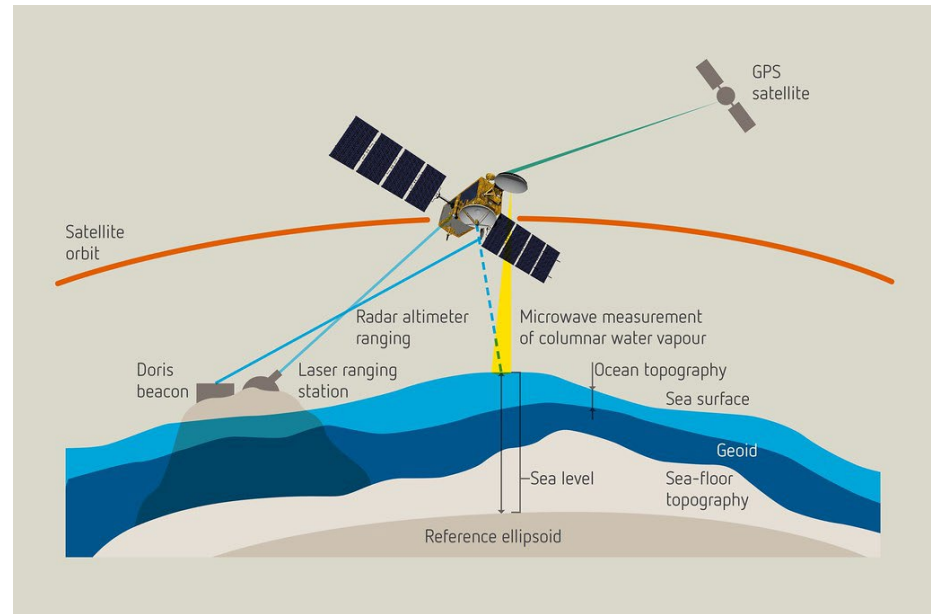
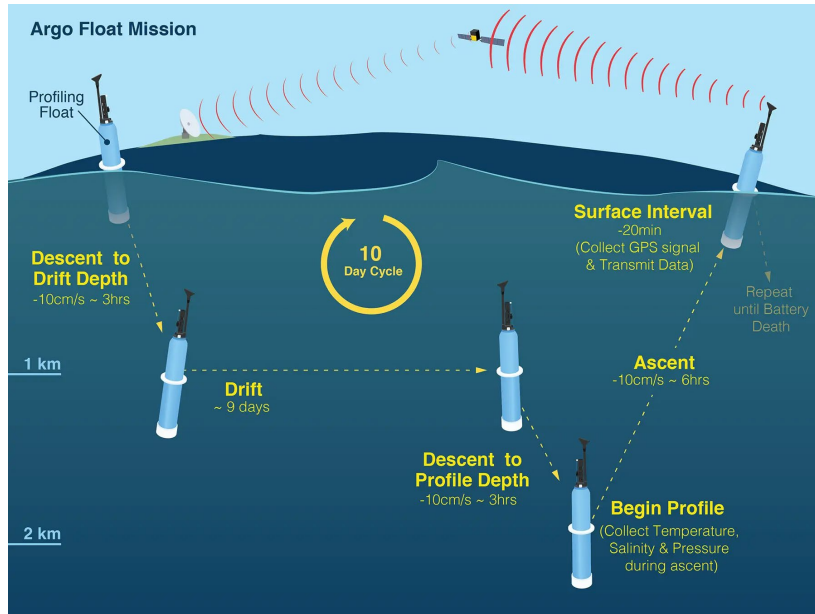


