

#13 High-Resolution Ocean Simulations using the NEMO ocean model and AGRIF nesting software

Clark Pennelly, Xianmin Hu, Yarisbel Garcia, Laura Gillard, Natasha Ridenour, Laura Castro de la Guardia, Nathan Grivault, Juliana Marson, Samantha Roch, Paul Myers
Department of Earth and Atmospheric Sciences, University of Alberta

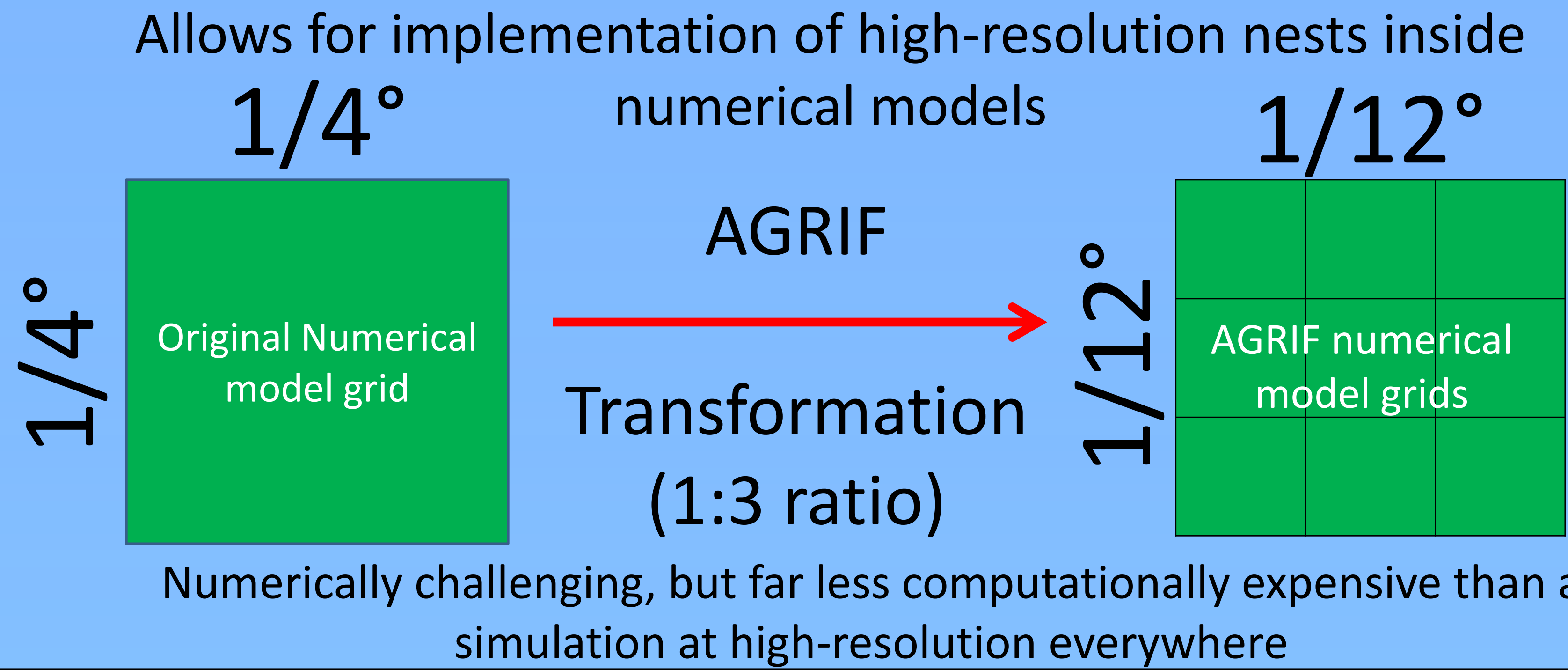


NEMO (Nucleus for European Modelling of the Ocean)

