



**NAFO** Northwest Atlantic  
Fisheries Organization



# **The 2021 Overview of the Environmental and Physical Oceanographic Conditions on the Eastern Canadian shelves (NAFO Sub- areas 2, 3 and 4**



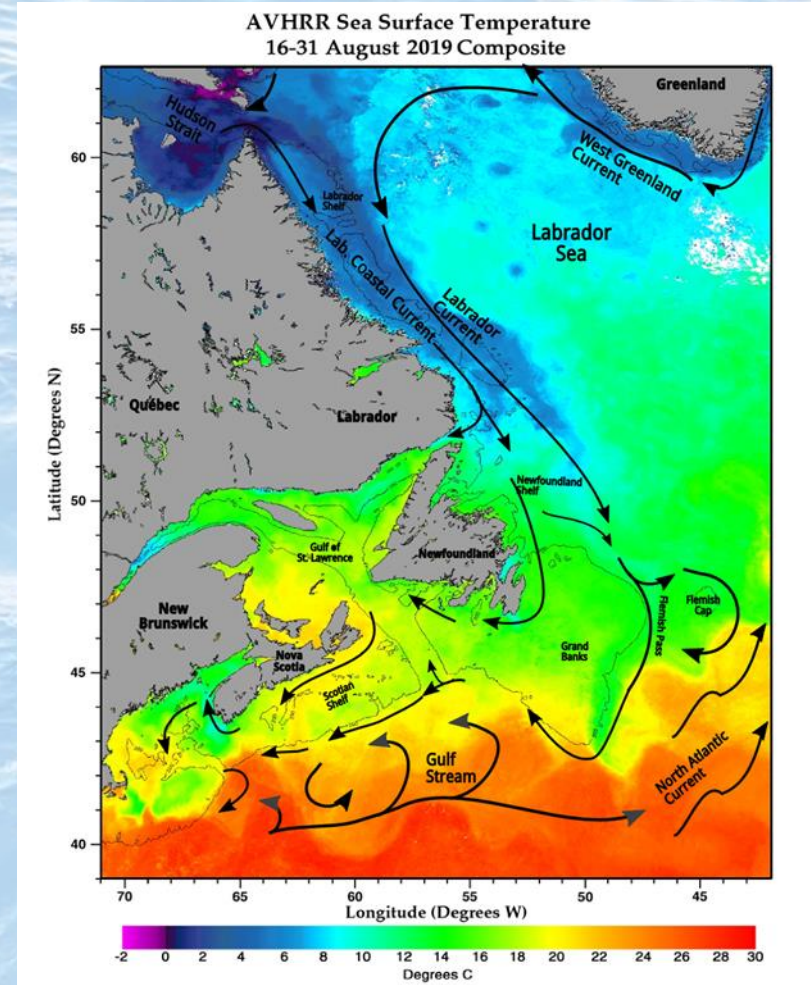
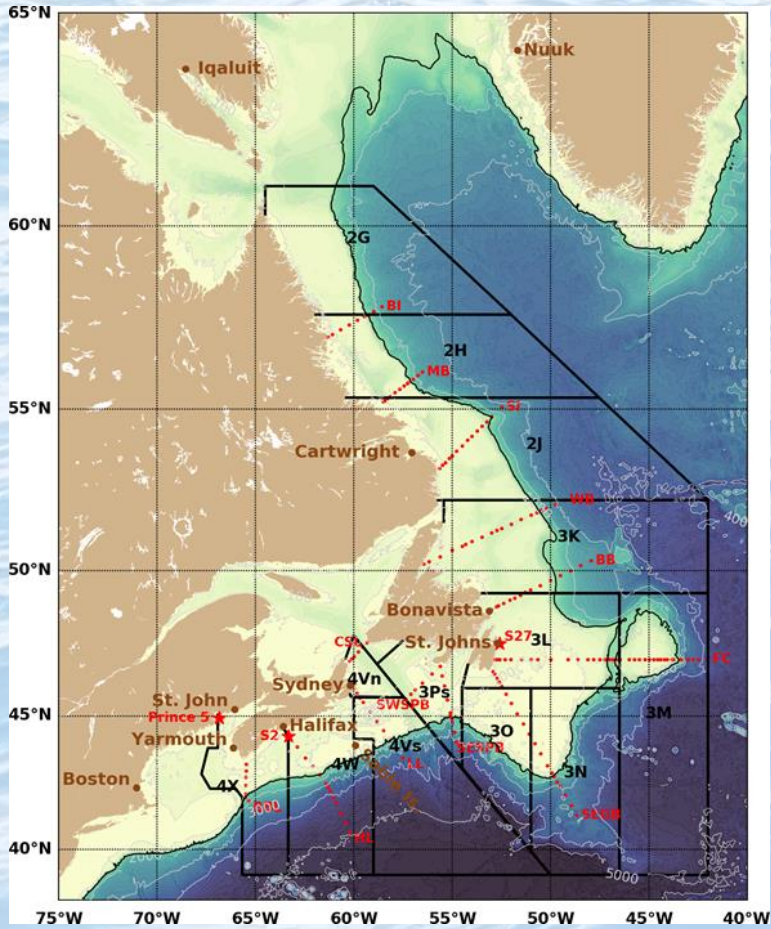
Fisheries and Oceans Pêches et Océans  
Canada Canada

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Atlantic Zone Monitoring Program (AZMP)  
NAFC Oceanography Section