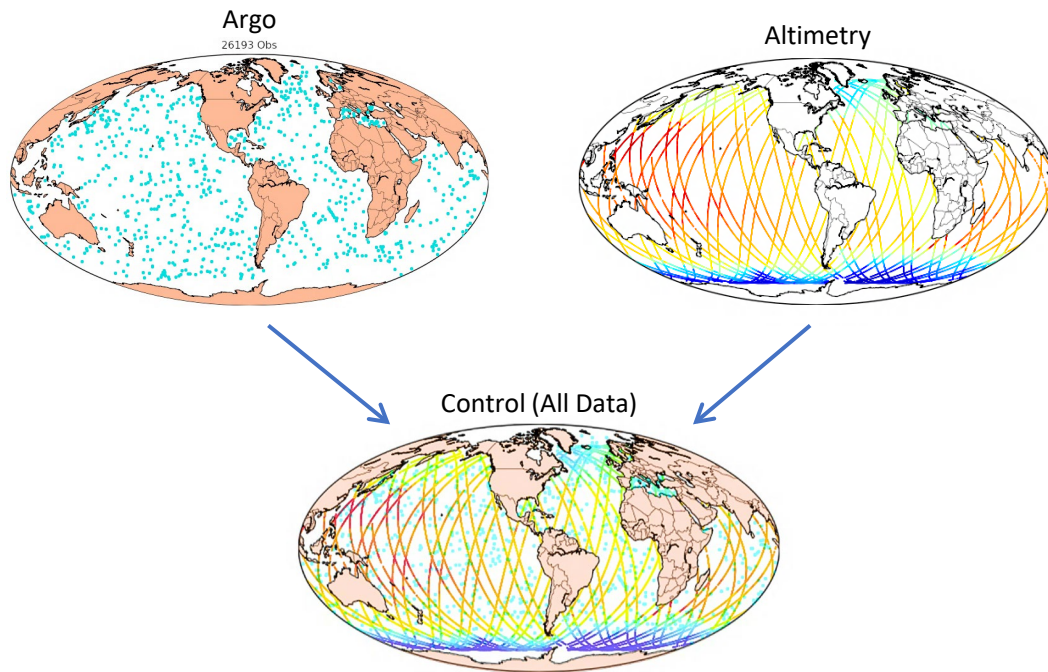
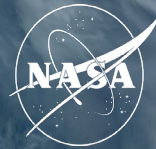
Observational Data Impacts on GEOS-S2S-3 Model Analysis of the Ocean

Lindsay Chu, Annika Jersild, Andrea Molod
University of Maryland Earth System Science Interdisciplinary Center

Data Types



Experiment Design



Three OSE runs for 2020:

No Argo run:
excludes Argo dataset

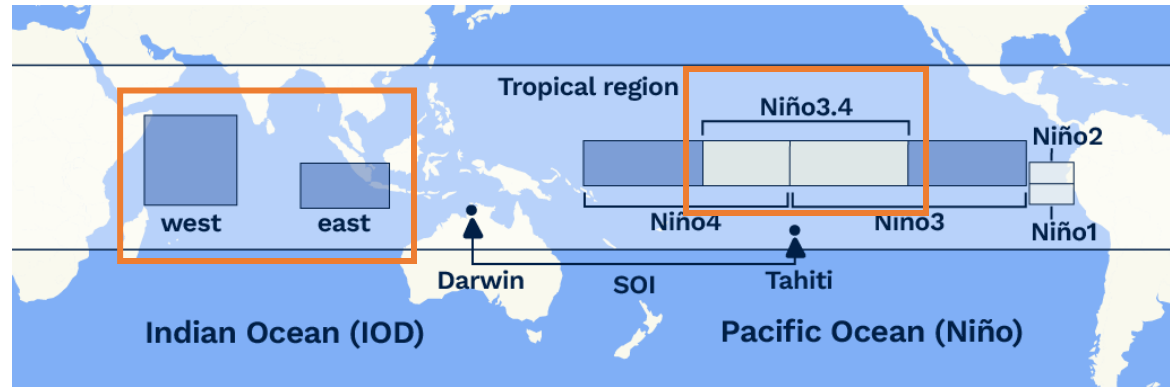
No Altimetry run:
excludes altimetry data

