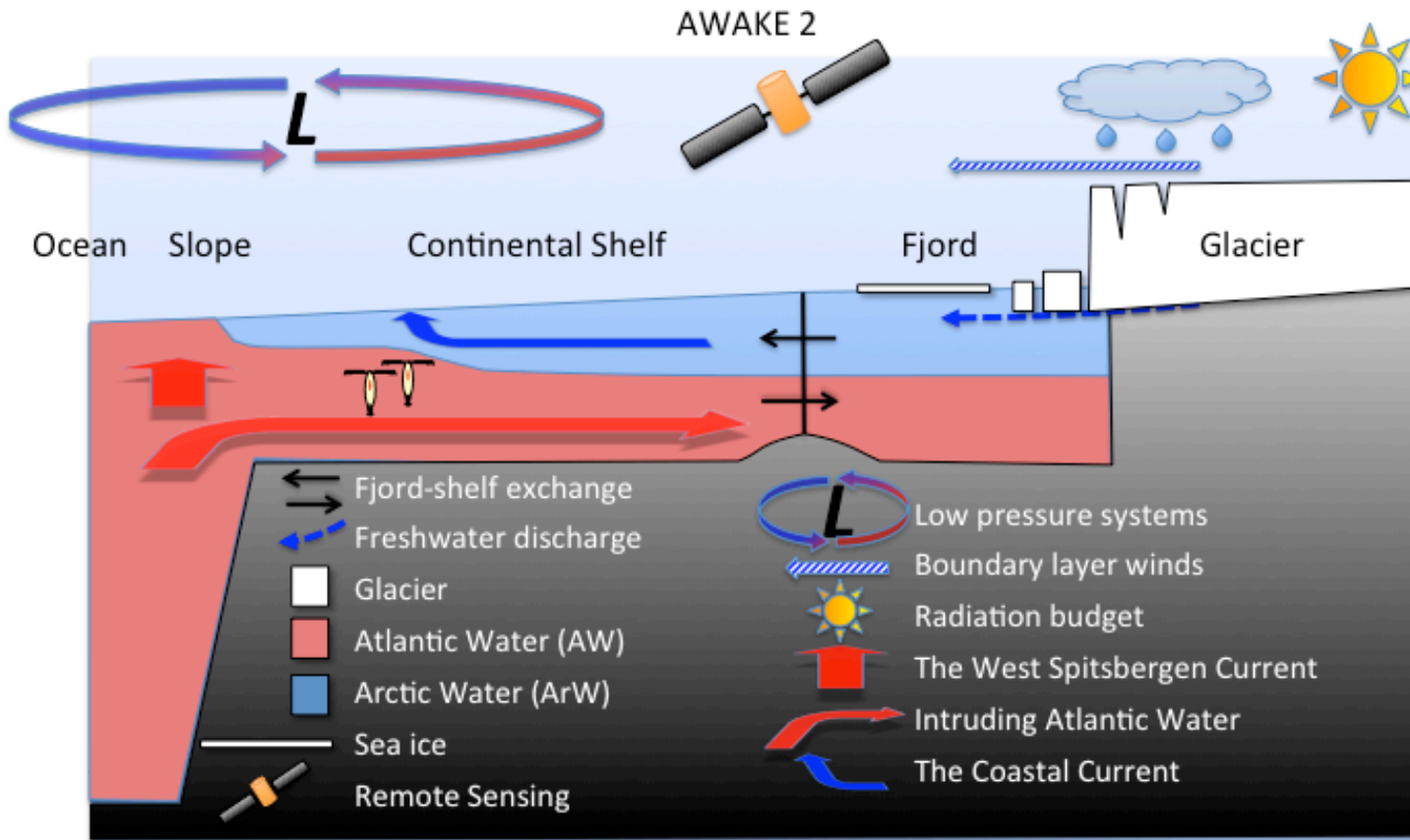


WP 2: Open ocean oceanography

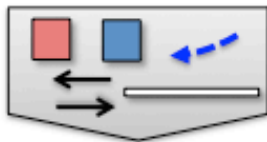
IOPAS, UNIS

Frank Nilsen (UNIS)

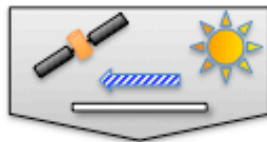
AWAKE-2



Open ocean (WP 2)



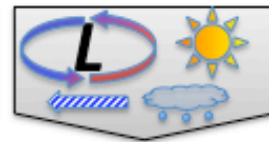
Fjords (WP 3)



Sea ice (WP 4)



FW from land (WP 5)



Atmosphere (WP 6)

WP 2 Objectives



UNIS



To define the main pathways of the warm Atlantic water towards the fjord system.

- Describing and quantification of the interannual variation of Atlantic and Arctic water and freshwater content on the shelf from available historical hydrographic data and new dedicated observations
- Explaining the mechanisms of the AW circulation onto the shelf and its interaction with the fjords

WP 2 Task



- T2.3. To investigate topographically guided mechanisms of the AW circulation onto the West Spitsbergen shelf. To develop the analytical model and use existing numerical model to study the shelf circulation (UNIS).