# NAFO Subareas 2, 3 and 4 – Main features and general circulation

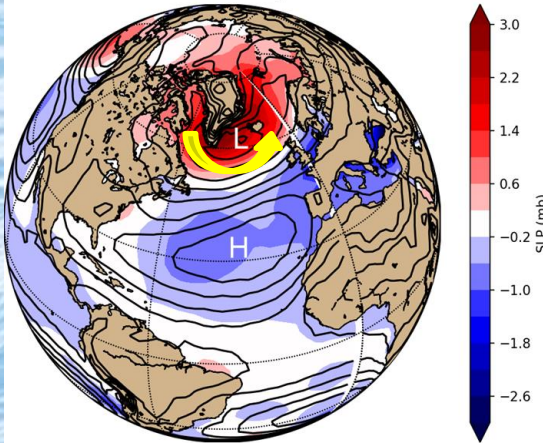




# NAFO Subareas 2, 3 & 4 – North Atlantic Oscillation (NAO)

## NAO –

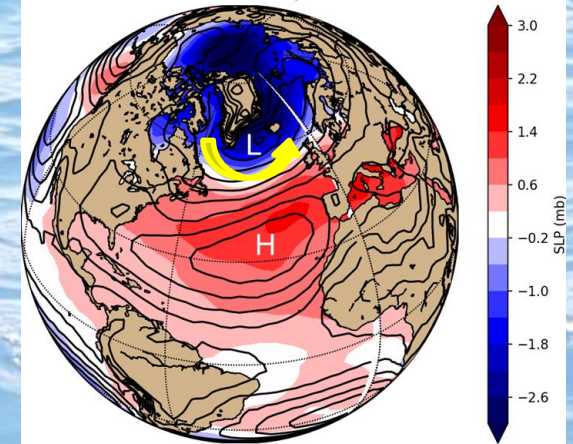
Sea Level Pressure anomaly- 1965-1969



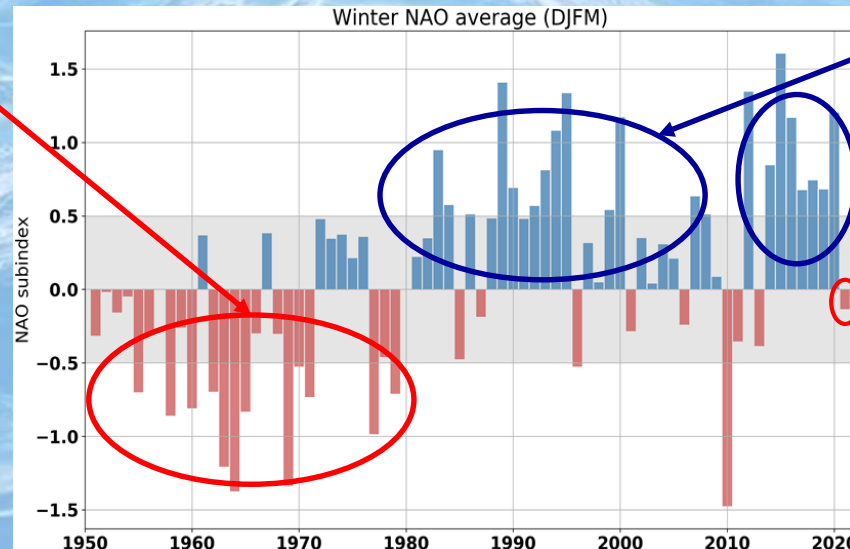
Warmer weather in NL

## NAO +

Sea Level Pressure anomaly- 1990-1994



Colder weather in NL

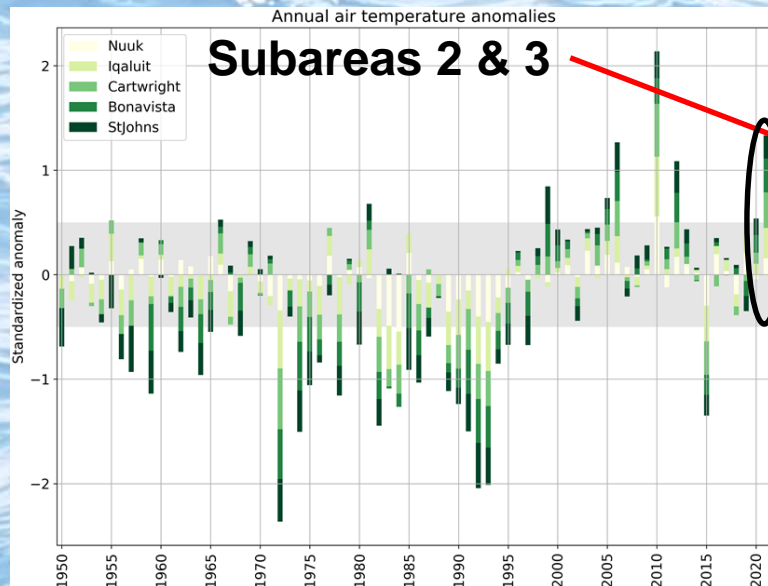


First time  
negative/neutral  
in 8 years

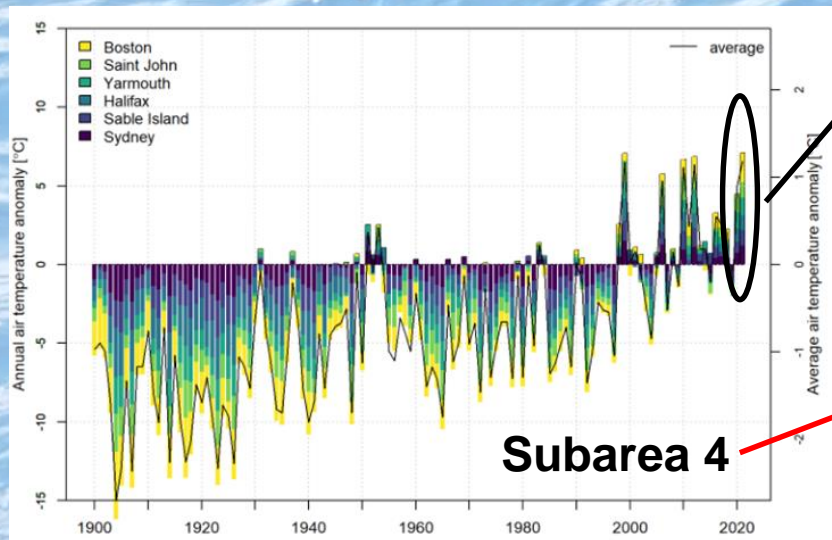
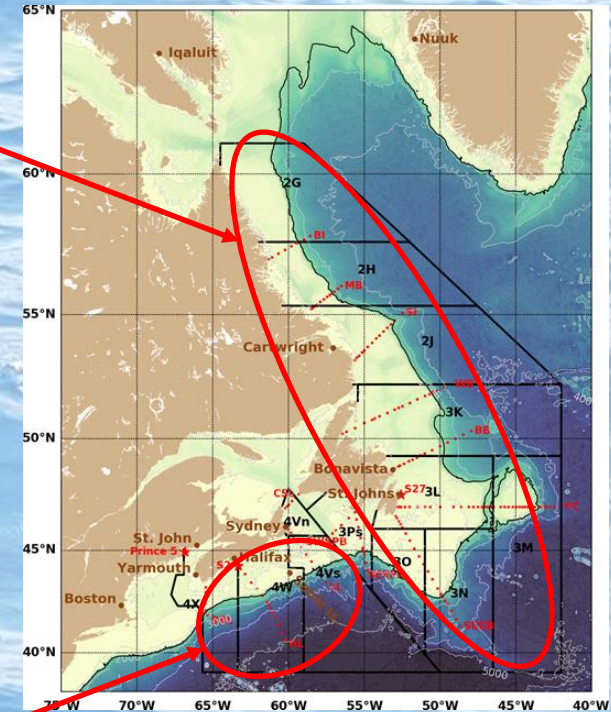




# NAFO Subareas 2, 3 & 4 – Air temperature



- All sites positive anomalies
- 2<sup>nd</sup> warmest overall.