Control run: includes
all observations

Methods



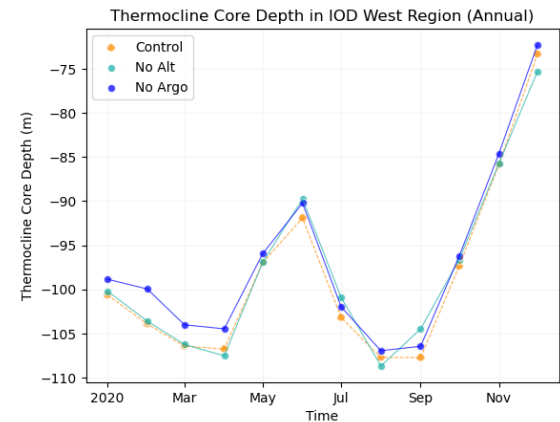
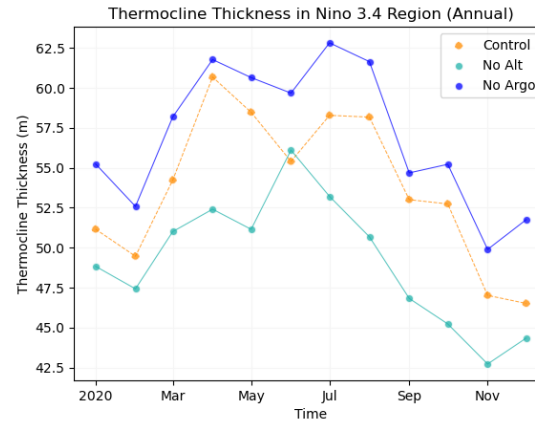
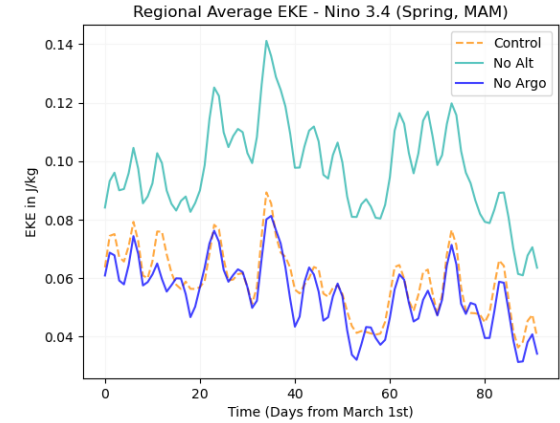
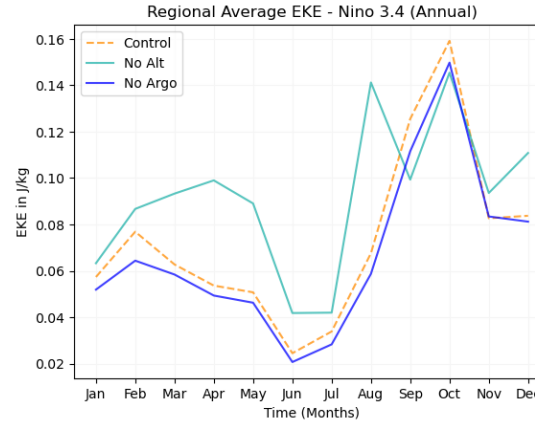
- Annual trends derived from monthly averages
- Seasonal trends derived from daily averages
- Regions:
 - Nino 3.4
 - IOD West
 - IOD East
- Variables:
 - Sea Surface Temperature (SST)
 - Sea Surface Salinity (SSS)
 - Eddy Kinetic Energy (EKE)
 - Thermocline Depth
 - Thermocline Thickness



Results



Significant Findings:



