

Ocean Sciences Meeting 2018, Portland

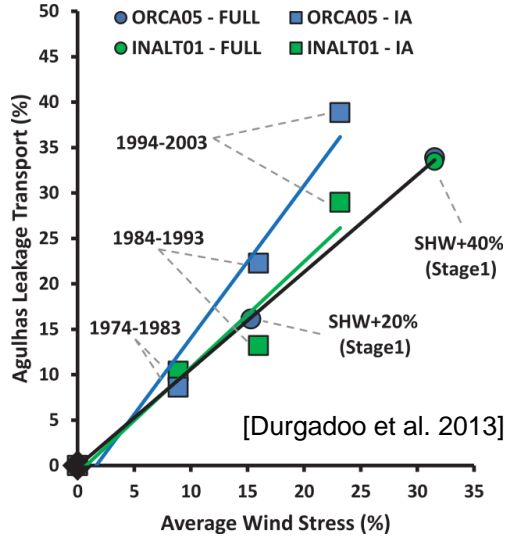
PL53A: Advances in our understanding of the MOC in the South Atlantic

Agulhas Dynamics and MOC in a High-Resolution Ocean- Atmosphere System Model

Jan Harlaß, A. Drews, F.U. Schwarzkopf, A. Biastoch, K. Matthes

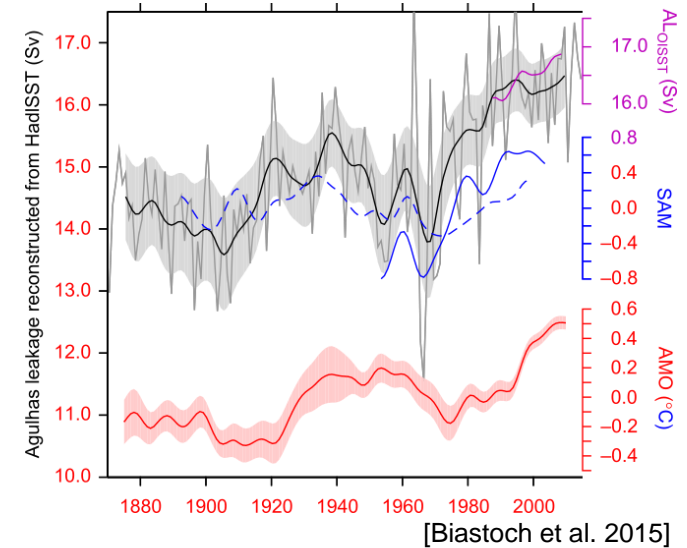
HELMHOLTZ
RESEARCH FOR GRAND CHALLENGES





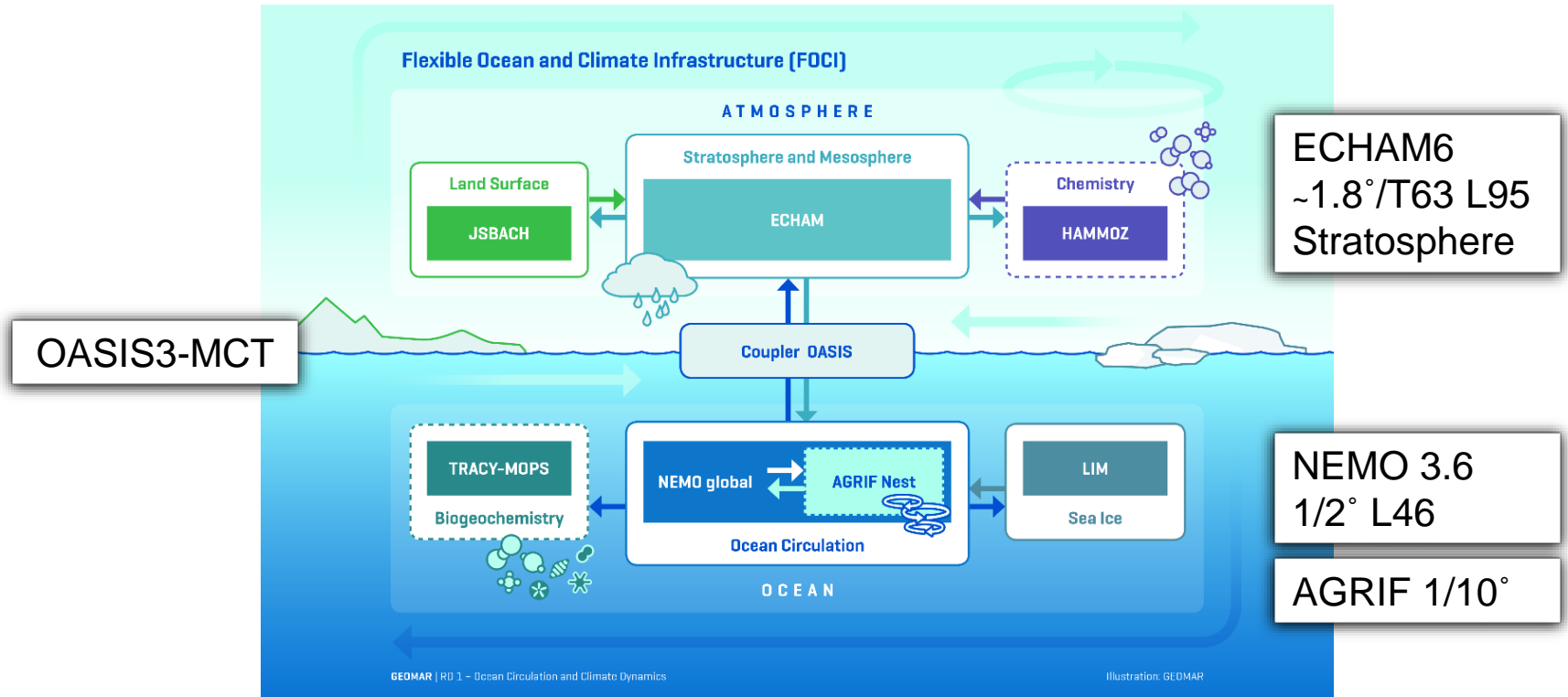
Wind changes
→ Agulhas Leakage

Agulhas Leakage
→ AMOC

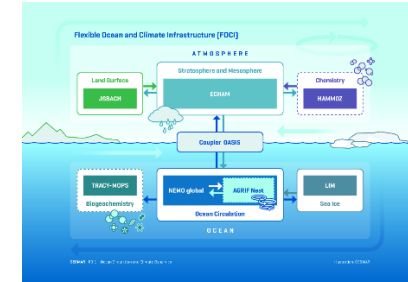
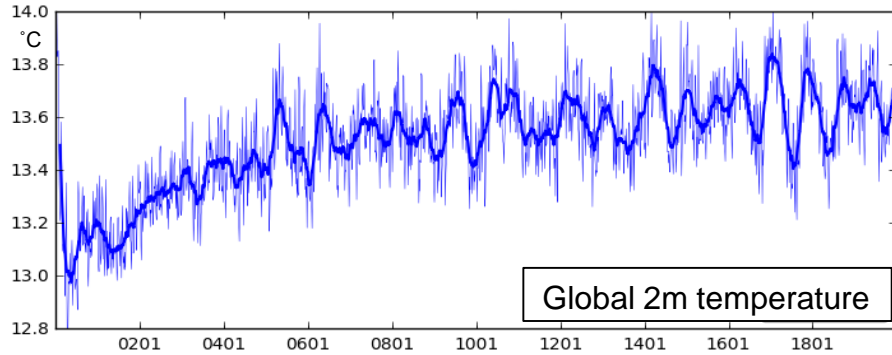