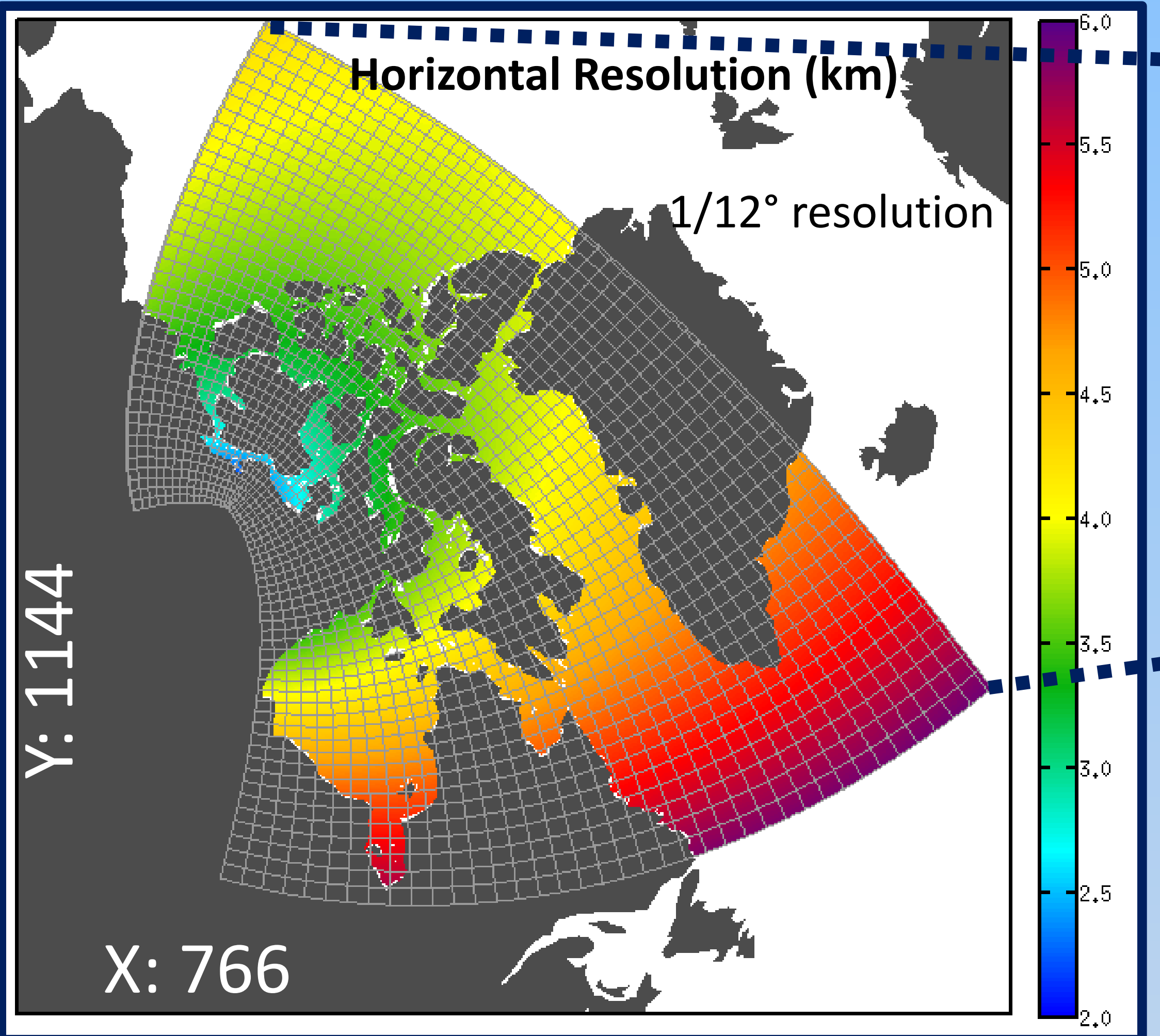
- Suite of coupled numerical models for studying the ocean
 - Ocean model (OPA)
 - Sea-Ice model (LIM2)
 - Tracer model (TOP)
 - Bio-geochemistry (BLING- see poster #16)
 - Nesting model (AGRIF)
- See Poster #14**

We use these models to perform research on the Northern Atlantic and Arctic region, studying various processes. Together, with AGRIF, we can understand important small scale features.

