

Labrador region is presenting a positive trend of SST and declining of sea ice coverage

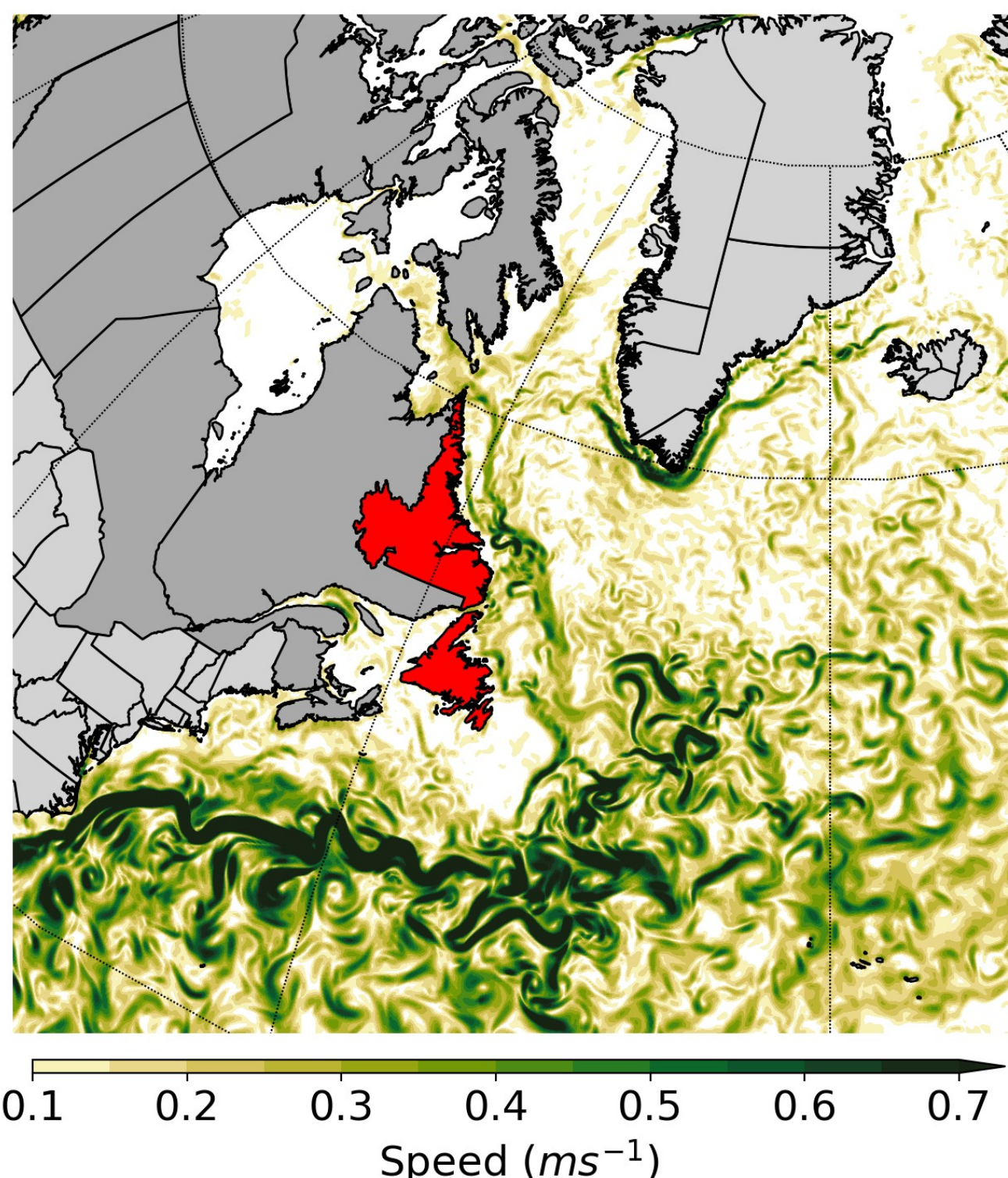
Towards a Regional Model for the Labrador Coast and Shelf