Eddy resolving model including atmosphere-ocean-feedbacks

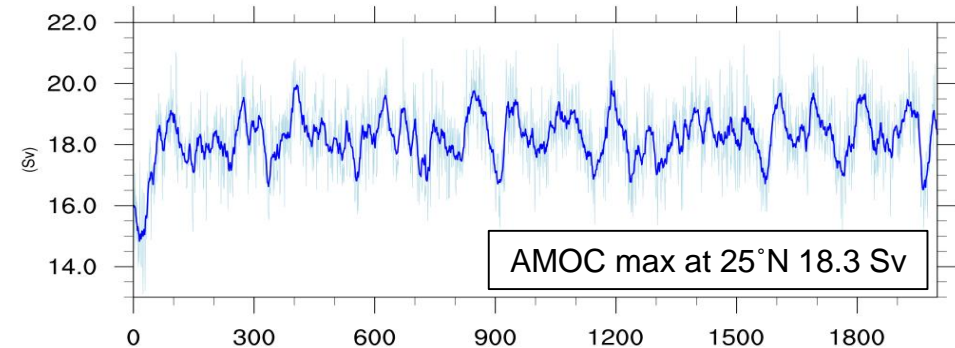
FOCI - Flexible Ocean and Climate Infrastructure



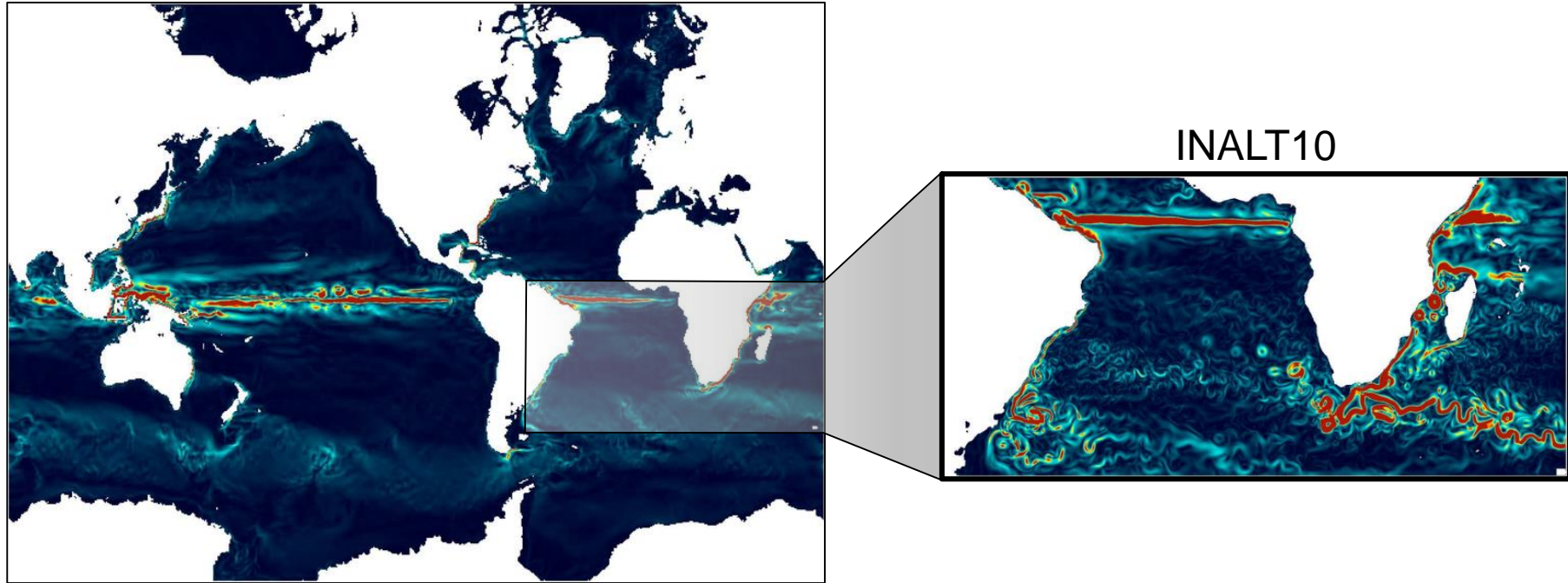
FOCI - Flexible Ocean and Climate Infrastructure