WP 2 Deliverables



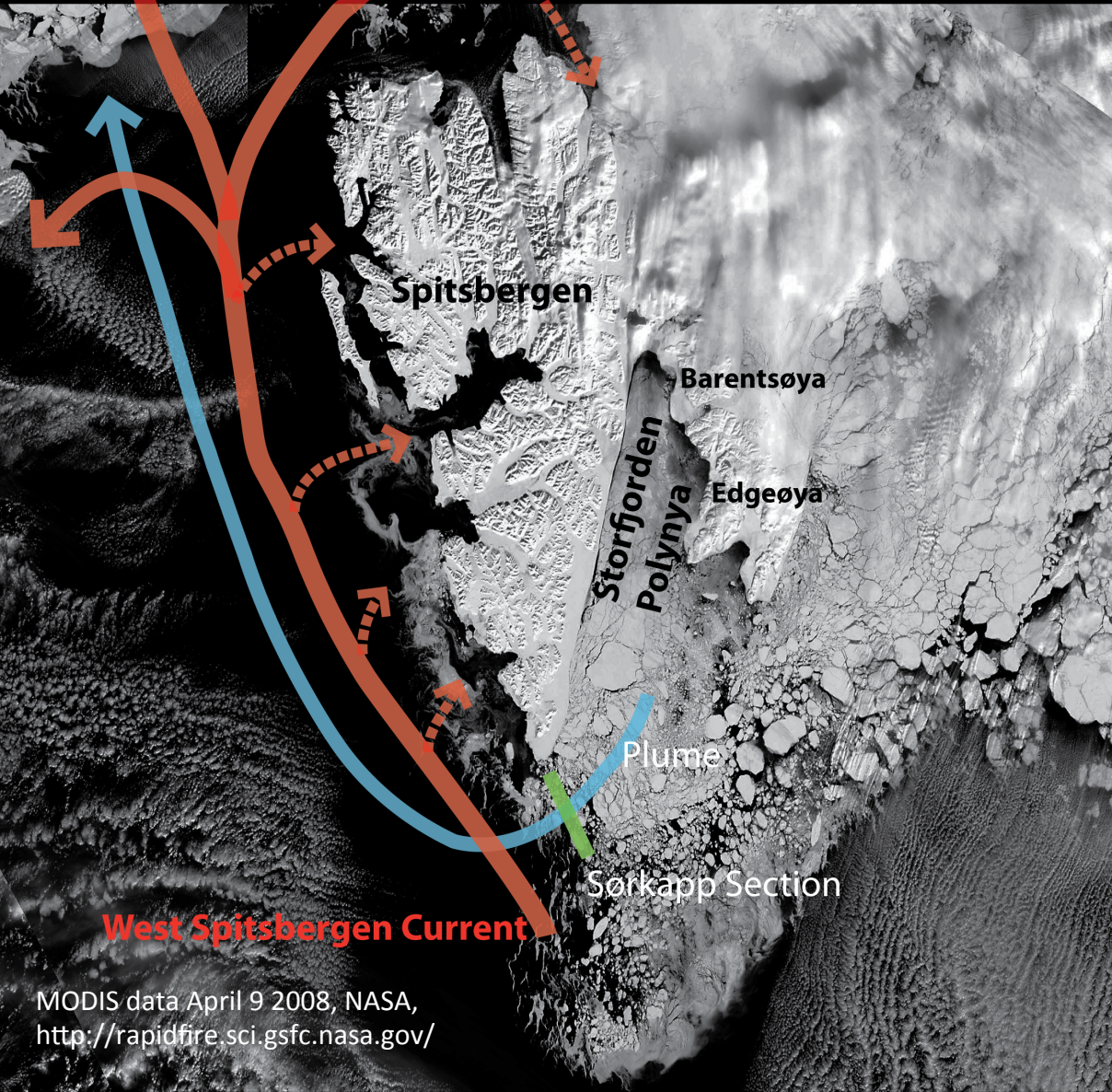
UNIS



- D2.3.1 The prognostic model for determination of dominating water masses on the shelf (UNIS, month 36)
- D2.3.2. The scientific paper in the peer reviewed journal describing the mechanisms of water masses domination on the shelf (UNIS, month 36)