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INTRO

- The region of interest is the Labrador Coast, continental shelf and deep waters.
- Main feature is the Labrador Current (LC): cold and fresh waters flowing SE
- Presenting significant ocean climate change in recent decades



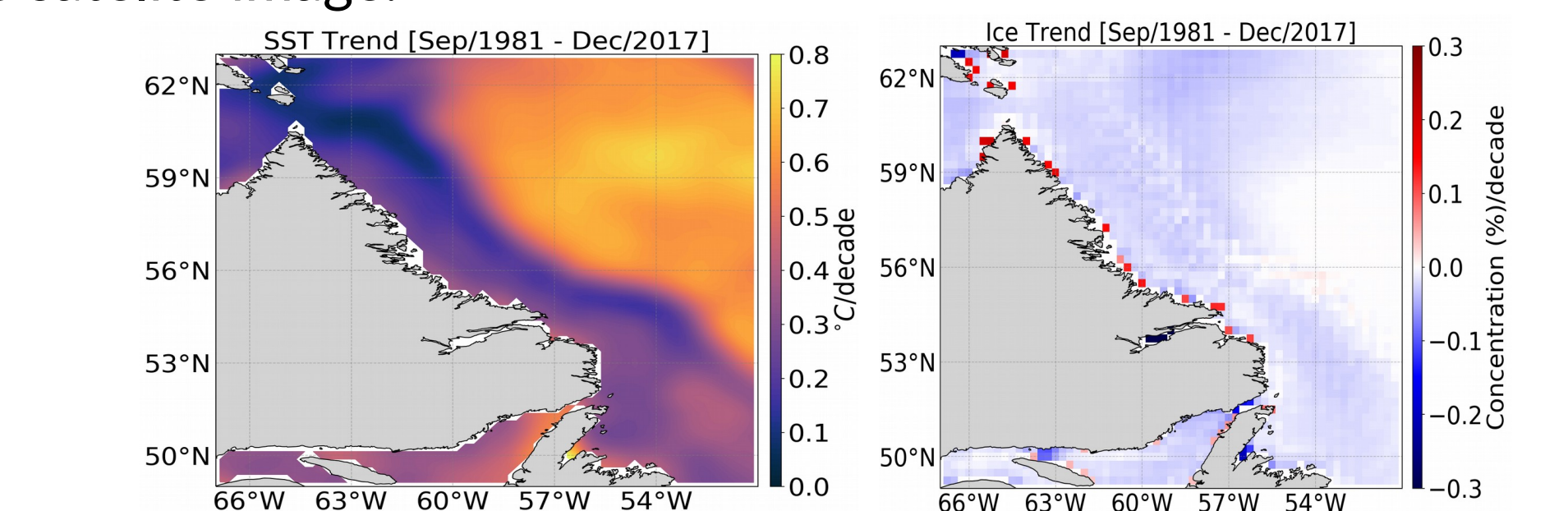
METHODS

- Data: daily NOAA OISST, SST and ice concentration
- Period of study: 1981-2017
- Linear regression for the whole period and also within individual decades
- Monthly means per year were also performed