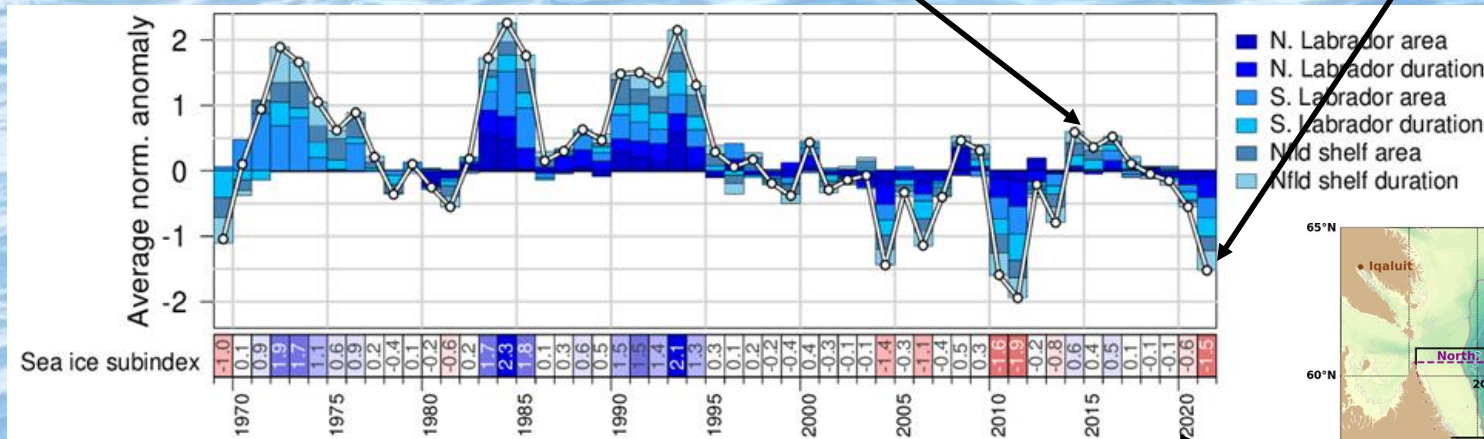




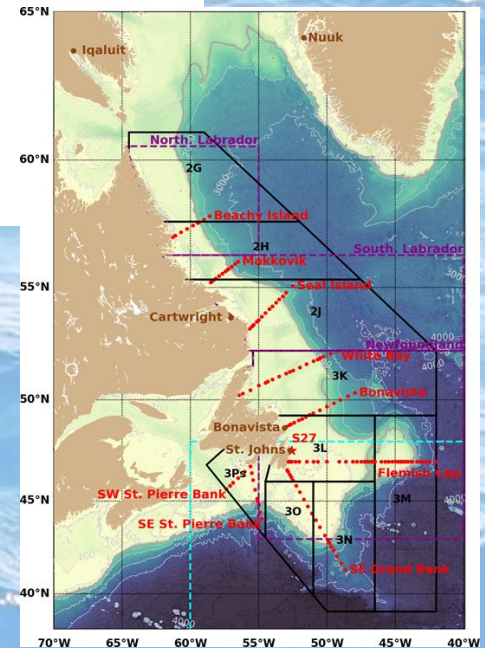
# NAFO Subareas 2, 3 & 4 – Sea Ice

Sea-ice rebound  
2014-2017

3<sup>rd</sup> lowest sea-ice  
on record



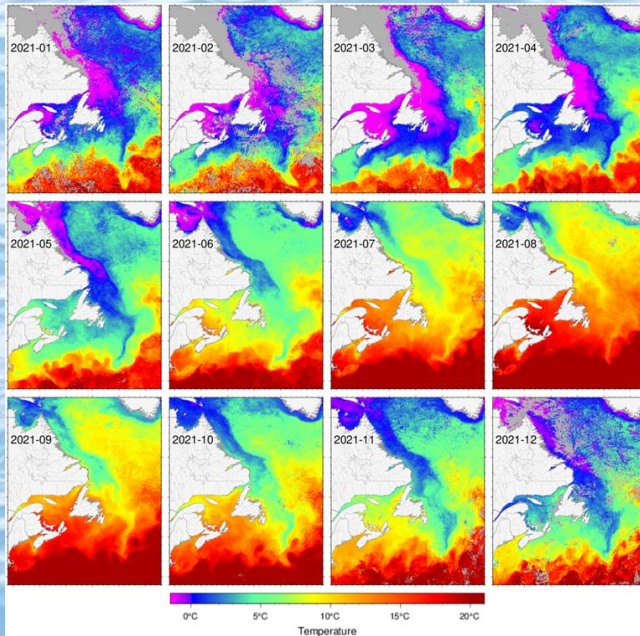