Sea ice factories & arctic fjord oasis

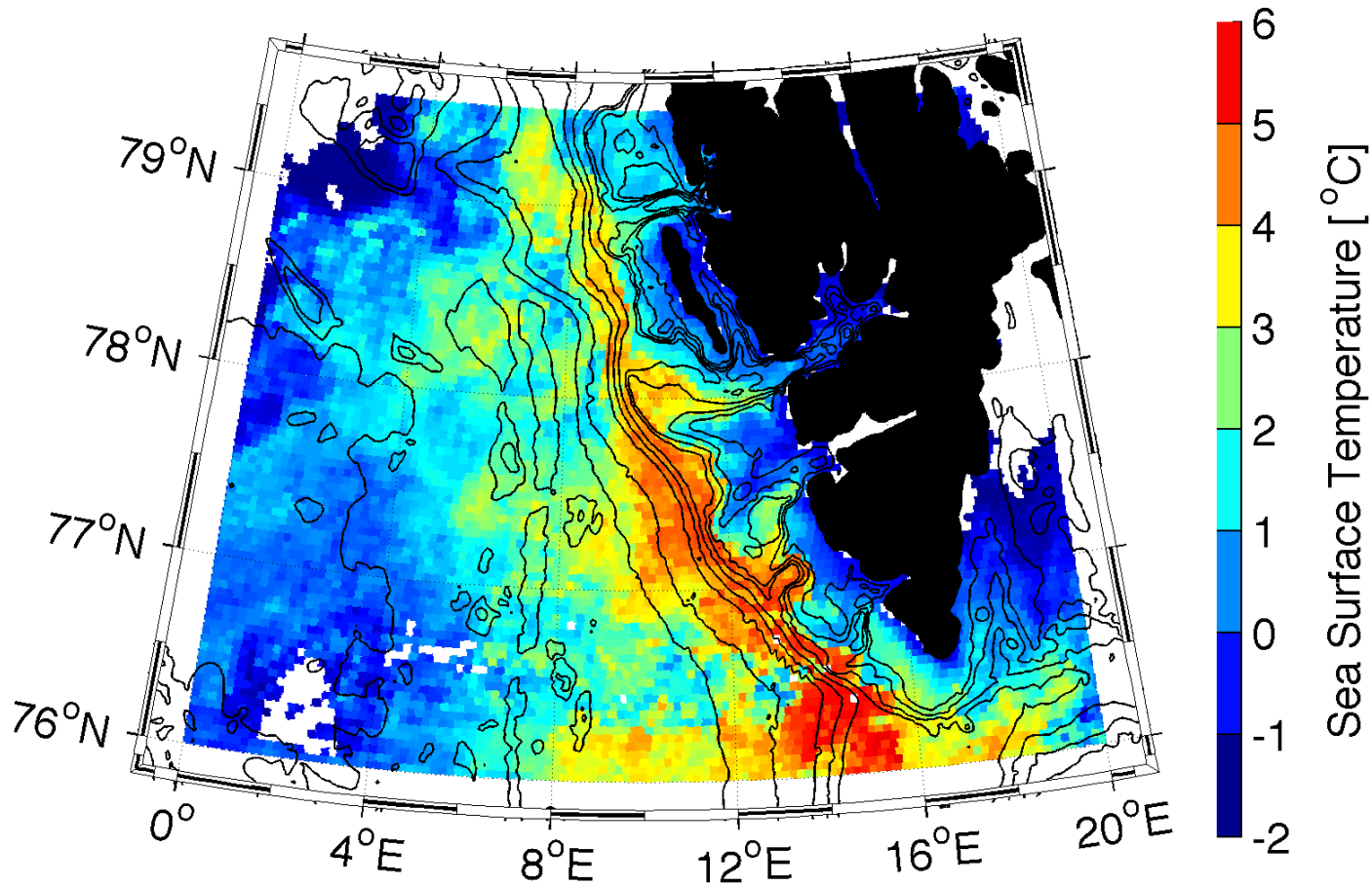


MODIS data April 9 2008, NASA,
<http://rapidfire.sci.gsfc.nasa.gov/>

Atlantic Water on the WSS

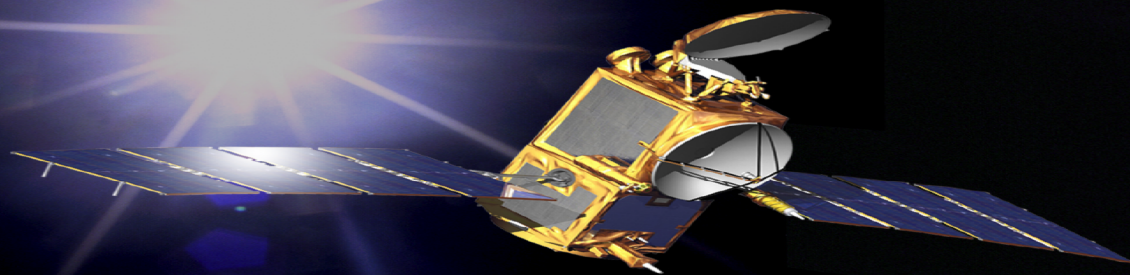
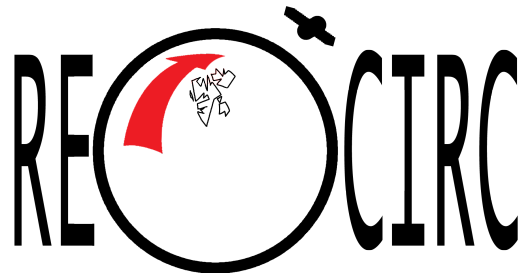


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Two first weeks of January 2008

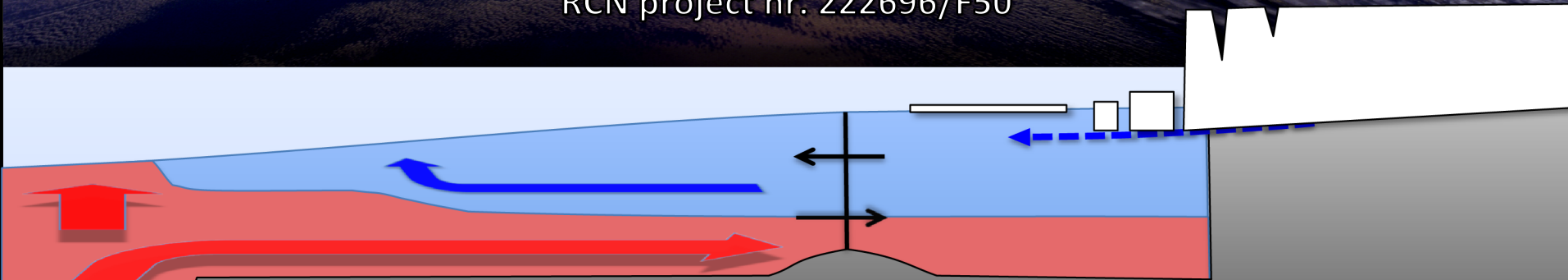
Reprojected MODIS SST data by A. Korosov & S. Sandven (NERSC)



