NAFO Northwest Atlantic Fisheries Organization

The 2022 overview of the hydrographic conditions off Southwest Greenland – NAFO Subarea 1

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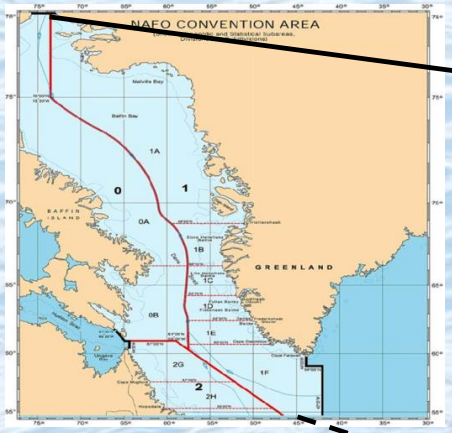
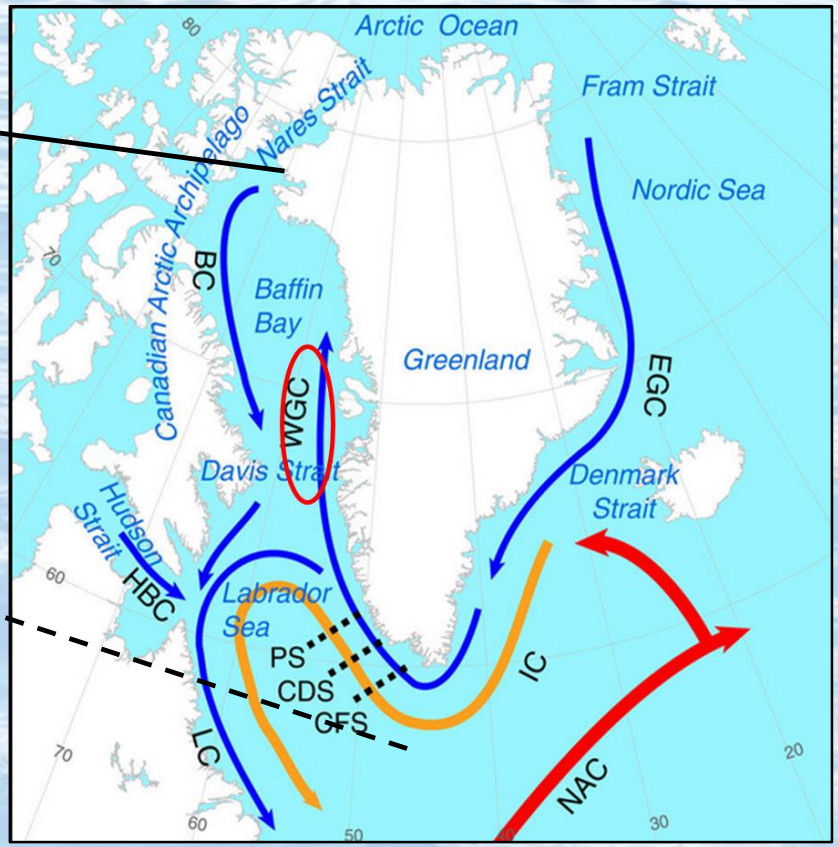
GRØNLANDS NATURINSTITUT GREENLAND INSTITUTE OF NATURAL RESOURCES