Predominance of low sea  
ice since the late 1990's



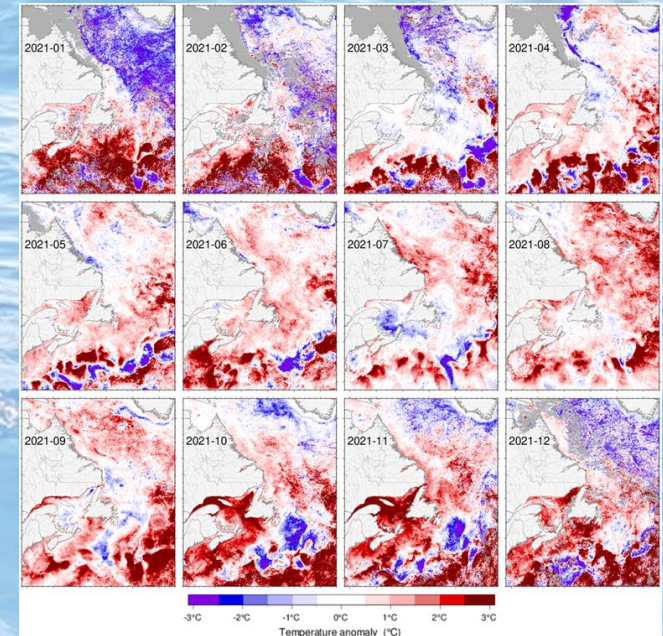


# NAFO Subareas 2, 3 & 4 – Sea Surface Temperature (SST)

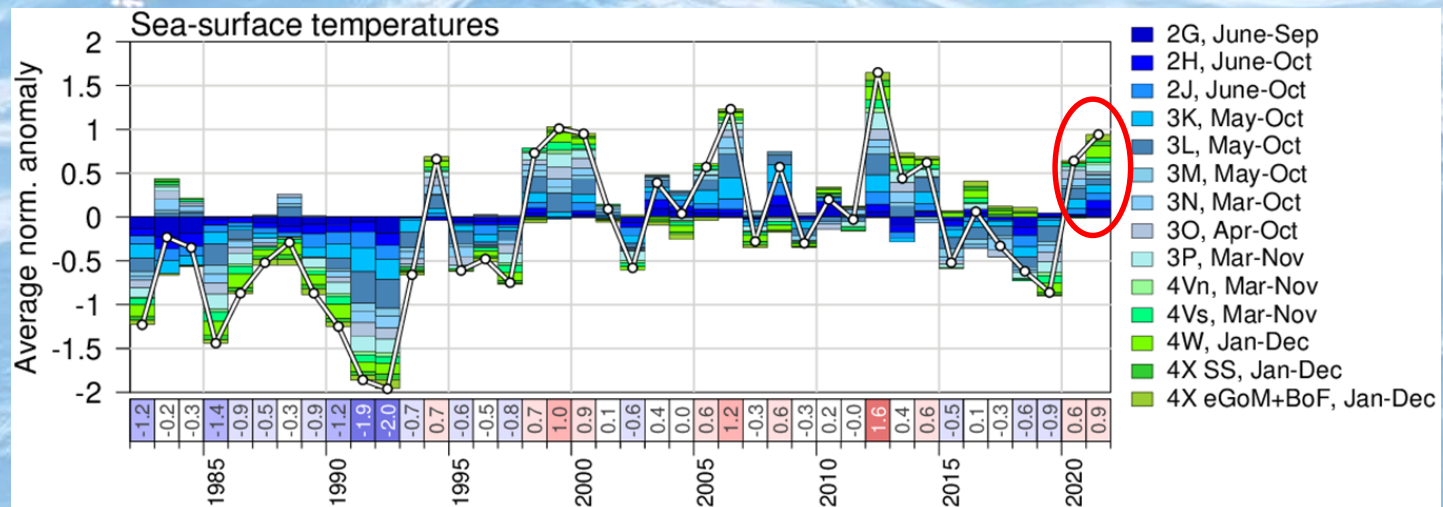
Temperature (°C)