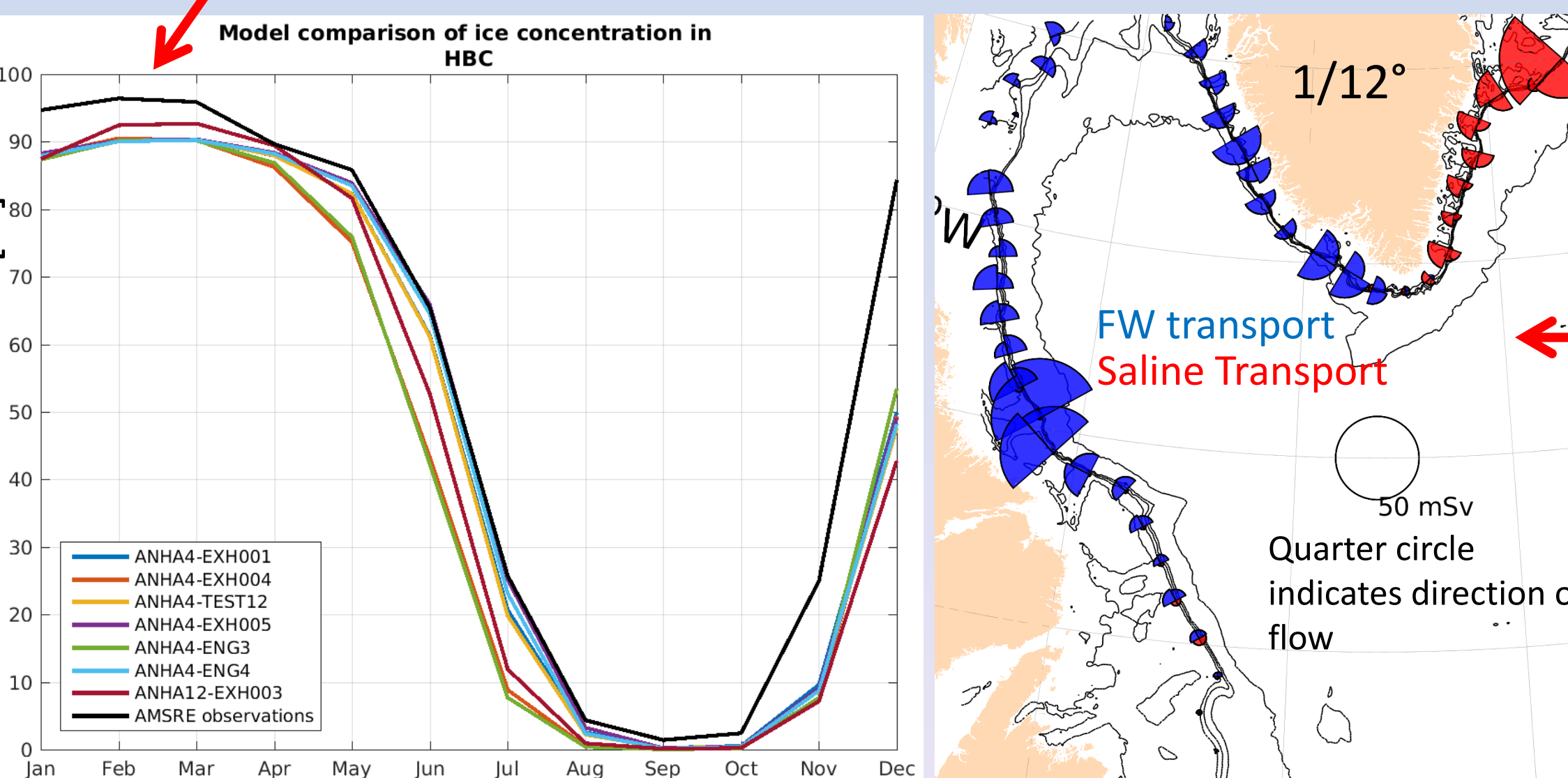
AGRIF (Adaptive Grid Refinement In Fortran)



