ECCO Representation of Water Masses

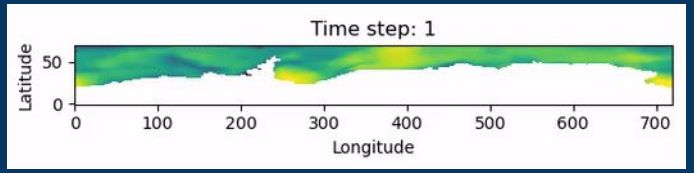
Isba Keshwani, Sarah Zhang

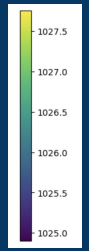
***WMW**: water-mass women, women of mode waters, women of water mass, etc…*



Overview

Understanding how ECCO represents water masses, specifically Antarctic Bottom Water (AABW), and whether recent Antarctic extremes are captured in ECCO.

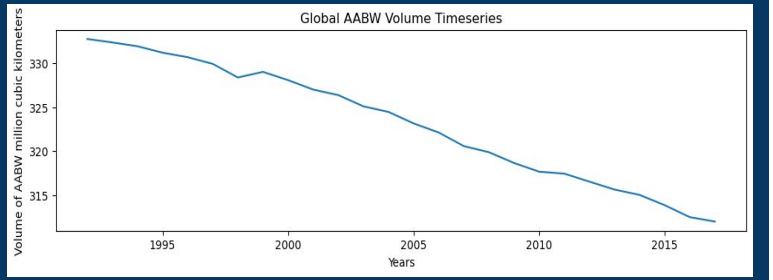




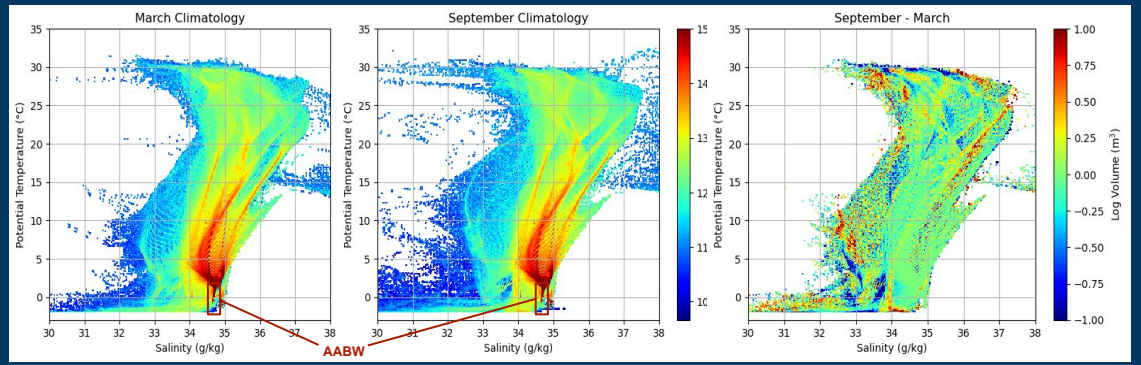
Antarctic Surface Density: 1992 (Feb. - Oct.)

Products, Resources Used

- ECCO V4r4: density, temperature, salinity, grid products
- ecco_v4_py (and Ian), ecco_access
- ECCO hack week tutorials, OSS



AABW ranges from θ = -0.8 ℃ to 2 ℃ and salinity of 34.6 to 34.7 g/kg. We calculated the volume of ocean water within this range from our volumetric TS plot. Then, repeated the calculation from 1992 to 2017.



Global volumetric temperature & salinity: 1992-2017 averages in March, September, and March subtracted from September, respectively. Volumes (m^3) are represented in log scale.

Challenges Faced

- Calculating/understanding volume of ocean using MITgcm grid
- Identifying where AABW waters were
- Calculating AABW volume by constraining temp and salinity

Future Work

- Plot the ECCO temperature, salinity along an ocean transect (ex. recreate WOCE A16)
- Validate AABW volume derivations with observations/other model outputs
- Explore High Salinity Shelf Water production using ECCO