Temperature anomaly (°C)

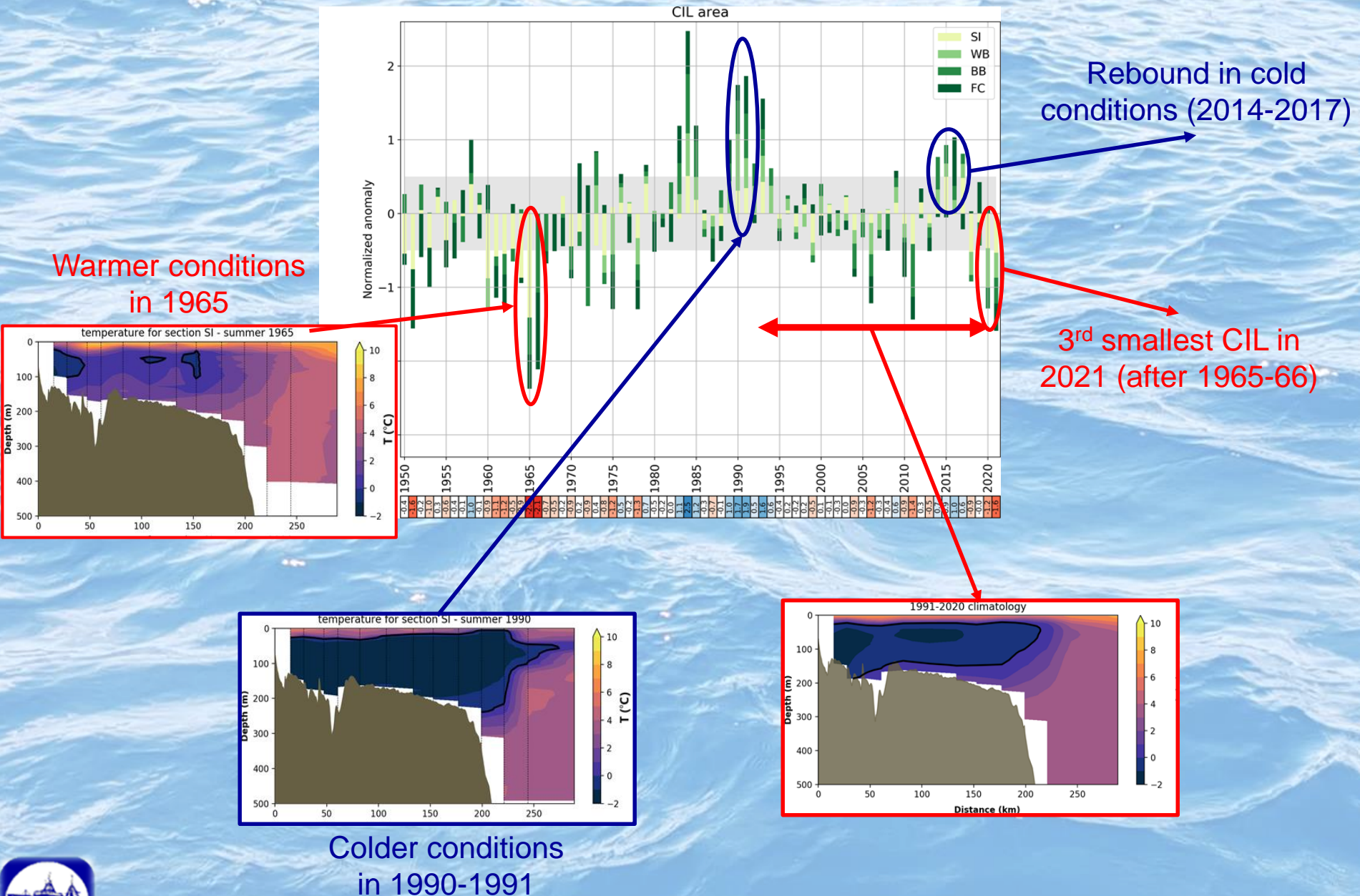


Warmer than average  
SST for the second  
year in a row