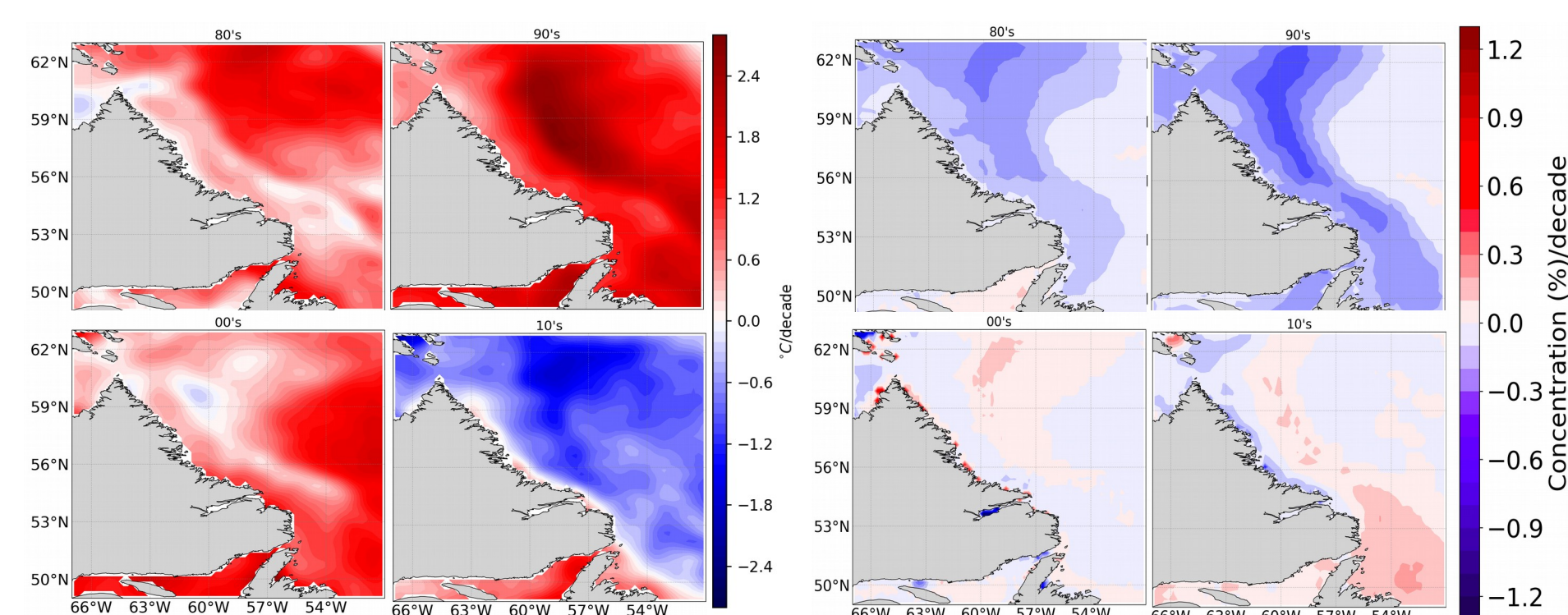
RESULTS

Left panel: shows the trend for SST for the total period (1981-2017), with a positive trend over the whole area. The LC (evident in blue colours) shows a weaker trend.