NAFO Subarea 1 – Main features and general circulation





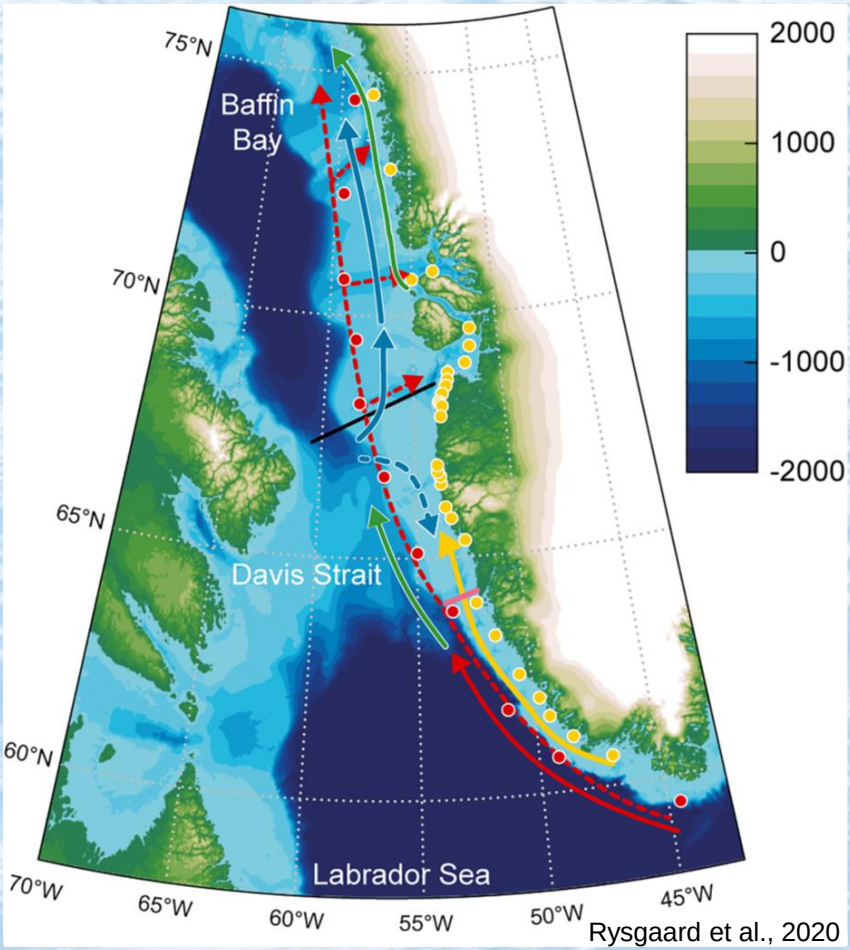
- West Greenland Current (**WGC**) transports warm and saline water from the North Atlantic northward along the west Greenland continental slope.

- Baffin Island current (**BC**) transports cold and fresher water from the Arctic Ocean southward along the continental slope.

CIRCULATION PATTERNS

EGC – East Greenland current transports cold and low-salinity water from the Arctic Ocean
LC – Labrador current transports cold and low-salinity water from polar origin
IC – Irminger Current transport warm and saline waters from the eastern North Atlantic
NAC – North Atlantic current transports warm water to the northern Atlantic
HBC – Hudson Bay current exchanges waters between the Hudson Bay and the Labrador Sea