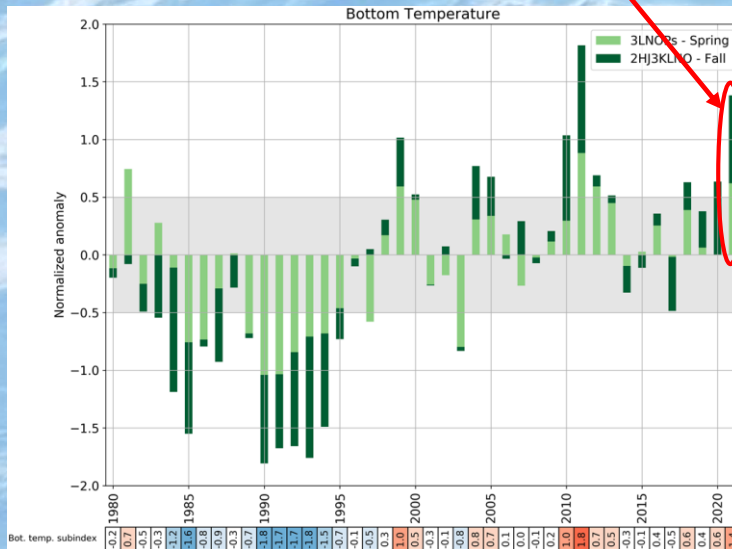
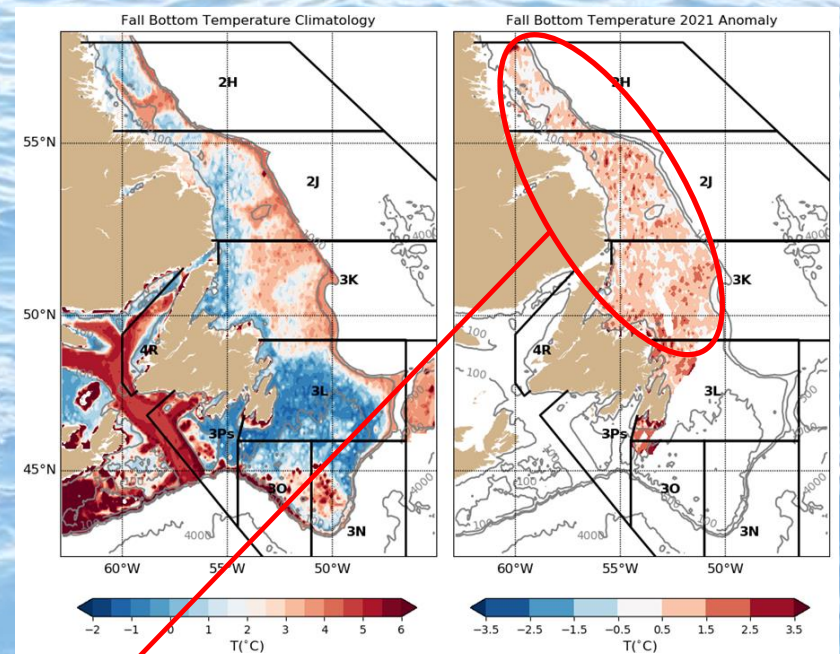
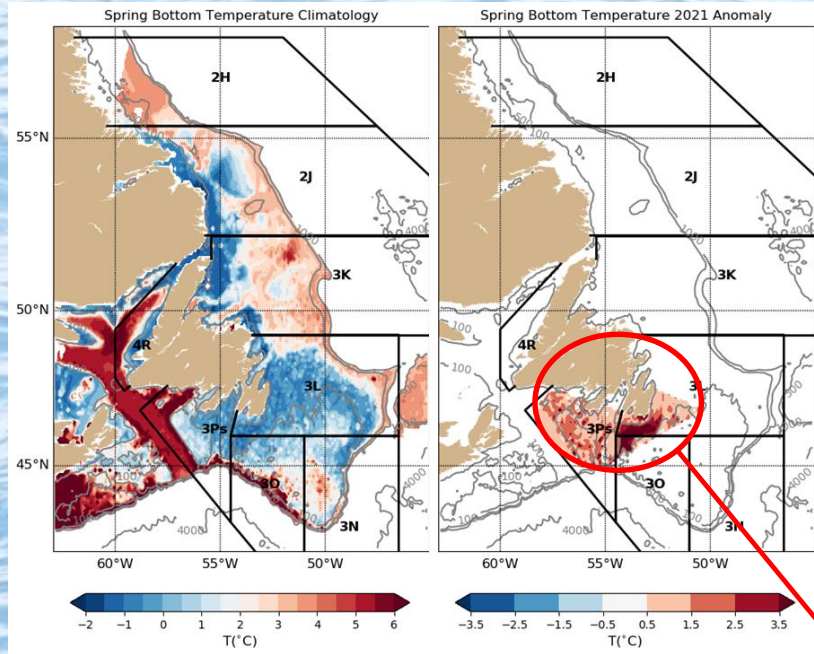