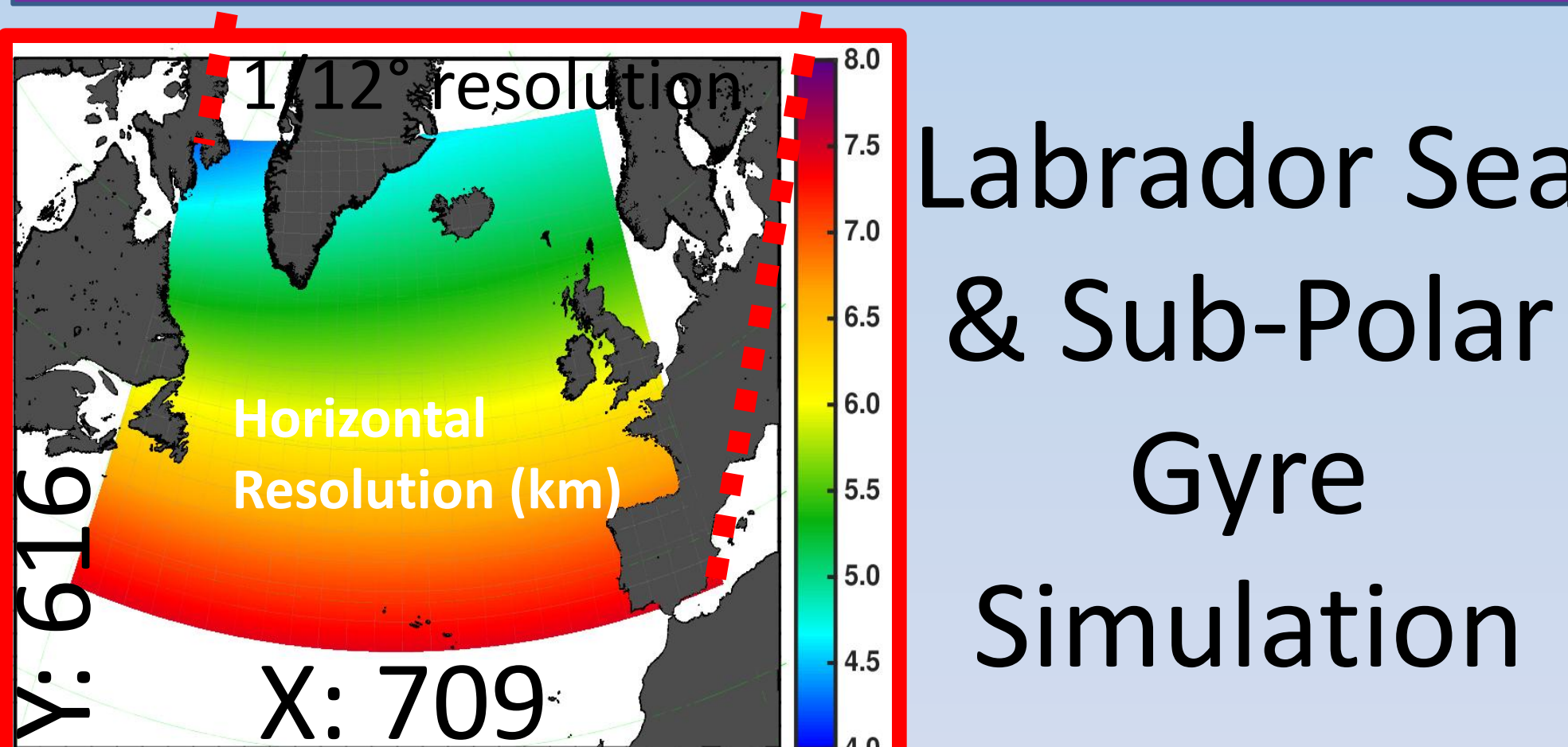
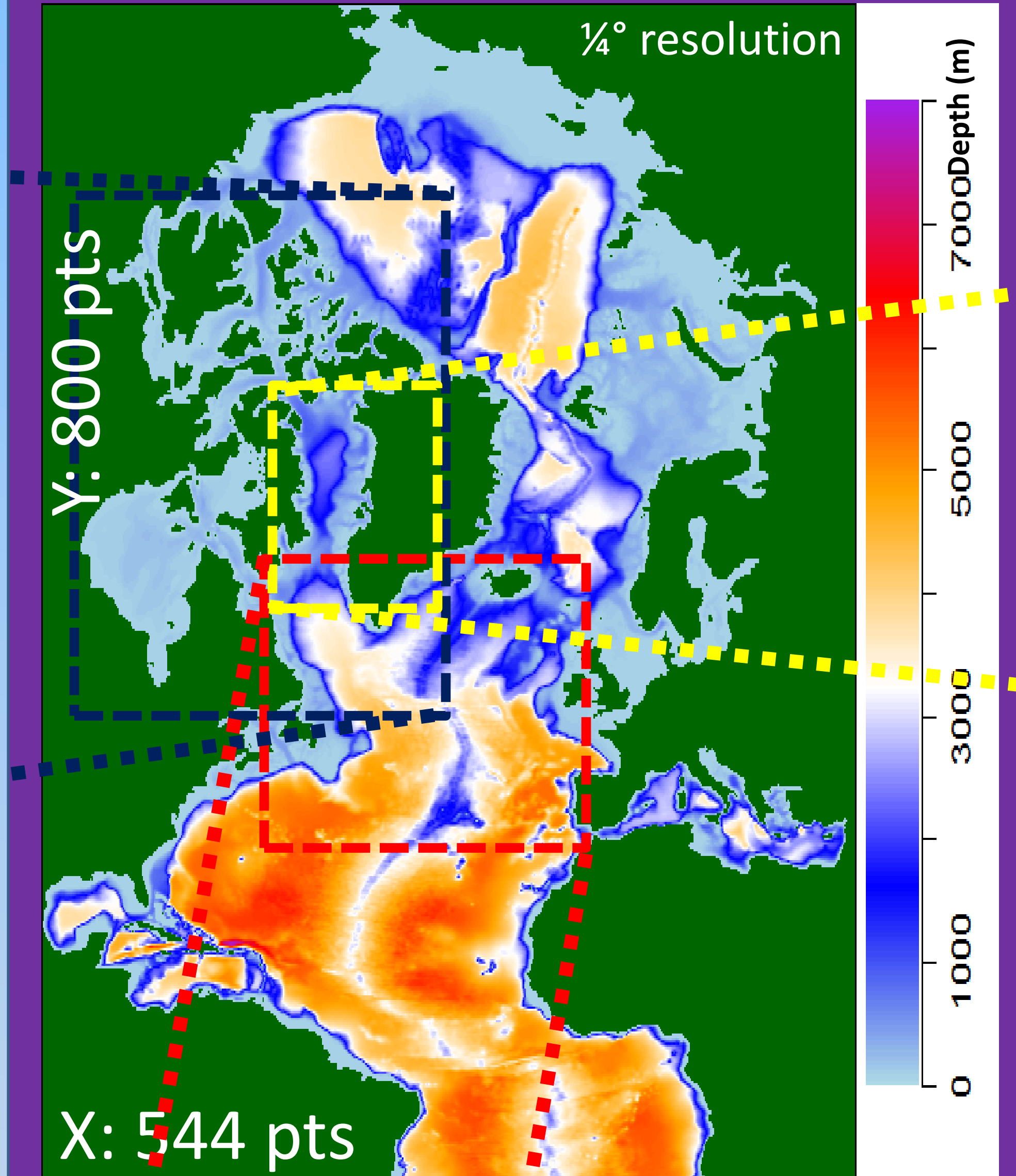
Canadian Arctic Archipelago Simulation



