

# Indigenous Knowledge co-creation can help predict future climate stability in Hudson Bay.

Hannah L. Louis and Paul G. Myers

Department of Earth and Atmospheric Sciences, University of Alberta

## Examining Climate Change in Hudson Bay with High-Resolution Numerical Modelling

### BACKGROUND

- Cree and Inuit Elders in the Hudson's Bay Complex (HBC) reported an abrupt change in the climate starting in the 1990s
- Traditional methods of predicting sea ice/snow are not failing
- Lack of scientific data and climate services in the region poses a safety risk to surrounding communities

### Research Questions

- I. How will increasing air temperatures affect the overall dynamics of the HBC?
- II. Relative contributions of the processes that control the dynamics of the HBC?
- III. Which processes are responsible for the reported abrupt ecological changes?

### OCEAN CHANGES

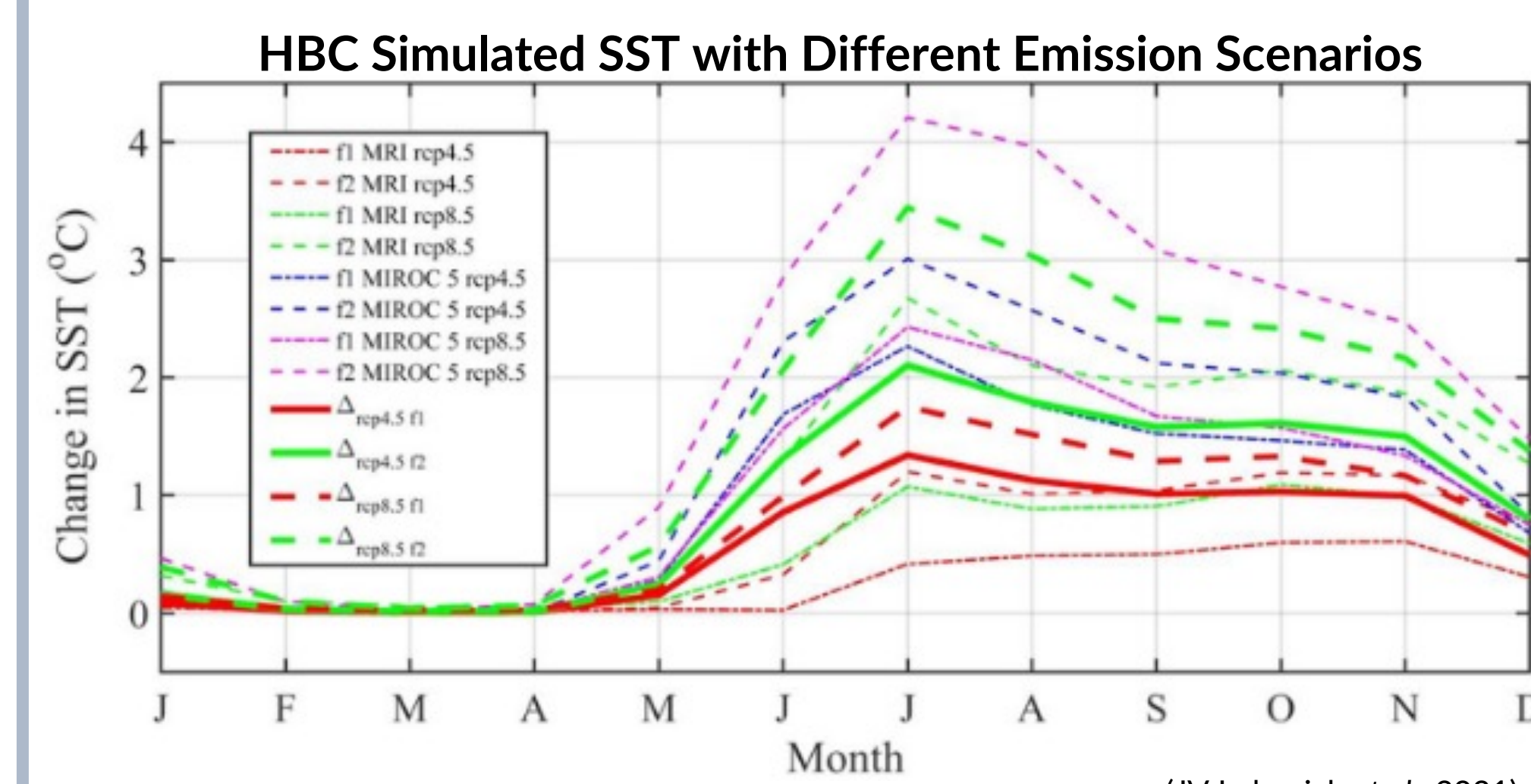
- Early onset of sea ice breakup, delay in onset of sea ice formation
- Hydroelectric development impacting the freshwater cycle
- Sea surface temperatures (SST) increasing
- Sea surface salinity (SSS) future projections are ambiguous
- Different and opposing processes influence SSS