NAFO Subarea 1: Main features and general circulation

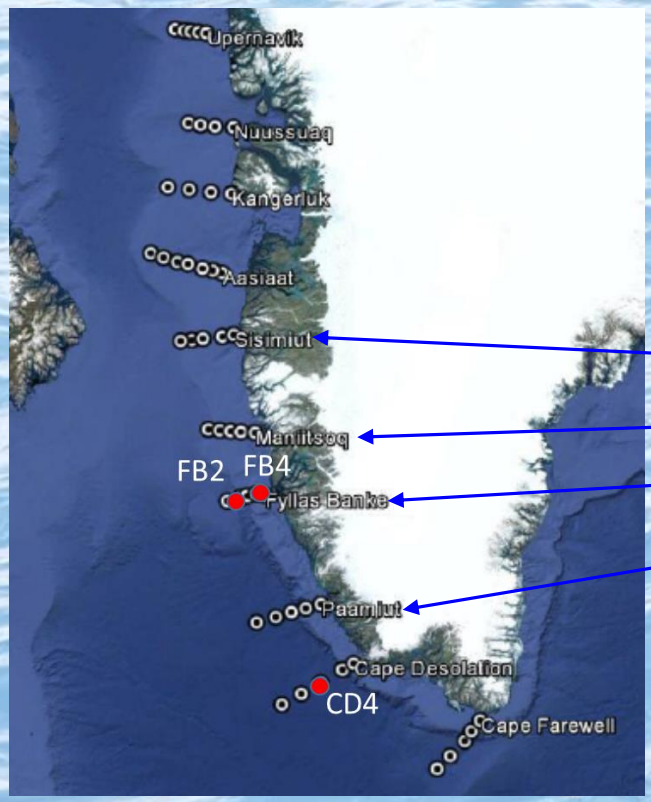


Rysgaard et al., 2020

BBPW – Baffin Bay Polar Water

- West Greenland Current (**WGC**) has 3 components:
  - a cold, fresh and surface near inshore surface coastal waters (**CW**);
  - a saltier, warmer and deeper offshore water – the Subpolar Mode Water (**SPMW**);
  - freshwater runoff from Greenland.

NAFO Subarea 1: Oceanographic sections and main climate variables

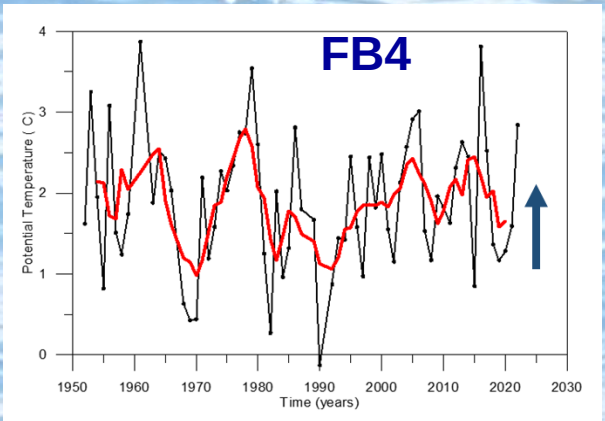


- Location of standard sections in West Greenland waters.
- **Oceanographic sections** sampled in **late July 2022**.
  - Sisimiut
  - Maniitsoq
  - Fyllas Banke
  - Paamiut
  - reference stations FB2, FB4, CD4

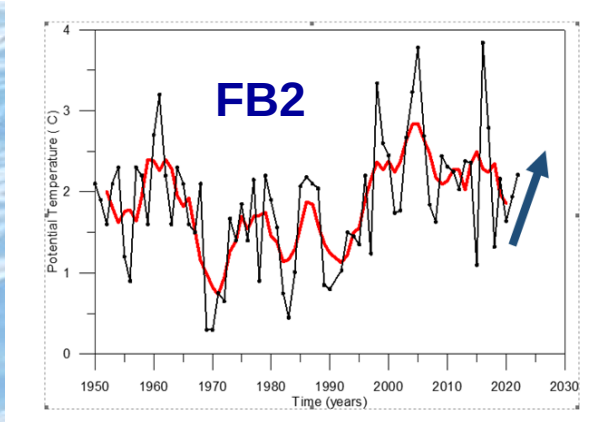
CLIMATE variables

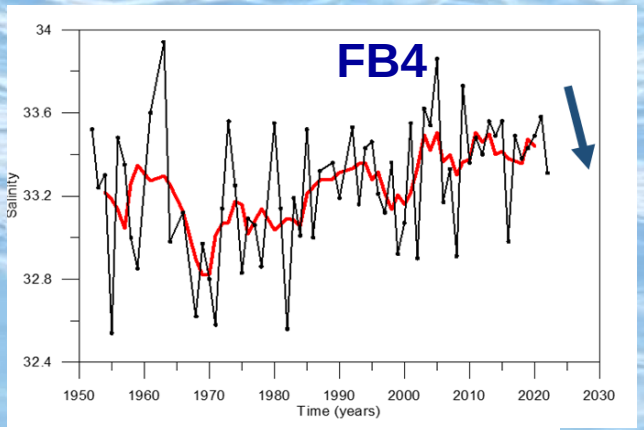
- **Positive** winter **NAO** index (2022)
- Nuuk mean **Air Temperature** (2022) = -1.3 ºC.
  - 0.3 ºC **lower** than the 1991-2020 long-term mean.
  - 1.4 ºC **lower** than in 2021