# NAFO Subareas 2, 3 & 4 – Cold Intermediate Layer (CIL)





# NAFO Subareas 2 & 3 – Bottom temperatures

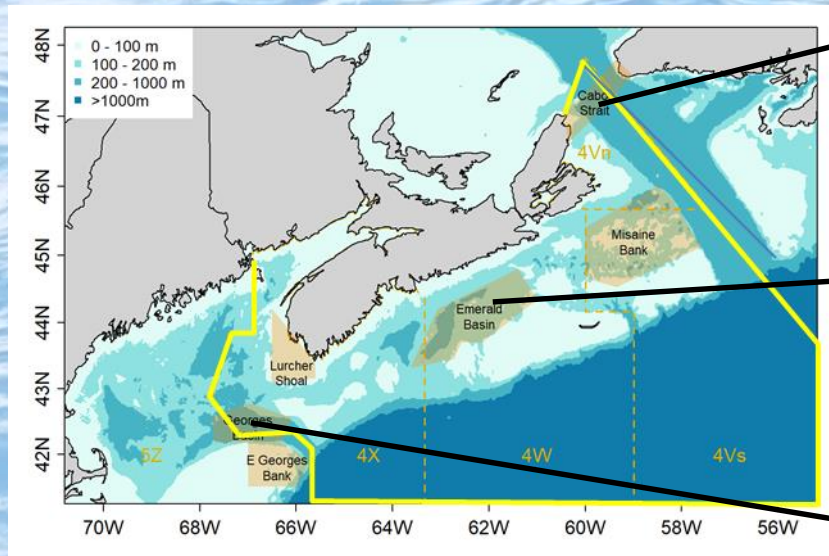


2<sup>nd</sup> warmest bottom temperature

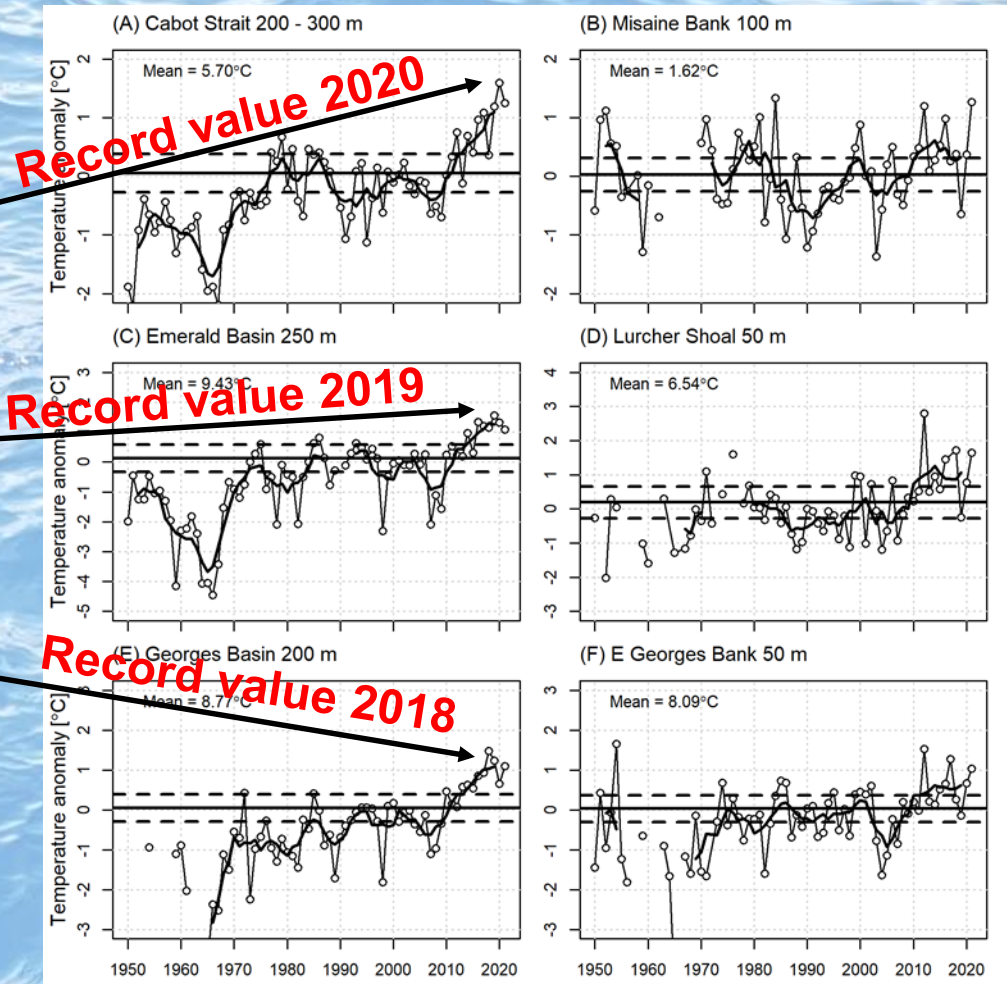




# NAFO Subareas 4 – Bottom temperatures

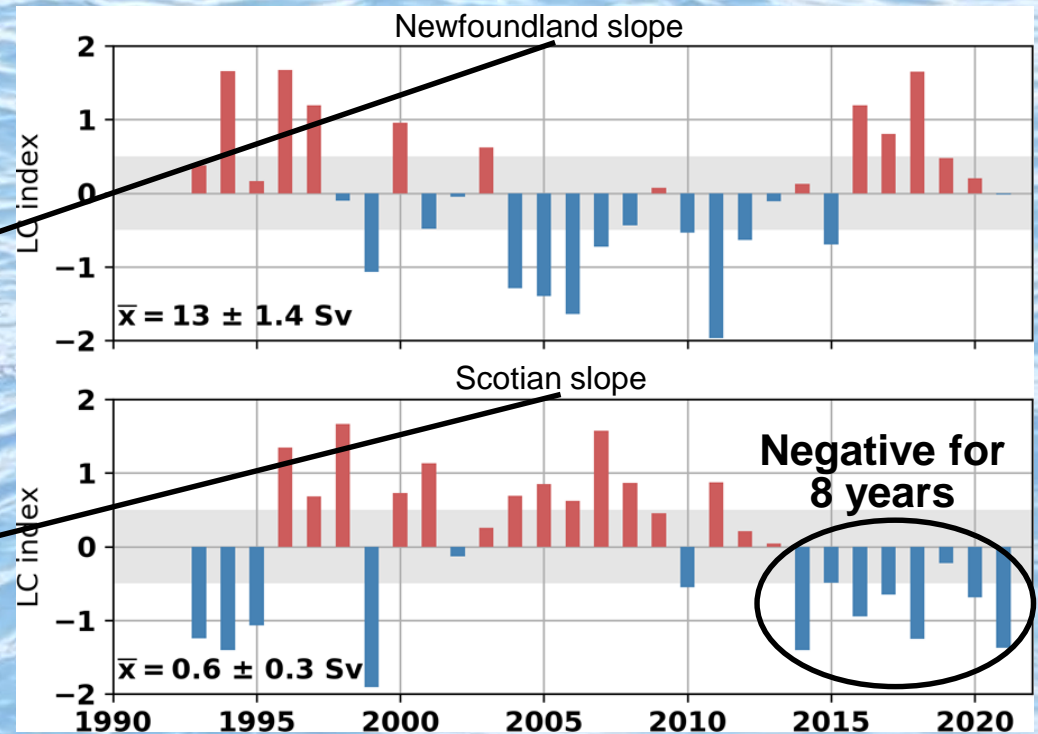
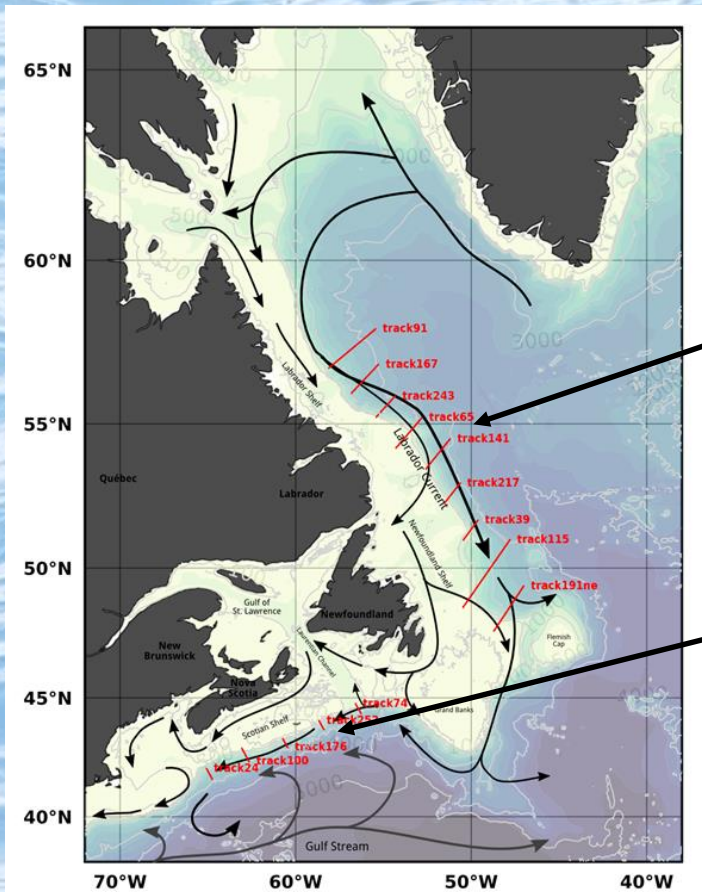


Bottom temperatures  
above normal values





# NAFO Subareas 2, 3 & 4 – Labrador Current transport



Lower Scotian slope transport means warmer and less oxygenated water entering the Laurentian channel





# Highlights

- The winter **NAO** was **negative** for the **first time in 8 years**.
- The annual **air temperature** was **above normal** across the **NAFO Subareas 2, 3 & 4** (including some records).
- **Sea ice** conditions were at their **third lowest** level of the time series (after 2010 and 2011).
- Seasonal **Sea Surface Temperature** was **above-normal** across the **NAFO Subareas 2, 3 & 4**.
- The **Cold Intermediate Layer** on the **Newfoundland shelf** was at its **third smallest area** since 1950 (after 1965 and 1966).
