Regional Model to Simulate Ocean Acidification across the Arctic Ocean

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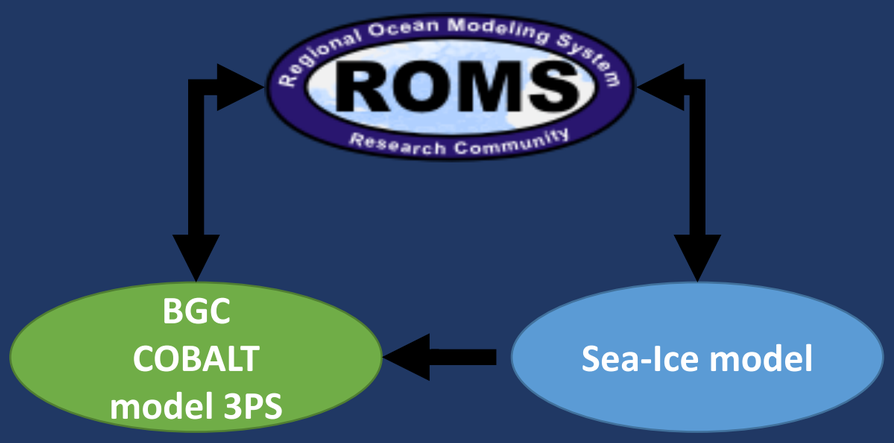
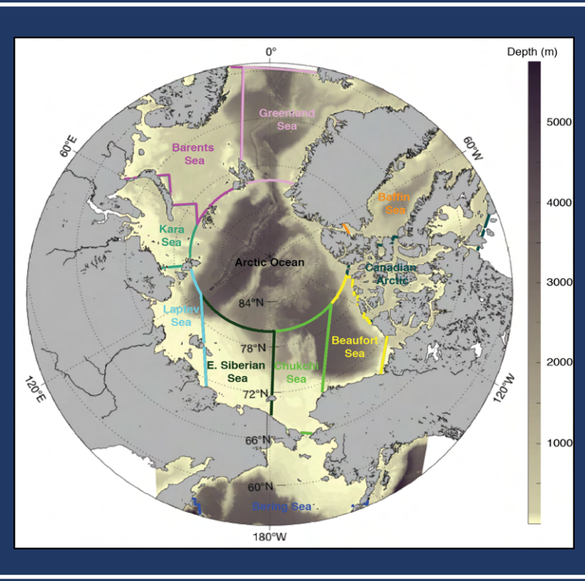
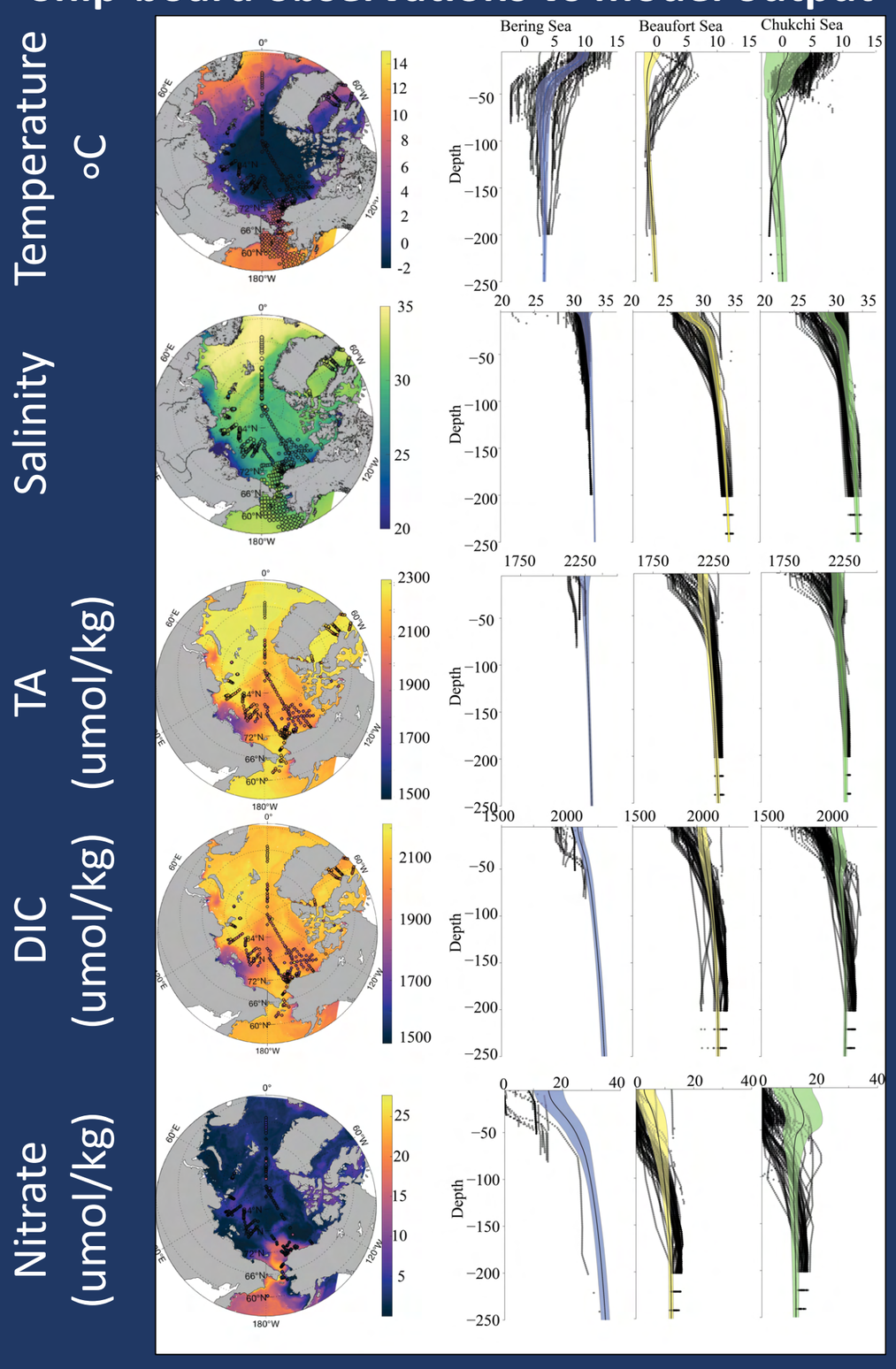
Climate change and ocean acidification are changing the chemical environment of the Arctic Ocean at a faster rate **than any temperate region**. Here, we introduce a new regional ocean biogeochemical model to study inorganic carbon dynamics across the Arctic Ocean. We use available satellite, shipboard and mooring data to thoroughly evaluate the strengths and weaknesses of the model to simulate sea ice, salinity, temperature, inorganic carbon and nutrients, and Chl-a concentrations. **The model is able to reproduce the main features of the Arctic Ocean.** Analysis of the physical, chemical, and biological drivers of the inorganic carbon dynamics give insights into how climate change and ocean acidification may affect different Arctic shelf regions.