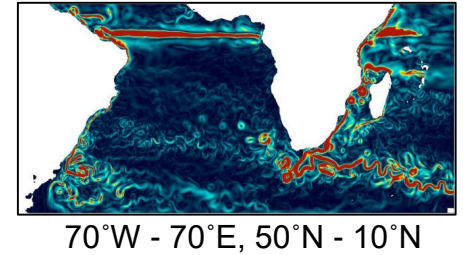
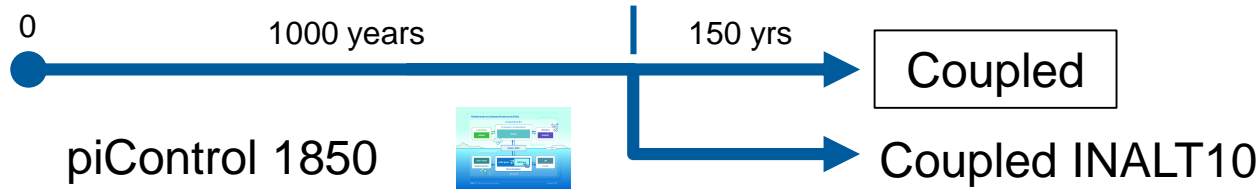
no restoring
pre industrial climate
> 4000 years



FOCI – High Resolution Nest



INALT10 coupled vs. ocean-only



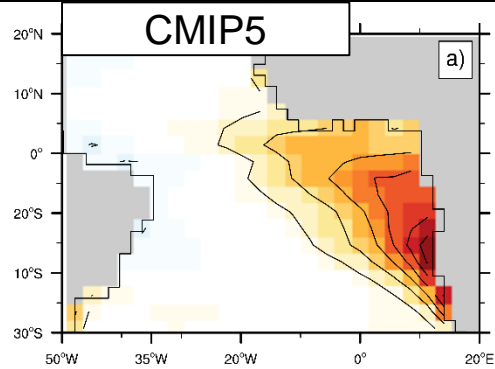
1/10°, L46
64.5 million grid points

Accompanying **Ocean-only** experiments

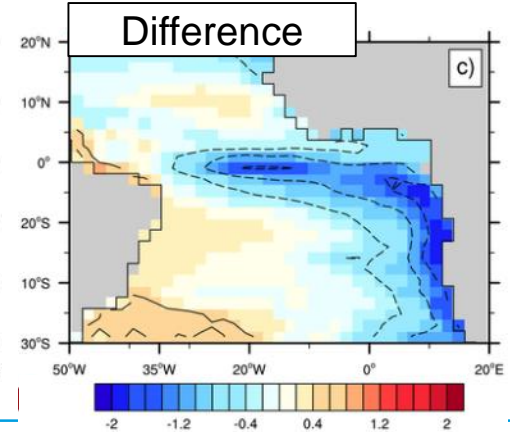
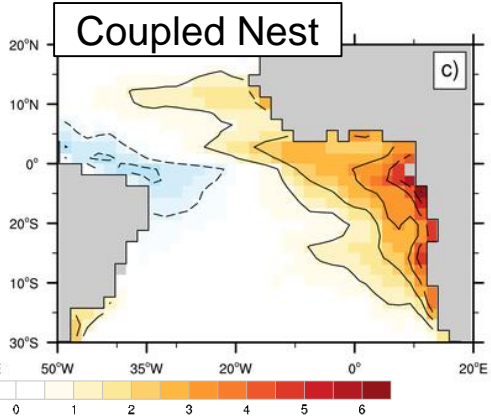
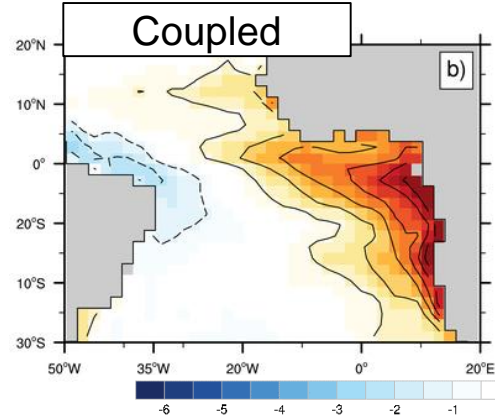
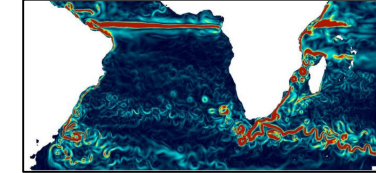
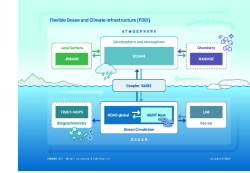
COREv2 forcing