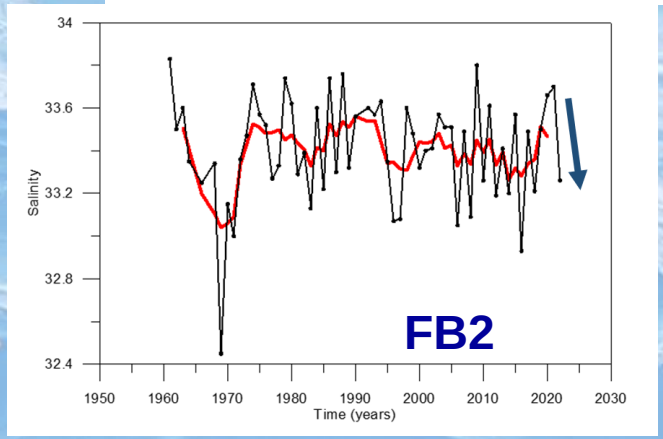
NAFO Subarea 1: Fyllas Banke (FB4 & FB2)



Temperature continue to **increased** being above to the **long-term means** (+1.15 and +0.30 °C) in **coastal (FB4)** and **offshore (FB2)** waters.





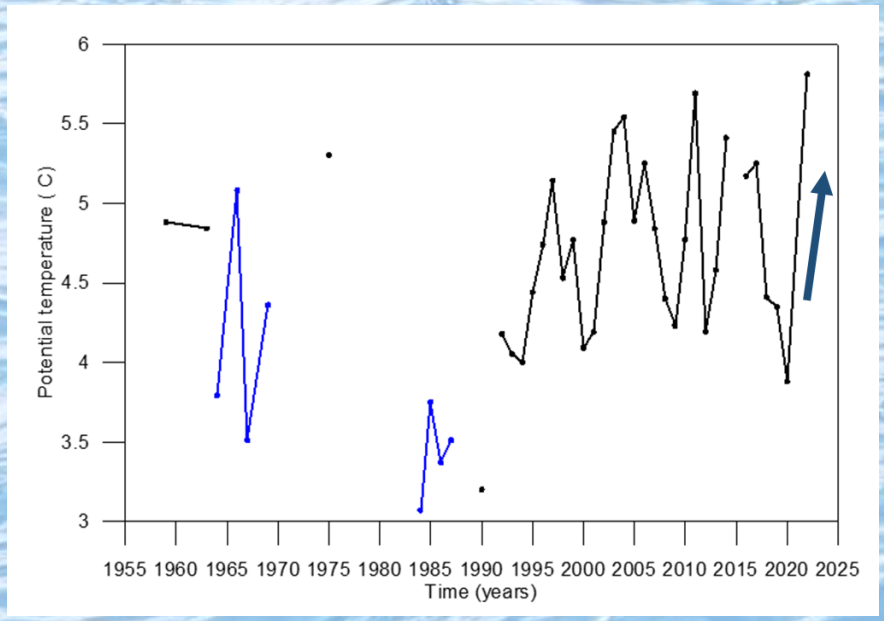


In 2022 salinity was +0.04 **above** its **long-term mean** (33.27) in coastal waters.

Offshore waters showed salinity (-0.16 °C) **below** the long term mean (33.42).

Salinity of the **coastal** (**FB2**) and **offshore** waters (**FB4**) showed the same trend with marked **decrease**.