- Horizontal resolution **5 km to 9 km**
- **50 vertical levels** terrain following
- **Monthly** temporal resolution
- **36 biogeochemistry** (BGC) state variables
- **carbonate and oxygen cycles**
- **Physics (1980 to 2020)**
- **Biogeochemistery (2015 to 2020)**

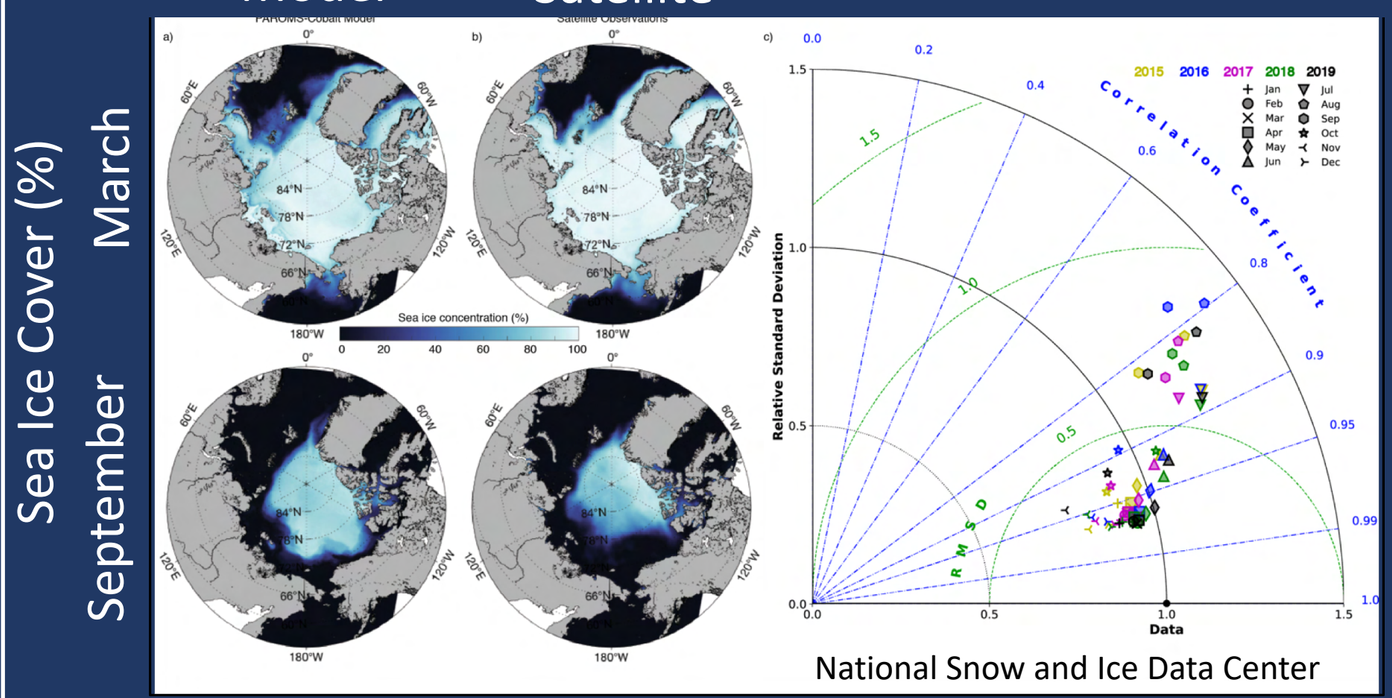


Ship-board observations vs model output

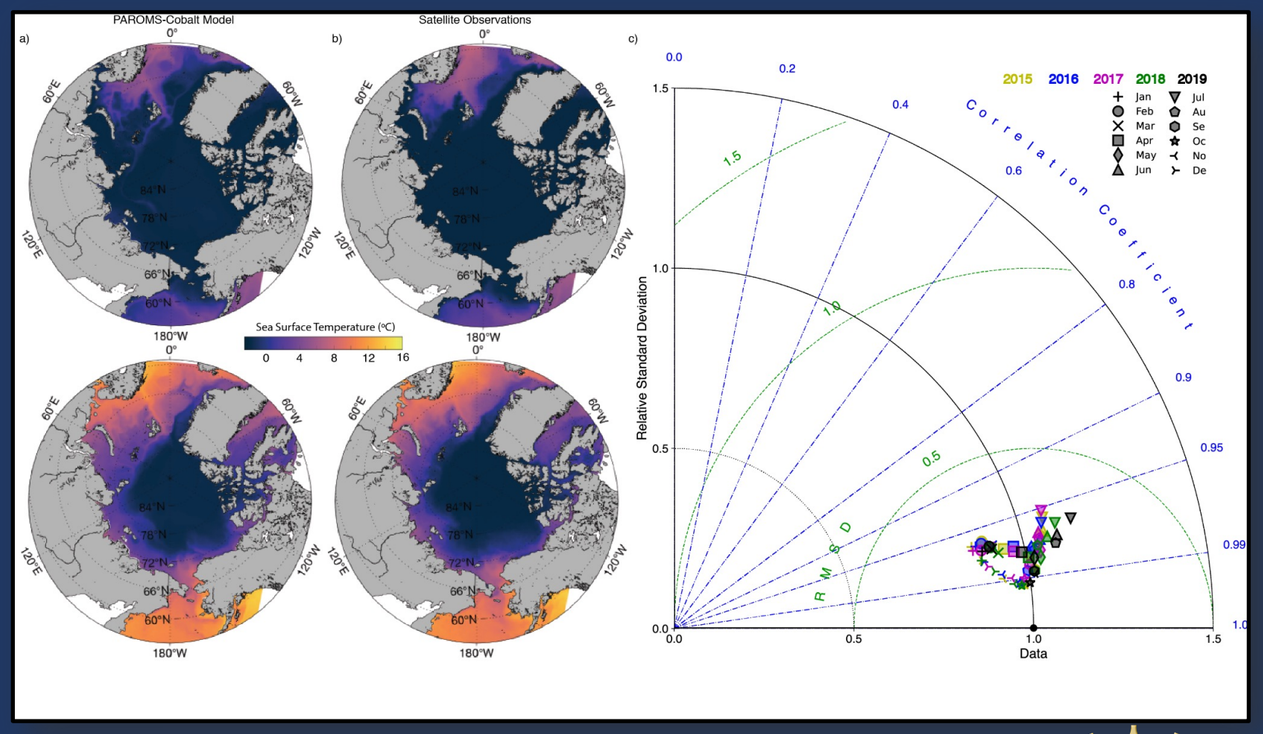


Maps showing modeled average surface condition in late summer (August to October) in 2015, overlaid with available observations from same period. Modelled (color) and observed (black dots) profiles of the respective parameter.

Satellite observations vs model output



National Snow and Ice Data Center



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