Remote Sensing of Ocean Circulation and Environmental Mass Changes

REOCIRC

RCN project nr. 222696/F50



Norwegian Partners

The University Centre in Svalbard (Leader)
Nansen Environmental and Remote Sensing
Center

International partner

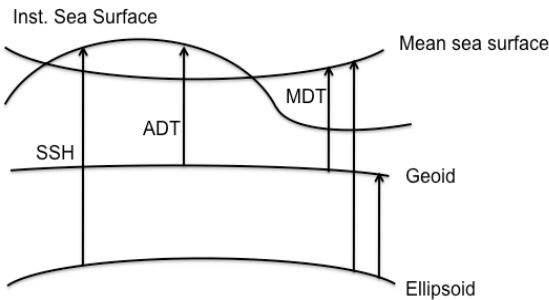
Polar Science Center, University of Washington

© Frank Nilsen



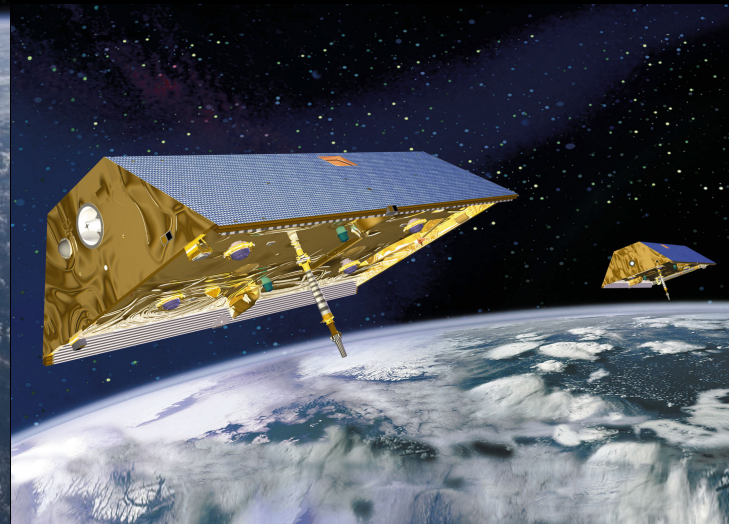
REOCIRC main objective

To study the Absolute Dynamic Topography (ADT) of the West Spitsbergen Current (WSC) by taking advantage of advances in satellite gravimetry (GOCE) and altimetry, and providing ground truth for satellite gravity solutions (GRACE) from in situ ocean bottom pressure measurements.



MDT = Mean sea surface – Geoid (referenced to the same ellipsoid)

We seek a better understanding of the variability (seasonal, interannual and decadal) in oceanic volume and heat fluxes towards the Arctic Ocean and a unified understanding of mass changes in the eastern Fram Strait and in Svalbard