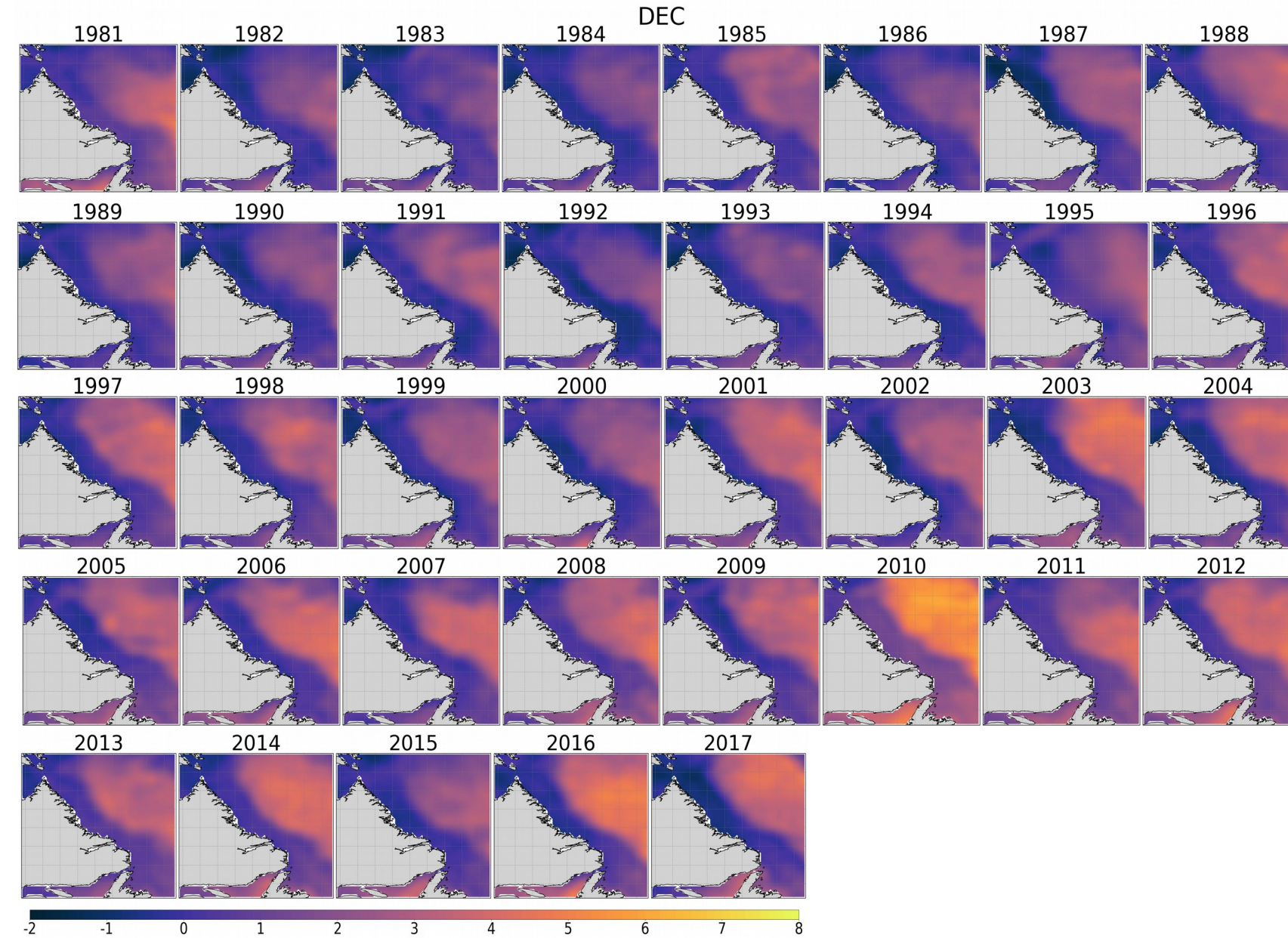
Right panel: shows the trend for sea ice concentration, which is decreasing over most areas. The isolated spots of positive trends along the coast are possible due to the resolution (or artefacts) of the satellite image.