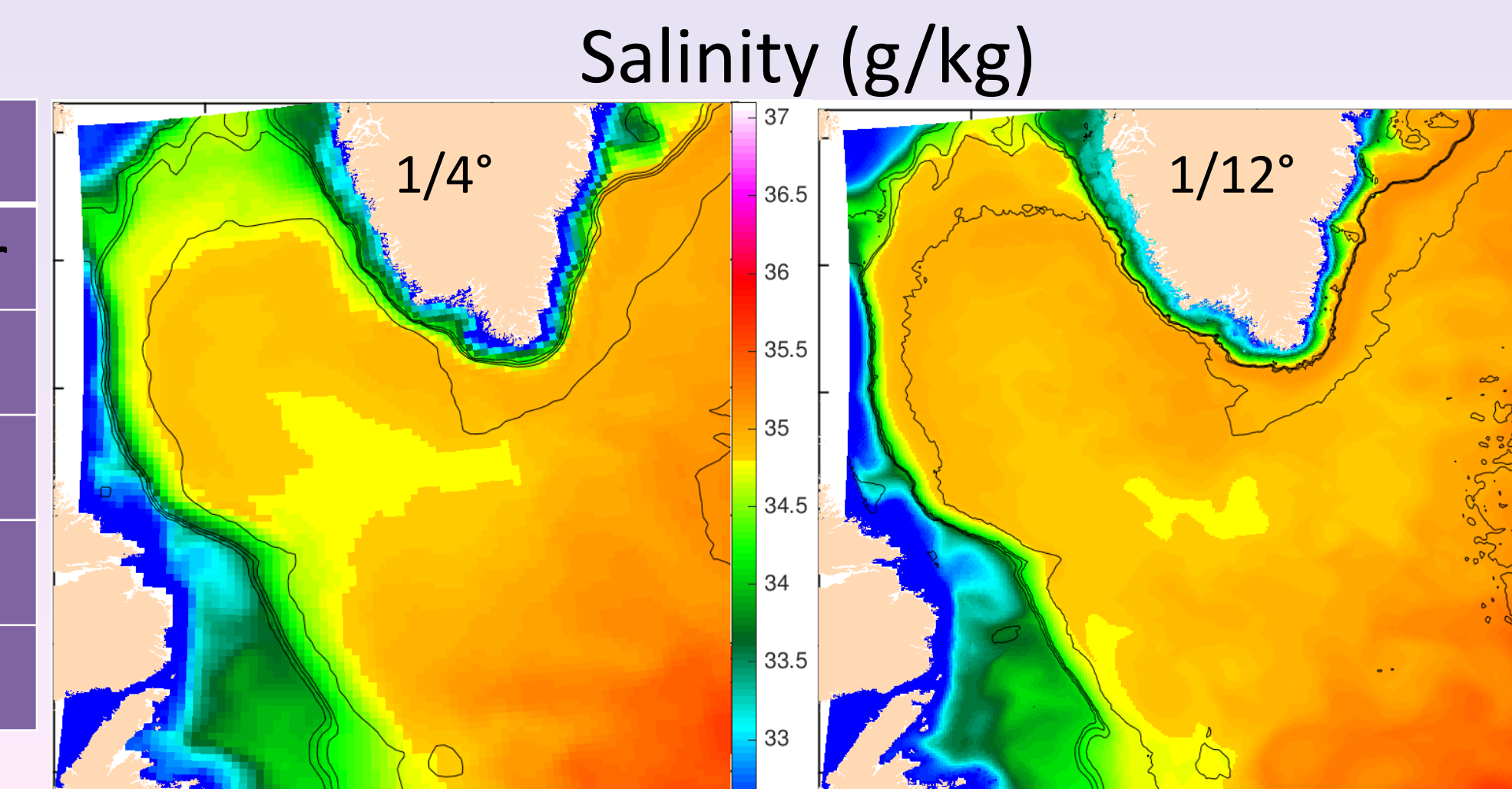
- Topics:
- Transports through Archipelago (Poster #15)
 - Sea-ice growth, melt, and accumulation
 - Hudson Bay circulation & freshwater eddies
 - Freshwater accumulation in Baffin Bay
 - Sea-ice dynamics and river discharge