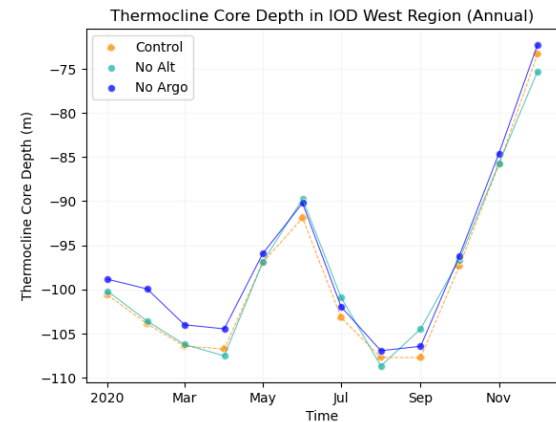
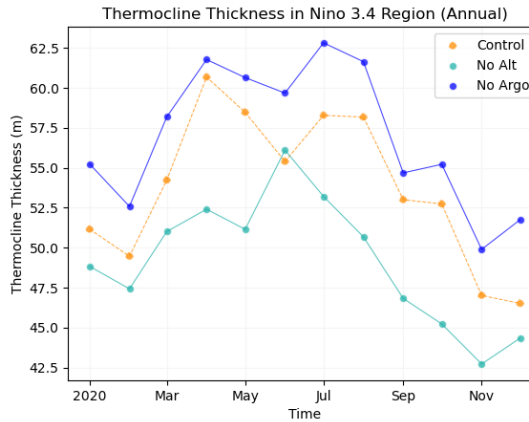
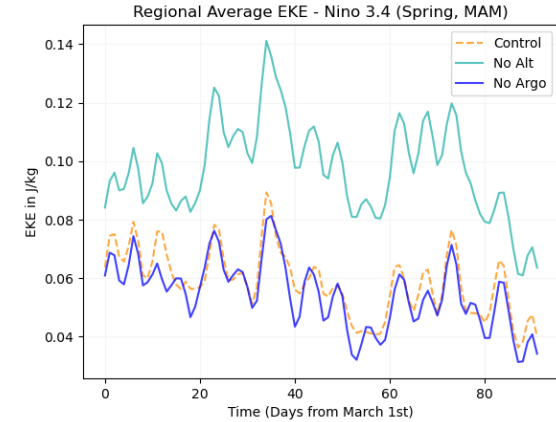
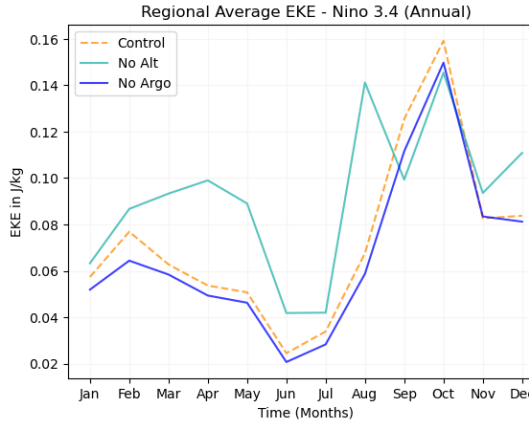
Results



Significant Findings:

No Argo

- EKE – Niño 3.4
- Thermocline Core Depth – IOD West
- Thermocline Thickness – Niño 3.4