WP1 - In situ OBP observation and water column time series

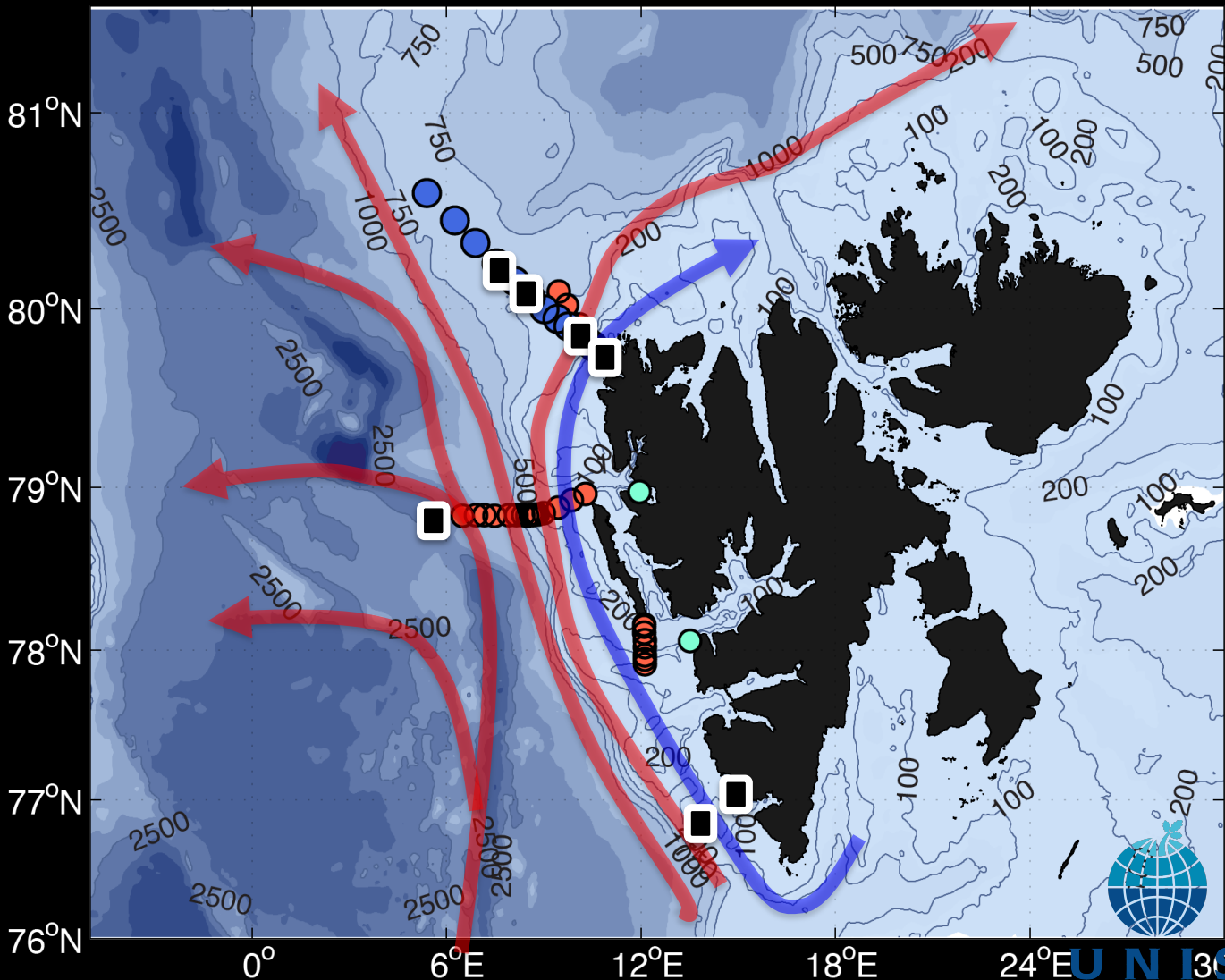
Responsible: UNIS, PSC

RECIRC YP1

- 30" McLane bouyancy 168 kg
- Argo s/n 332
- Minilogger s/n :
- SBE-37 MicroCat s/n :
- Acoustic Release AR2500 no. 1697
- SBE-26 s/n 26P68942-1363
- Anchor wet weight 800 kg