NAFO Subarea 1: Cape Desolation



Water temperature (75-200m) showed a **shift on the trend, increasing** to the **highest value** observed in this station

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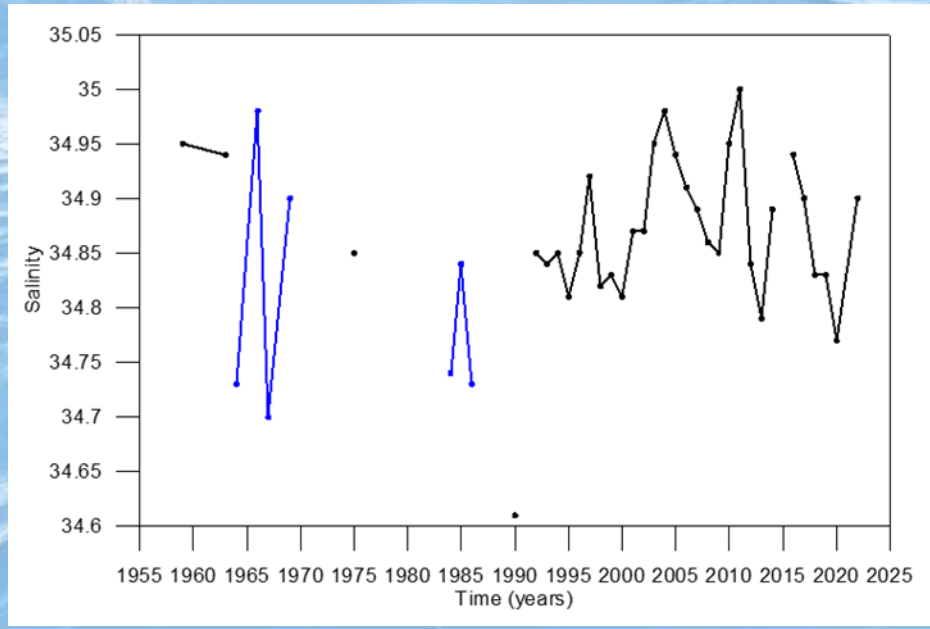
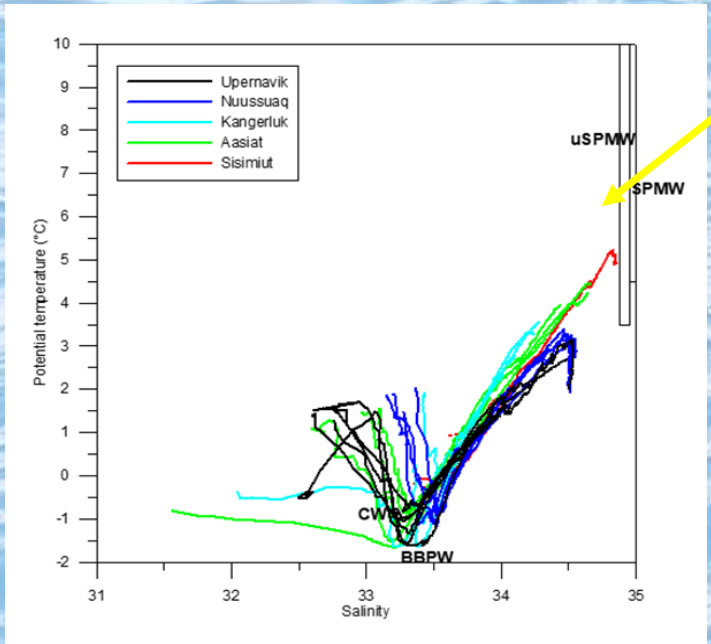
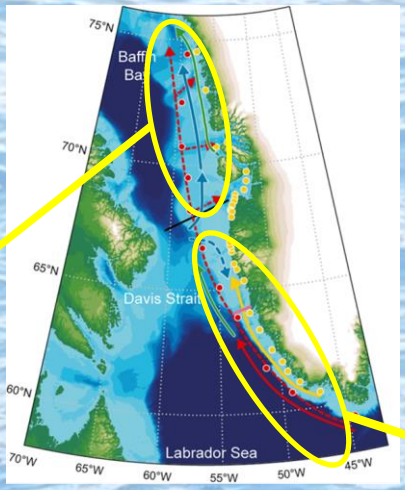
In 2022, temperature was 1.16 ºC above the **long-term mean** (+5.81°C).