Results



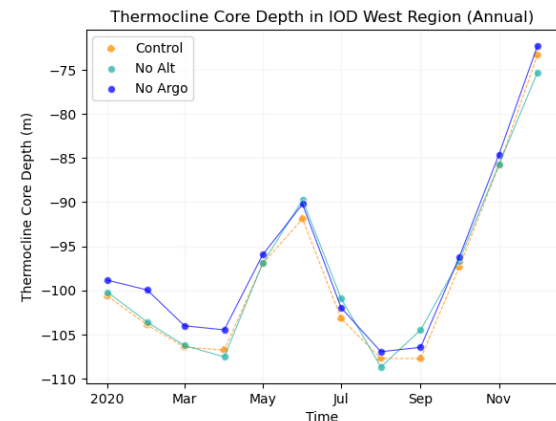
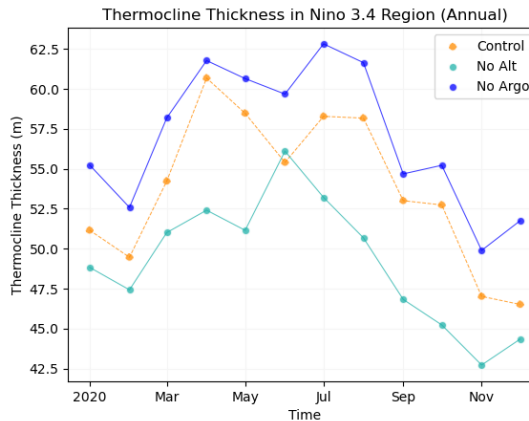
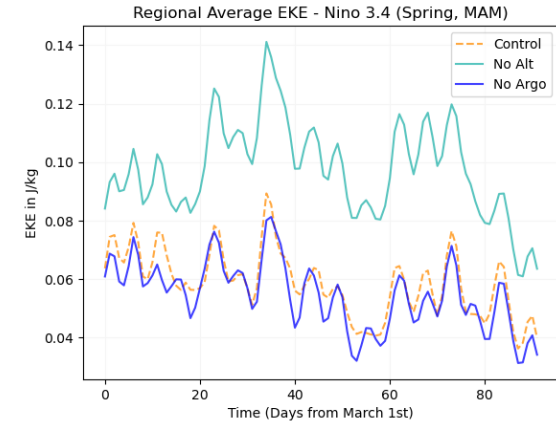
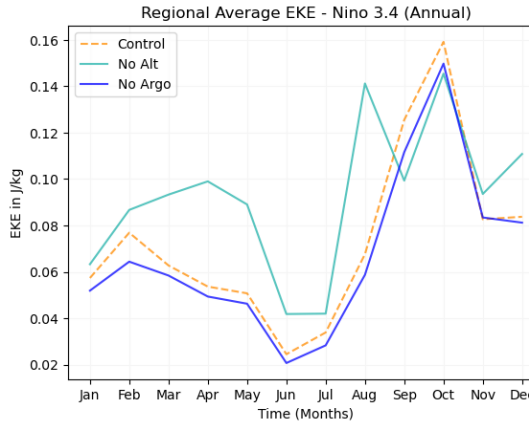
Significant Findings:

No Argo

- EKE – Niño 3.4
- Thermocline Core Depth – IOD West
- Thermocline Thickness – Niño 3.4

No Alt

- EKE – Niño 3.4
- Thermocline Thickness – Niño 3.4
- Surface Salinity – Niño 3.4 and IOD East
- Surface Temperature – IOD East