10 m kevlar

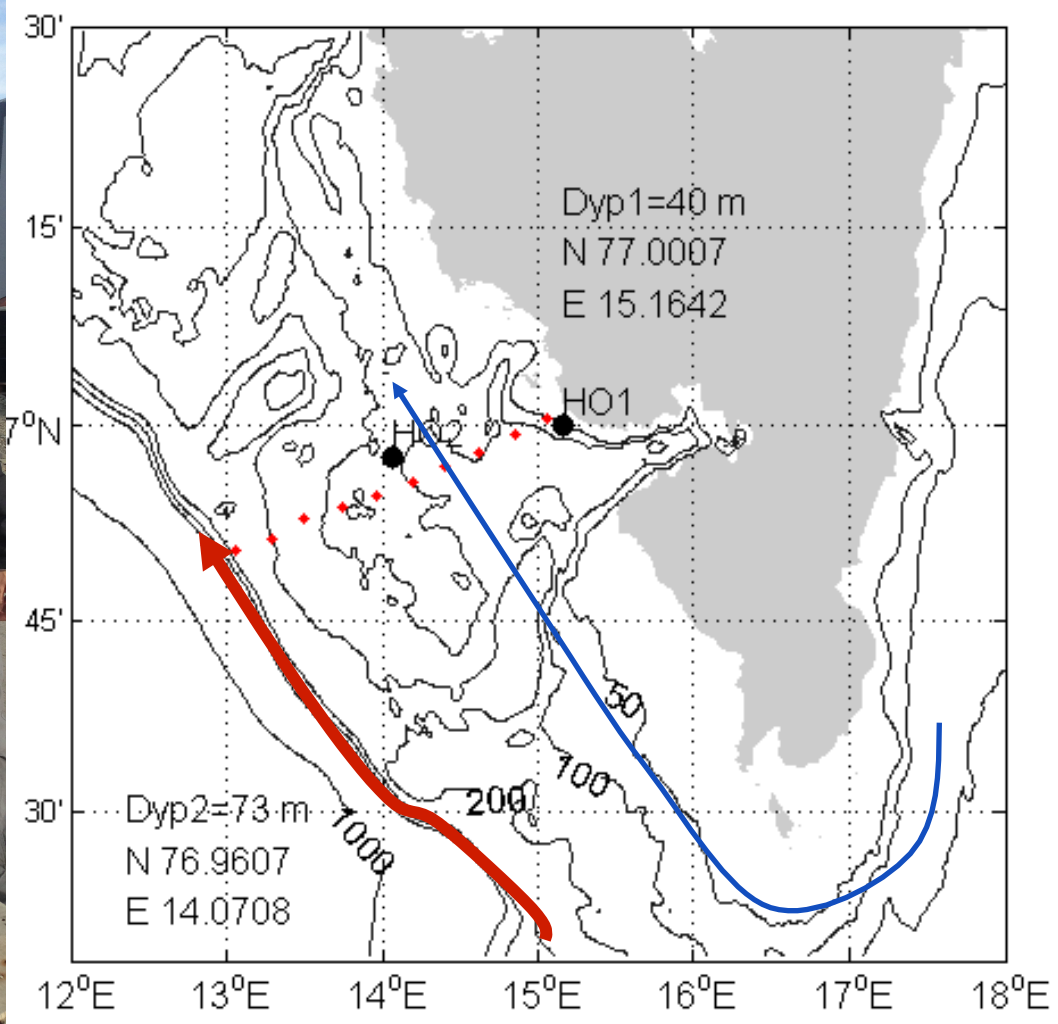
Depth 30 meter



AWAKE-2

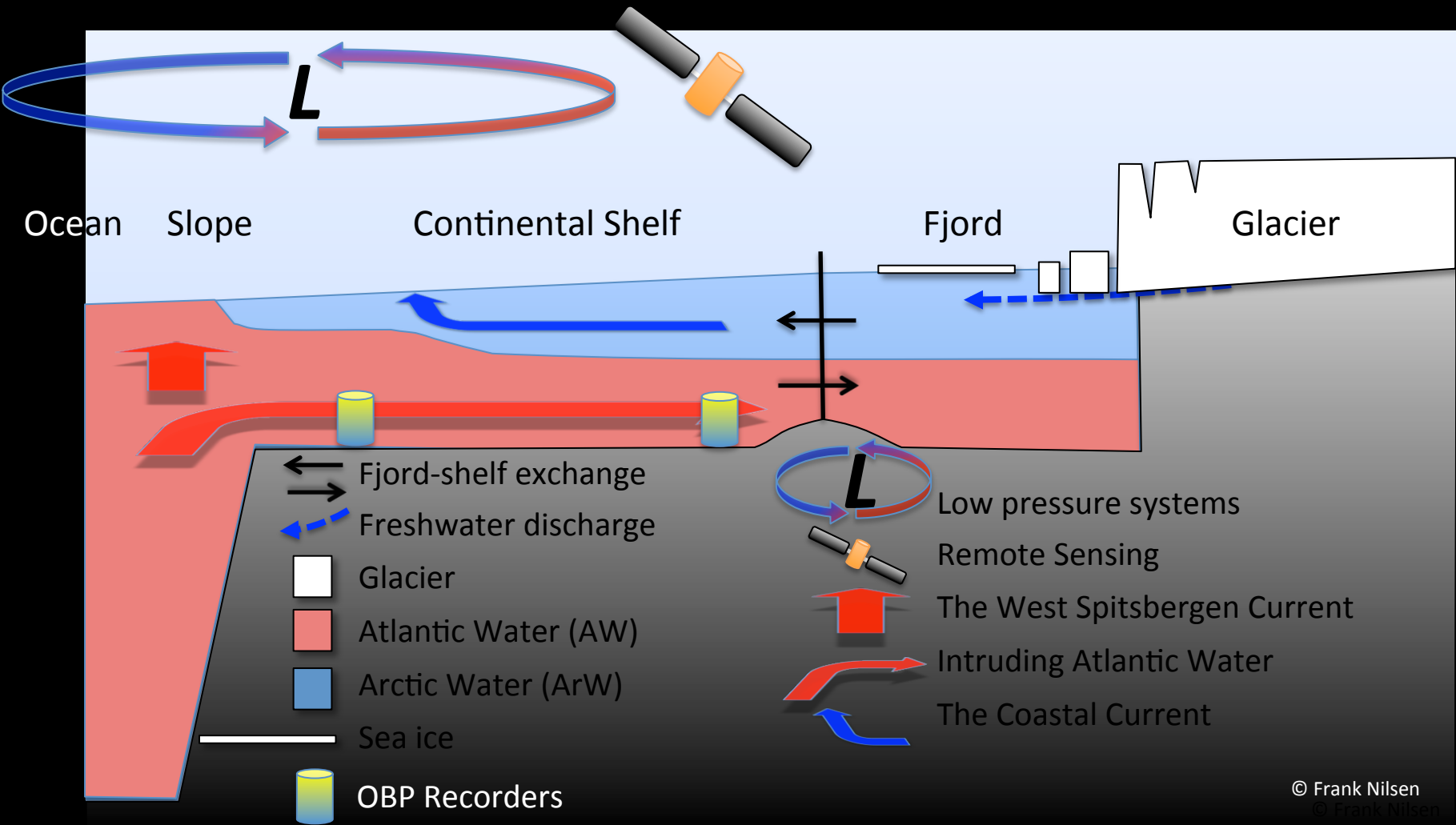


OBP moorings at Hornsund



100 kg