30yr spin-up + hindcast 1958-2009

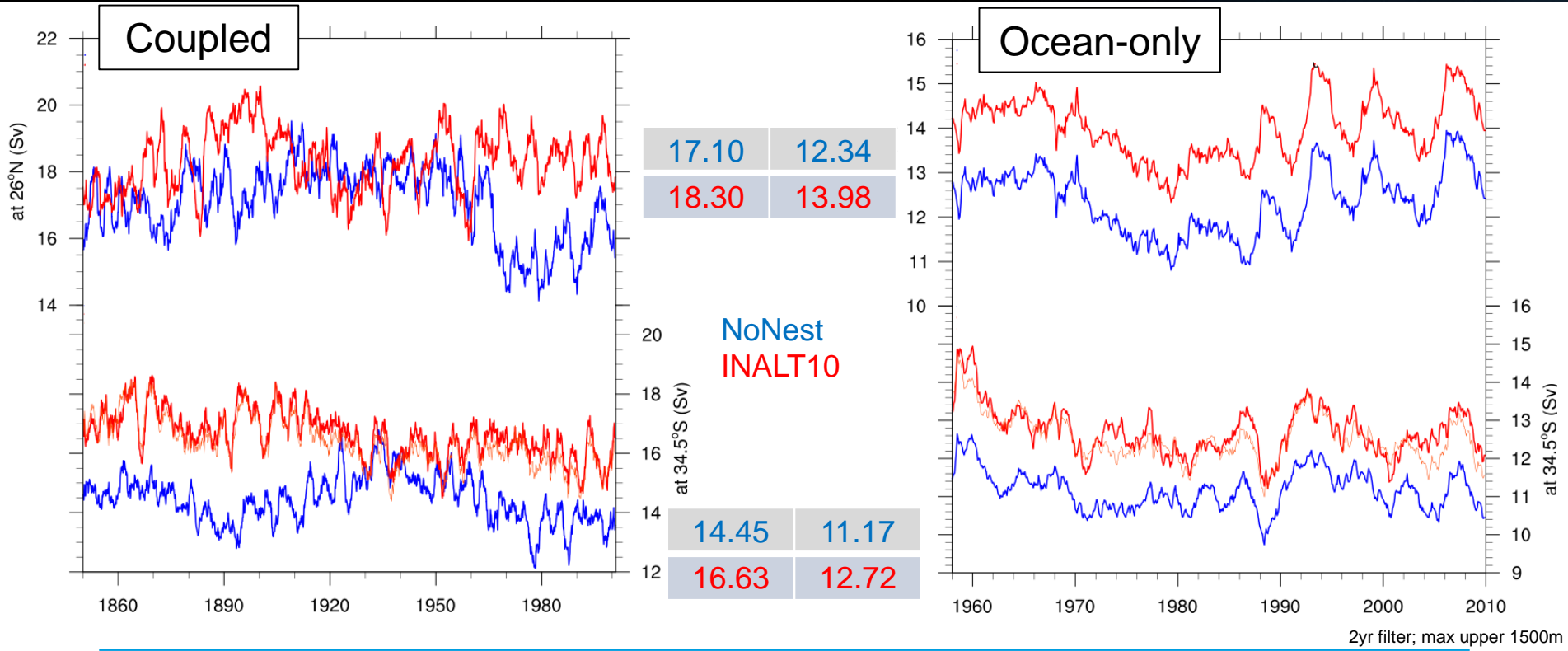
SST bias in FOCI



Boreal summer
JAS

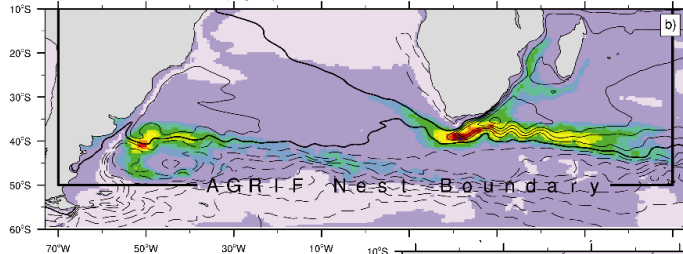
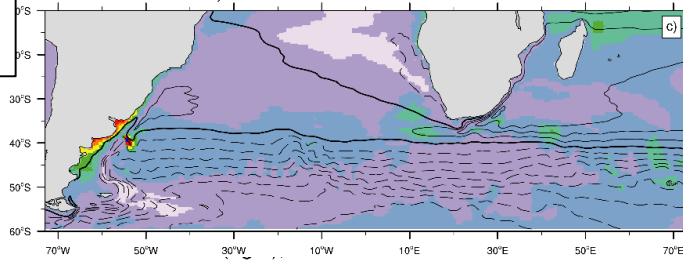


AMOC timeseries 26°N & 34°S