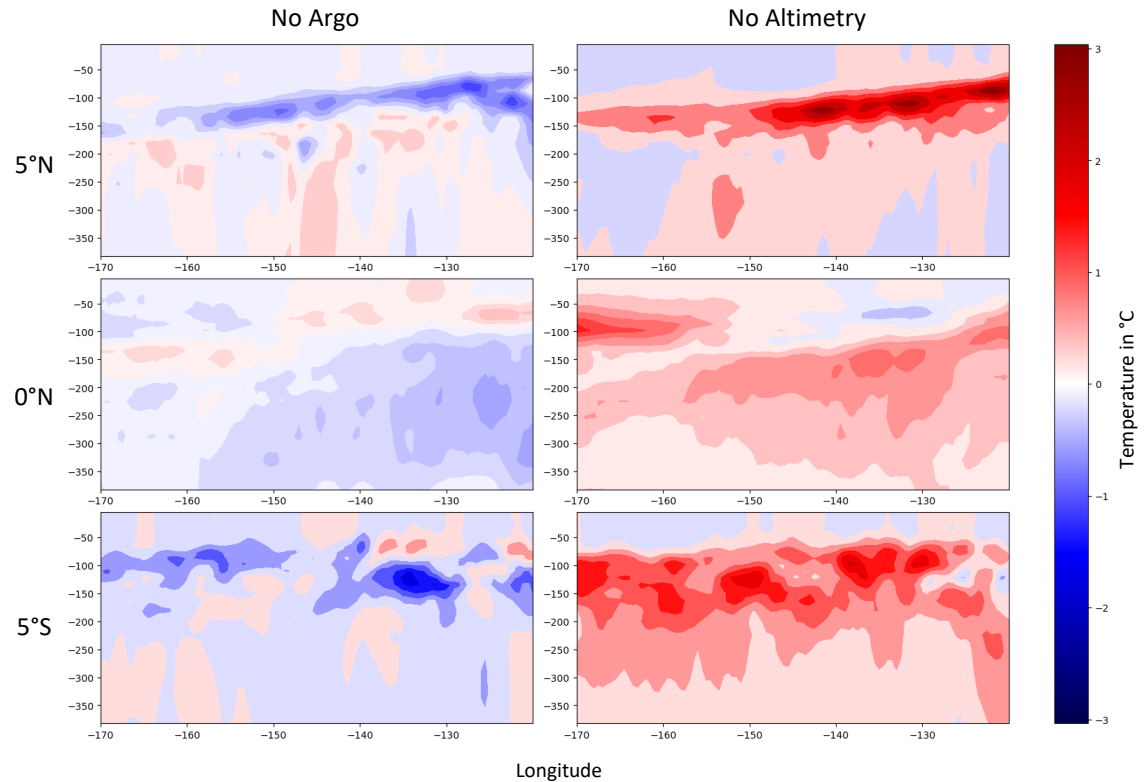


Results

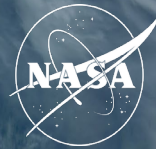


- Vertical Profiles display data impacts on sub-surface observations

Annual Average Difference in Temperature ($^{\circ}\text{C}$) from Control, Nino 3.4 Region

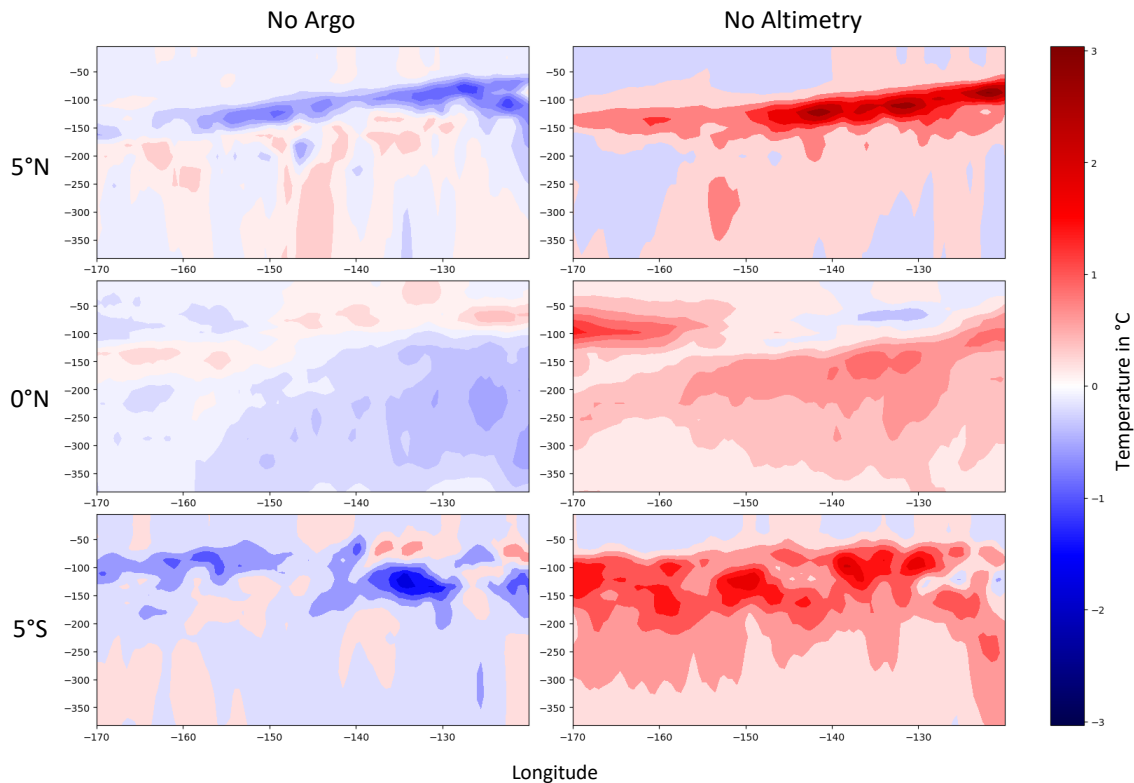


Results



- Vertical Profiles display data impacts on sub-surface observations
- No Argo = tendency to **underestimate**
- No Alt = tendency to **overestimate**