The West Spitsbergen Shelf



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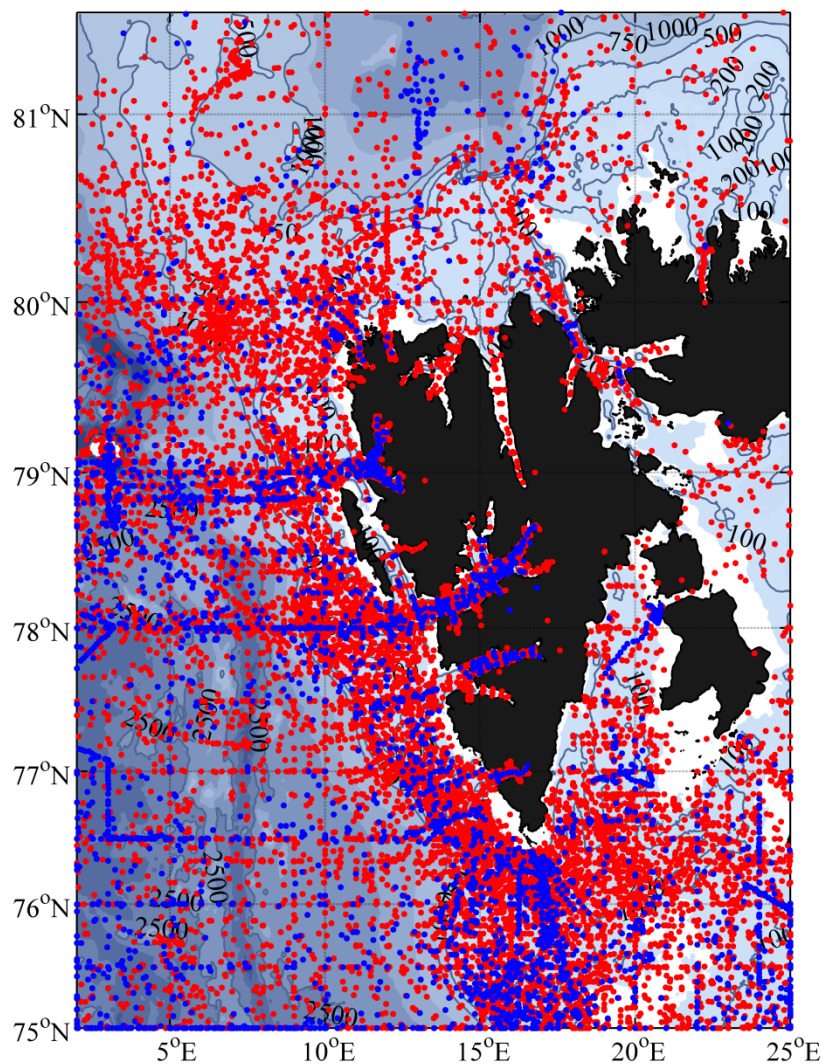
Mass [kg]: $M = \rho V = \rho HW, H = SSH$