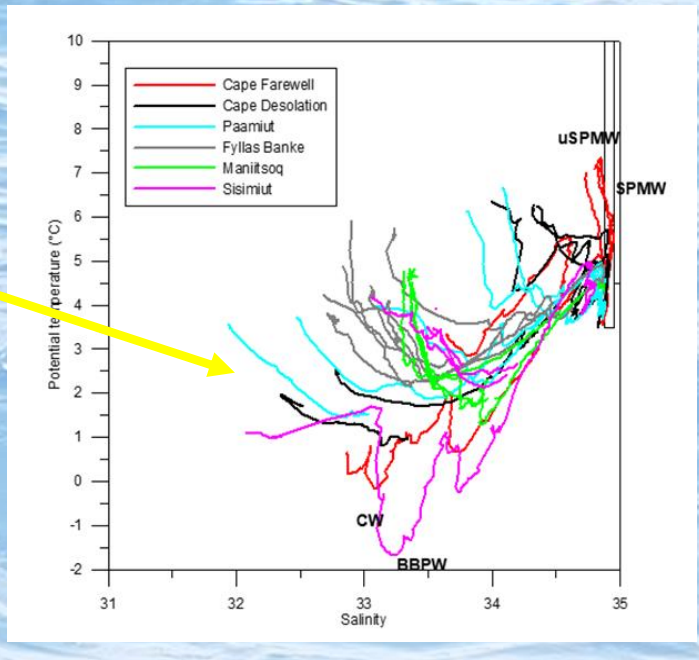
Salinity also **shifted the trend**, **increasing** in 2022 up to 0.02 above its **long-term mean** (34.9).



NAFO Subarea 1 – West Greenland







BBPW – Baffin Bay Polar Water
CW – Coastal Water
uSPMW - upper SubPolar Mode Water
SPMW - SubPolar Mode Water

- **SPMW** (salinity > 34.95) **only observed** on **Cape Farewall**
- From Cape Farewell (southern Greenland section) to the Sisimiut section the salinity varied from 34.88 to 34.95
- Only deep **SPMW** was observed to **enter Baffin Bay**

Subpolar Mode Water (SPMW) ⇔ Irminger Water

Highlights

- Hydrographic conditions were monitored at all 10 hydrographic standard sections in June-July 2022 **across** the continental **shelf off West Greenland**.
- The coastal water showed temperatures **above** the **long-term mean** south of the **Sisimiut section**.
- **Lowest** temperature was observed **north of the Sisimiut section**, associated with the **Baffin Bay Polar Water**
- After some years with a relative fresh **Subpolar Mode Water mass**, salinity has **returned** to its **long-term mean value**.

John Mortensen

Greenland Institute of Natural Resources
Kivioq 2, Box 570
3900 Nuuk,
Greenland

Source:

Mortensen, J. (2023). Report on hydrographic conditions off Southwest Greenland June-July 2022, NAFO SCR Doc. 23/005.

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Additional information:

Jensen, CD (ed.), 2023: Greenland - DMI Historical Climate Data Collection 1784-2022, DMI Report No. 23-04

Mortensen J, Rysgaard S, Winding MHS, Juul-Pedersen T, Arendt KE, Lund H, Stuart-Lee AE, Meire L. (2022). Multidecadal Water Mass Dynamics on the West Greenland Shel. *Journal of Geophysical Research: Oceans*, 127:e2022JC018724. https://doi.org/10.1029/2022JC018724

Rysgaard, S., W. Boone, D. Carlson, M. Sejr, J. Bendtsen, T. Juul-Pedersen, T. Lund, L. Meire, **J. Mortensen**. (2020). An updated view on water masses on the pan-west Greenland continental shelf and their link to proglacial fjords. *Journal of Geophysical Research: Oceans*, 125:e2019JC015564. https://doi.org/10.1029/2019JC015564