Annual Average Difference in Temperature ($^{\circ}\text{C}$) from Control, Nino 3.4 Region

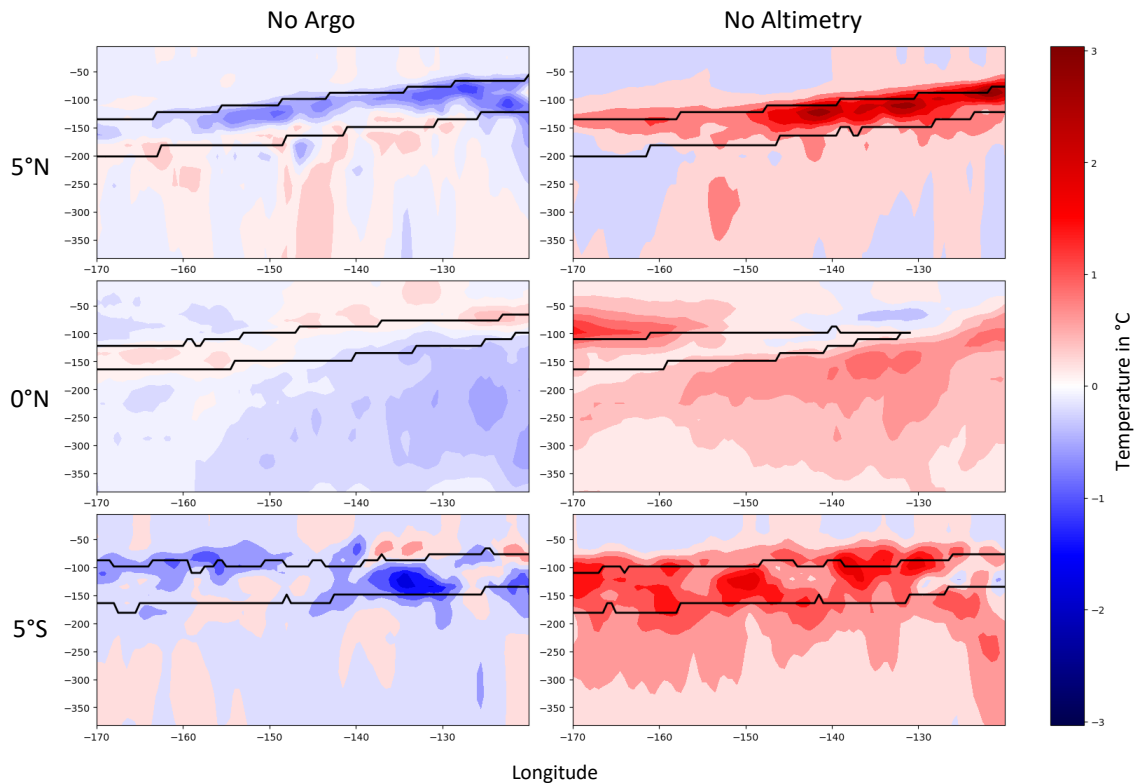


Results



- Vertical Profiles display data impacts on sub-surface observations
- No Argo = tendency to **underestimate**
- No Alt = tendency to **overestimate**
- Regions of high diff. are largely concentrated in the Thermocline

Annual Average Difference in Temperature ($^{\circ}\text{C}$) from Control, Nino 3.4 Region



Future Work



Future work:

1. Additional experimental model runs for other years/time periods
2. Expansion of ocean variables (heat content, Kelvin/Rossby waves, etc.)
3. Expansion of regions (Gulf Stream, AMOC, Southern Ocean regions, etc.)
4. Additional data input scenarios (e.g. removal of SMAP, SMOS, focus on salinity)