Svalbard Hydrographic Database (SHD)

- Data collected from 1) hydrographic data since 1994 collected by the University Centre in Svalbard (UNIS) during student- and research cruises, 2) Kongsfjorden and Eastern Framstrait hydrographic data from the Norwegian Polar Institute, 3) Norsk Marint Datasenter (NMD), the Institute of Marine Research, 4) the PANGAEA database of the Alfred Wegener Institute, 5) ICES Oceanographic CTD data, and 6) hydrographic data at standard bottle depths from the NISE database
- ~30000 conductivity, temperature and depth (CTD) profiles around Svalbard and eastern Framstrait
- Time period from 1901 to 2014

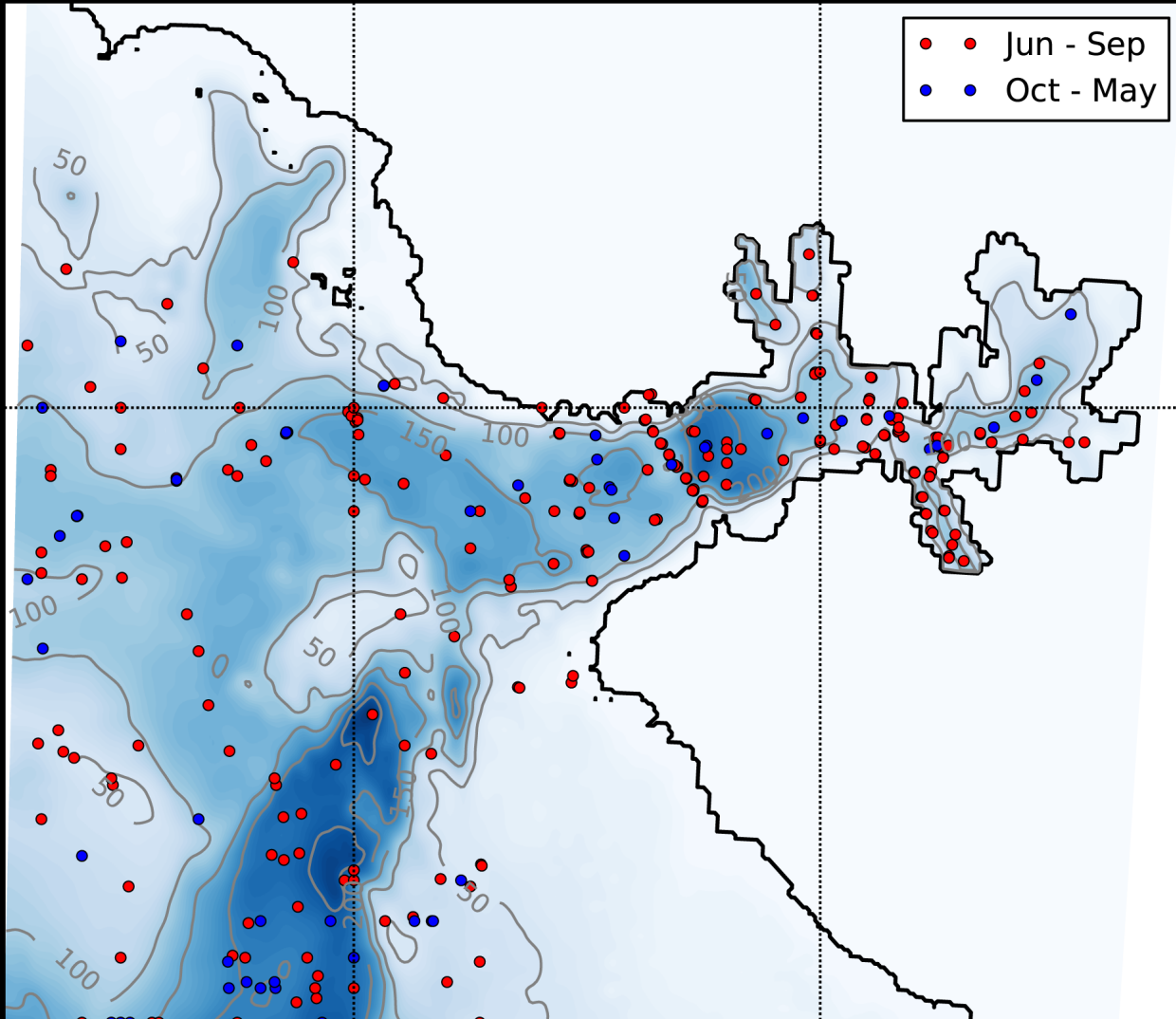


SHD station map

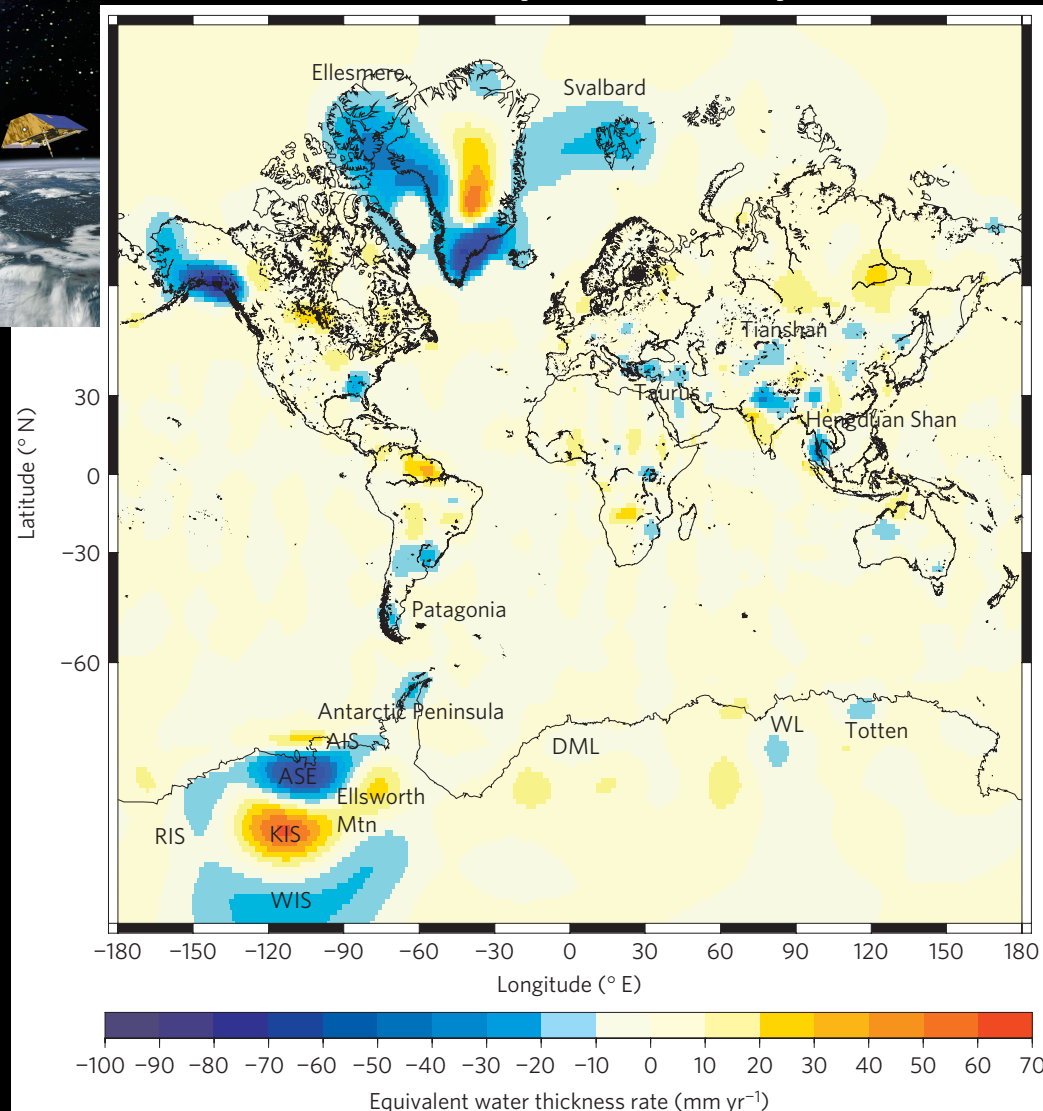
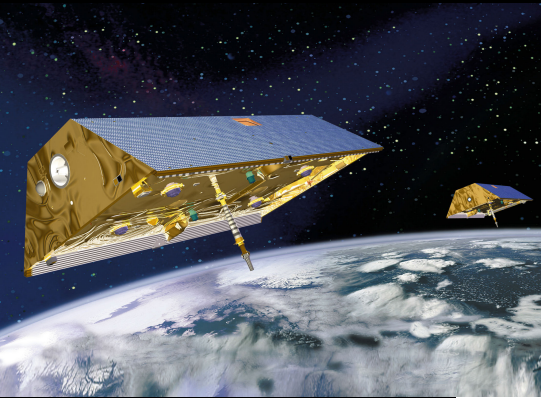


- More repeated and better data coverage in summer (red: June-October) than winter (blue: November-May)
- Some specific sections ($\sim 79^\circ\text{N}$ and $\sim 78^\circ\text{N}$) and fjords (Isfjorden, Kongsfjorden) repeated almost twice yearly since 1996

Hornsund data



Averaged global present-day surface mass trends (PDMT)



PDMT = present-day surface mass trend

Wu et al. (2010)
Nature Geoscience