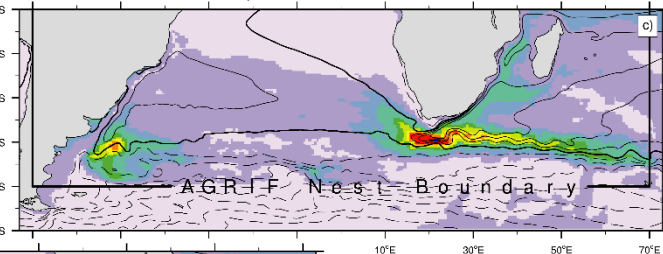
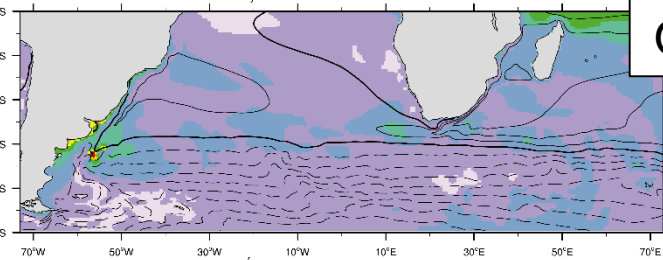


Mesoscale - SSH variance

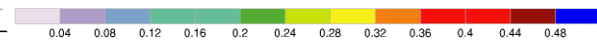
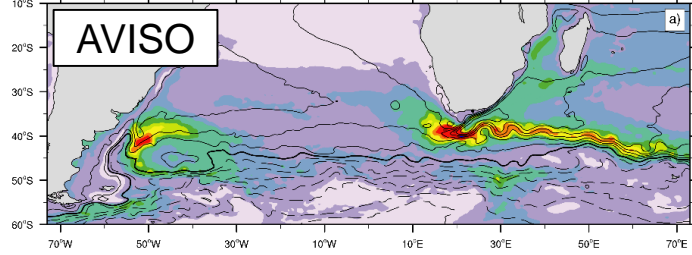
Coupled