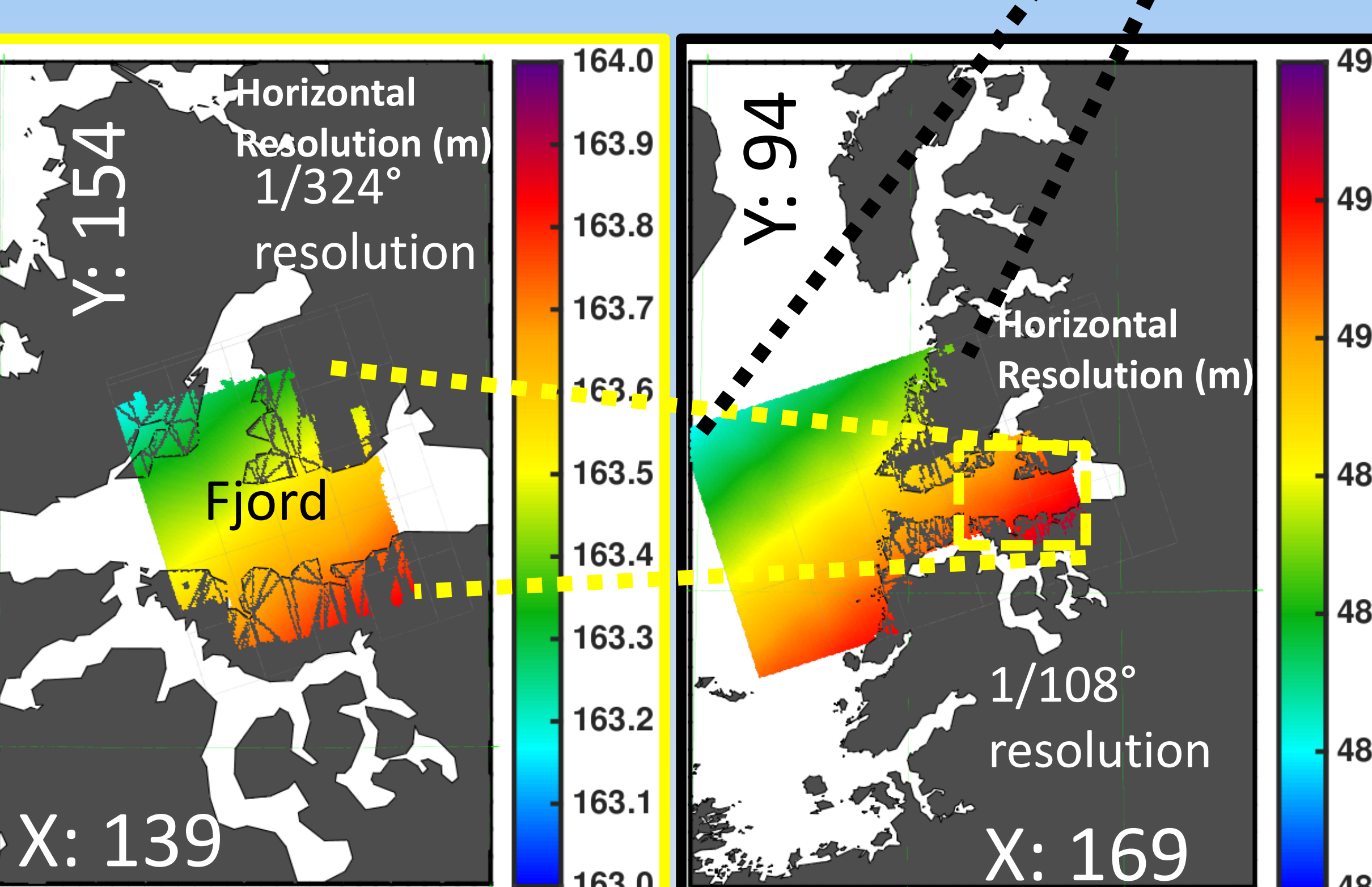