### NUMERICAL MODELING (NEMO)

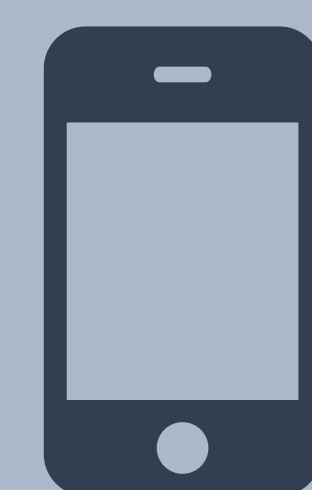
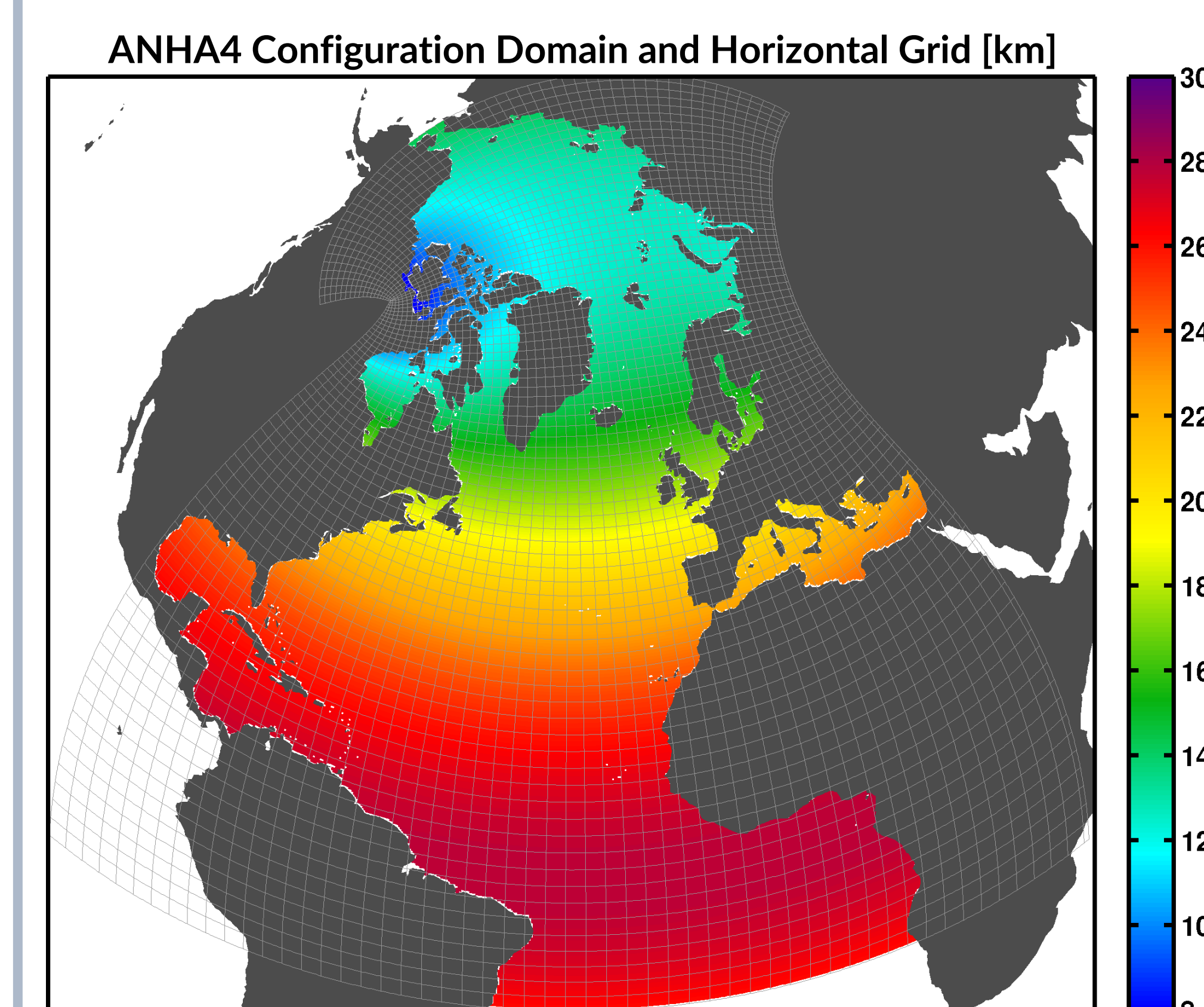
- Nucleus for European Model of the Ocean
- Analyze model output (Configuration: Arctic and the Northern Hemisphere Atlantic,  $\frac{1}{4}^{\circ}$  resolution (ANHA4))
- Model validation with two approaches:
  - a. Western science (e.g., satellite observations, historical databases)
  - b. Indigenous knowledge



(ZA Kuzyk & LM Candlish, 2019)



(JV Lukovich et al., 2021)



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Acknowledgements: I would like to thank Dr. Paul Myers, Dr. Zou Zou Kuzyk (UManitoba), and Dr. Eric Oliver (Dalhousie) for their support and insight.