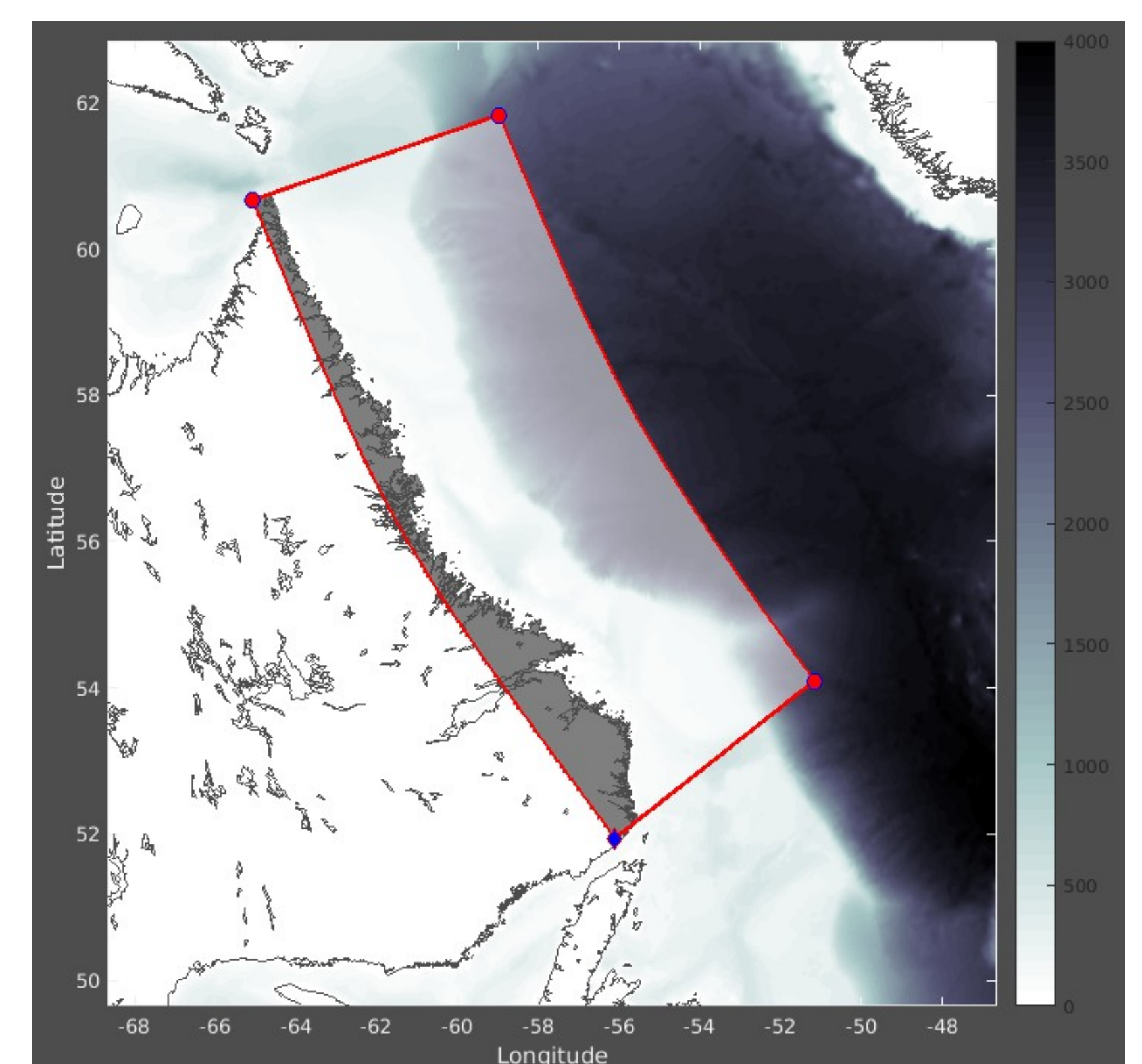
For the trends within 80's, 90's, 00's and 10's decades, different behaviours can be seen. The first two decades presented a strong increasing in SST and decrease in sea ice trends. The decade of 00's reduces its trend and in the 10's we see a decreasing SST and increasing sea ice.



The monthly mean SST for December is shown for each year in the panels below. In general, cold waters seems to occupy the Labrador shelf, whereas the Labrador Sea is showing an increase of SST. Both the year-to-year variability and long-term changes are clear.



NEXT STEPS



- We would like to explore these signals in more detail using a regional numerical ocean model
- ROMS for the physical oceanographic process, sea-ice (CICE) and possibly a marine biogeochemical model component
- Grid Resolution: 2x2 km, (190 grid points cross-shore, 590 following the shelf-break)
- 40 vertical levels
- GEBCO bathymetry
- Forcing Fields
 - Atmospheric: ERA5
 - Ocean: GLORYS
- PRELIMINARY QUESTIONS
 - What are the interannual and decadal variability and the long-term trends of the temperature, currents, sea ice fresh water for the region?
 - What is the ocean connectivity between coastal, continental shelf and deep ocean zones?



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