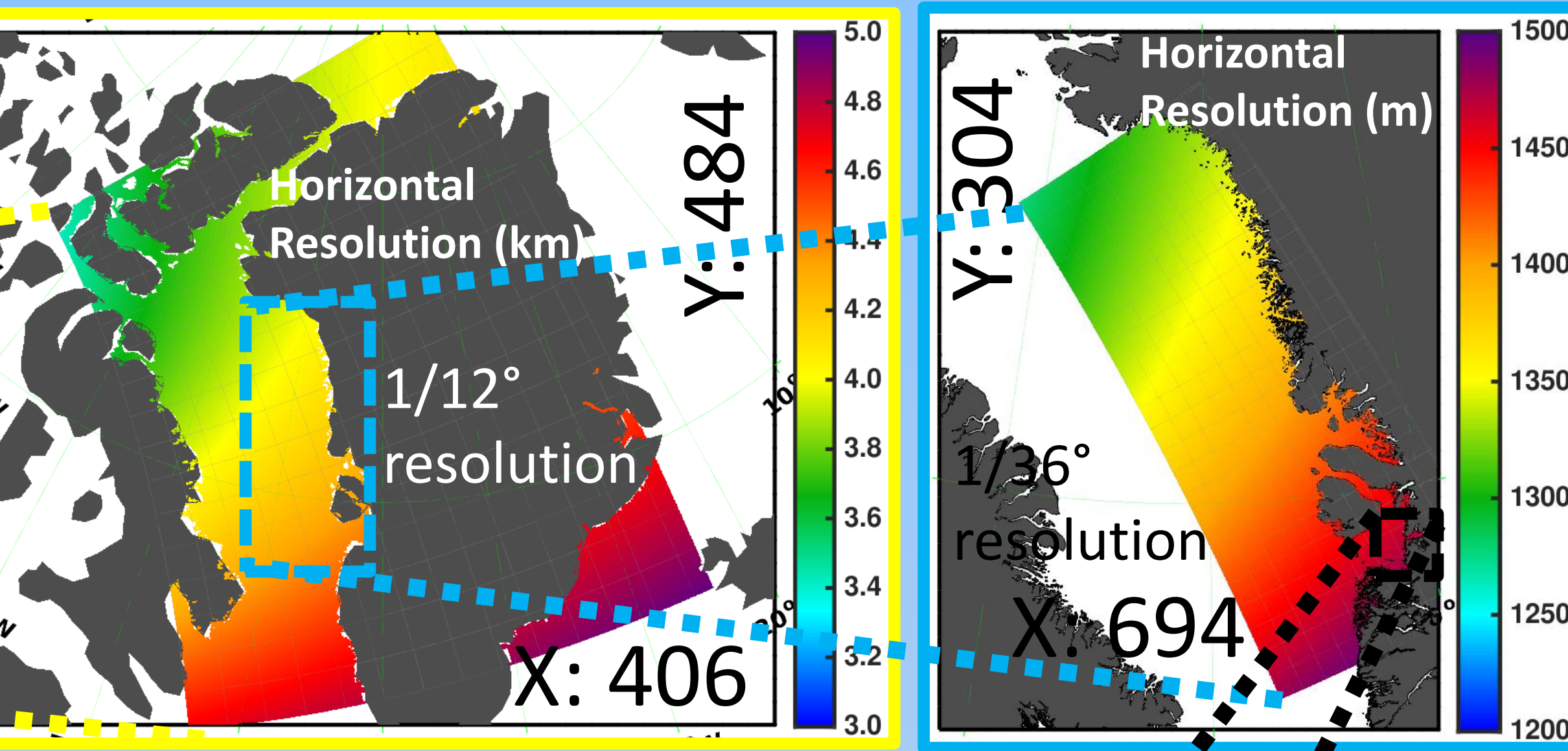
Parent Configuration