- **Bottom temperatures** were **above normal** across the **NAFO Subareas 2, 3 & 4** (including some records or near-records).
- The transport on the **Scotian Slope** remained **below normal** for the **8<sup>th</sup> consecutive year**.







**Frédéric Cyr**

Northwest Atlantic Fisheries Center,  
DFO-NL, St. John's, NL,  
Canada



Fisheries and Oceans  
Canada  
Pêches et Océans  
Canada



**Peter S. Galbraith**

Institut Maurice-Lamontagne  
DFO-QC, Mont-Joli, QC,  
Canada



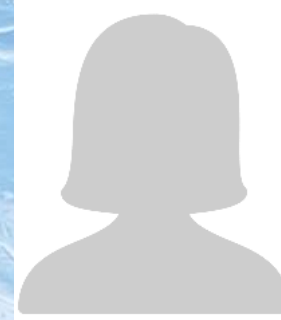
**Chantelle Layton**

Bedford Institute of Oceanography,  
DFO-MAR, Dartmouth, NS,  
Canada



**Dave Hebert**

Bedford Institute of  
Oceanography, DFO-MAR,  
Dartmouth, NS,  
Canada



**Nancy Chen**

Northwest Atlantic Fisheries Center,  
DFO-NL, St. John's, NL,  
Canada



**Guoqi Han**

Institute of Ocean Sciences,  
DFO-PAC, Sidney, BC,  
Canada

Source:

**Cyr, F., Galbraith, P.S., Layton, C., Hebert, D., Chen, N., Han, G. (2022). Environmental and Physical Oceanographic Conditions on the Eastern Canadian shelves (NAFO Subareas 2, 3 and 4) during 2021, NAFO SCR Doc. 22/020.**