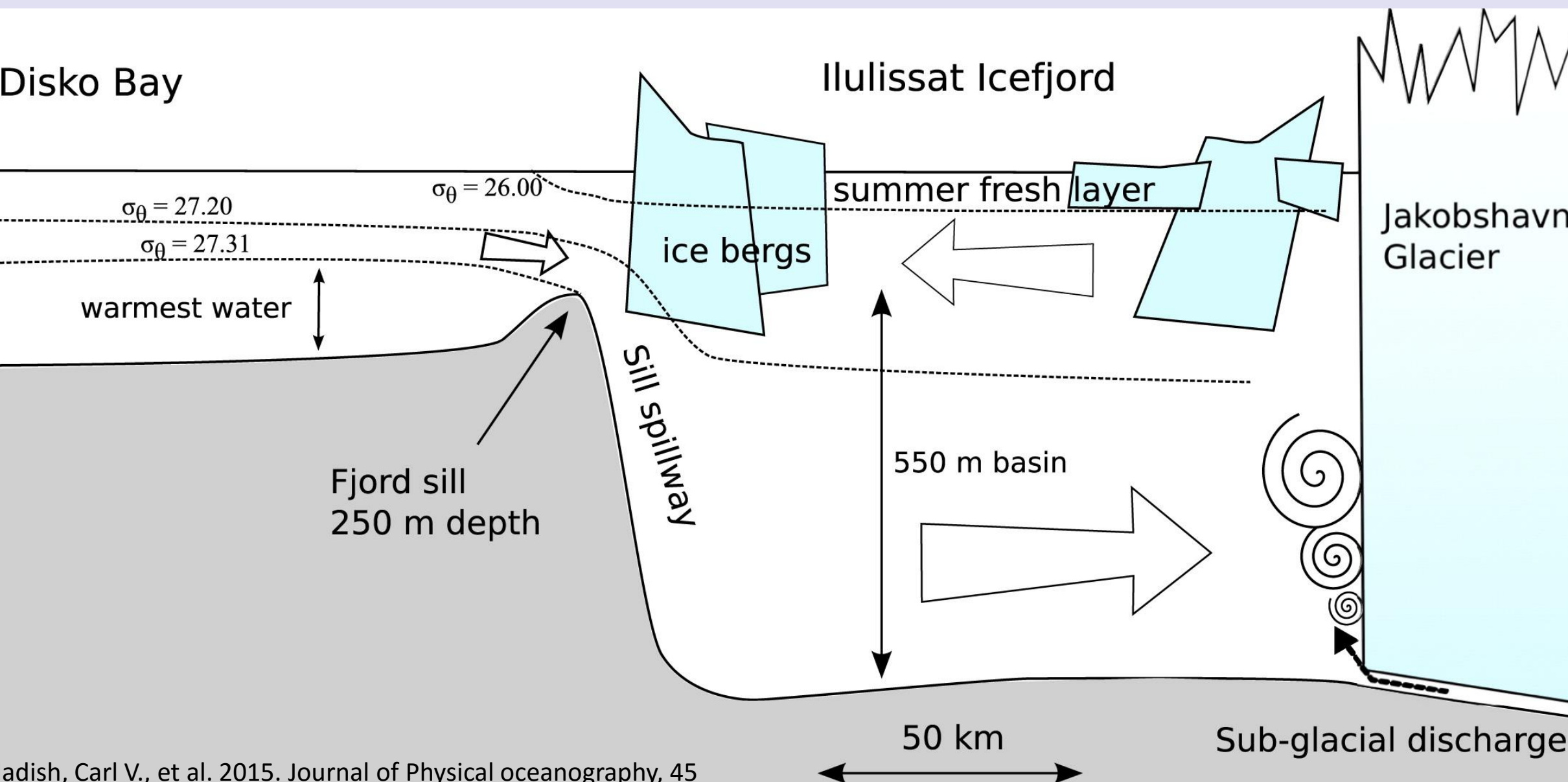
- Topics:
- Freshwater pathways into interior of Labrador Sea
 - Labrador Sea deep convection
 - North Atlantic Current
 - Resolving small scale eddies



Baffin Bay & Greenland Fjord Simulation



- Topics:
- Transport of deep water through glacier troughs
 - Fjord circulation
 - Model evaluation at very high resolution
 - Freshwater transport from fjord to ocean
 - Influence of warm water to melt coastal glaciers



Simulation	Computing cost
Parent simulation: 1/4°	0.14 core-years per simulation year
Parent simulation: 1/12°	3.8 core-years/year
Canadian Arctic*	1.3 core-years/year
Baffin Bay*	2.0 core-years/year
Labrador Sea*	0.4 core-years/year

* Denotes simulation uses at least 1 AGRIF nest