Ocean-only

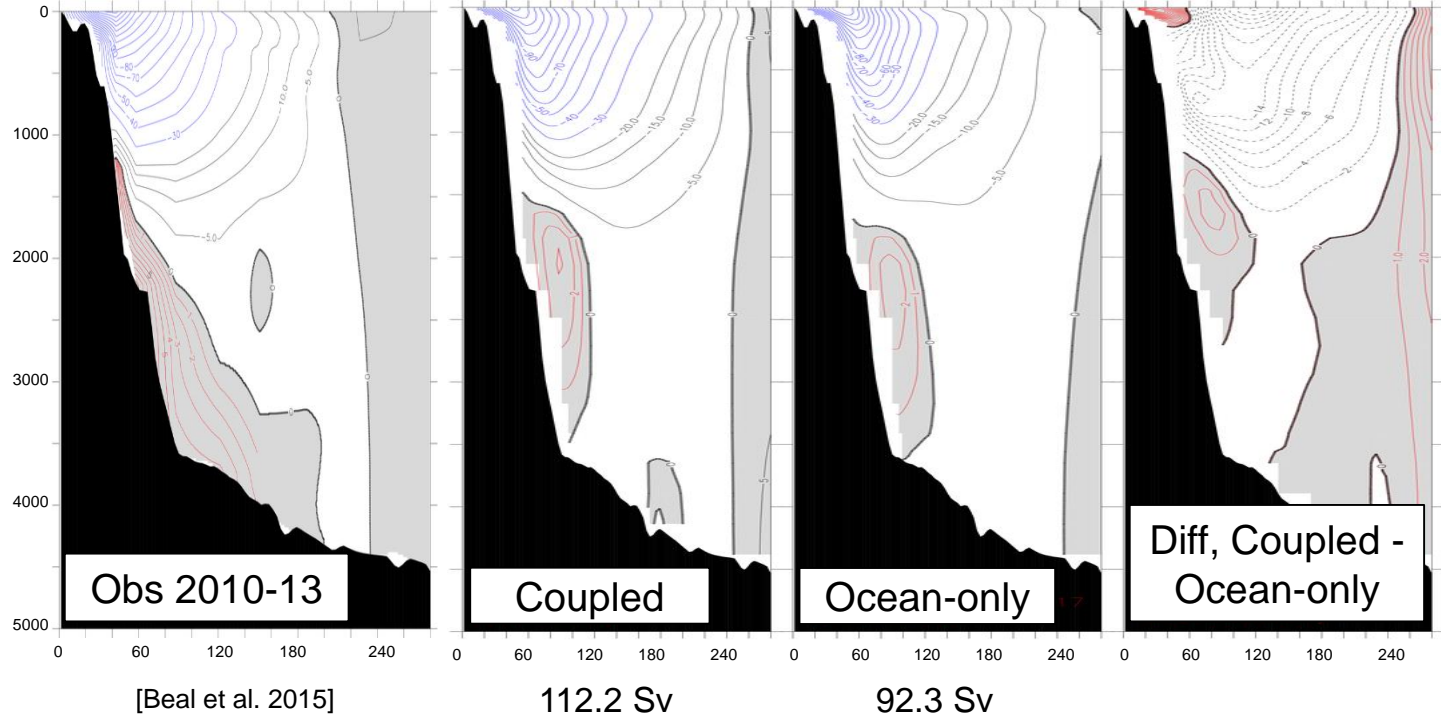
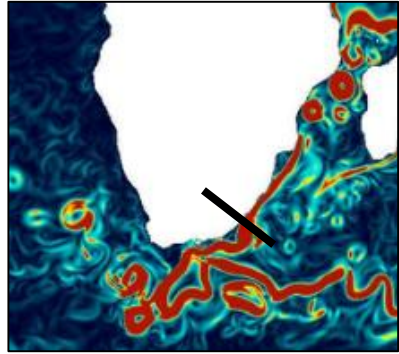


AVISO

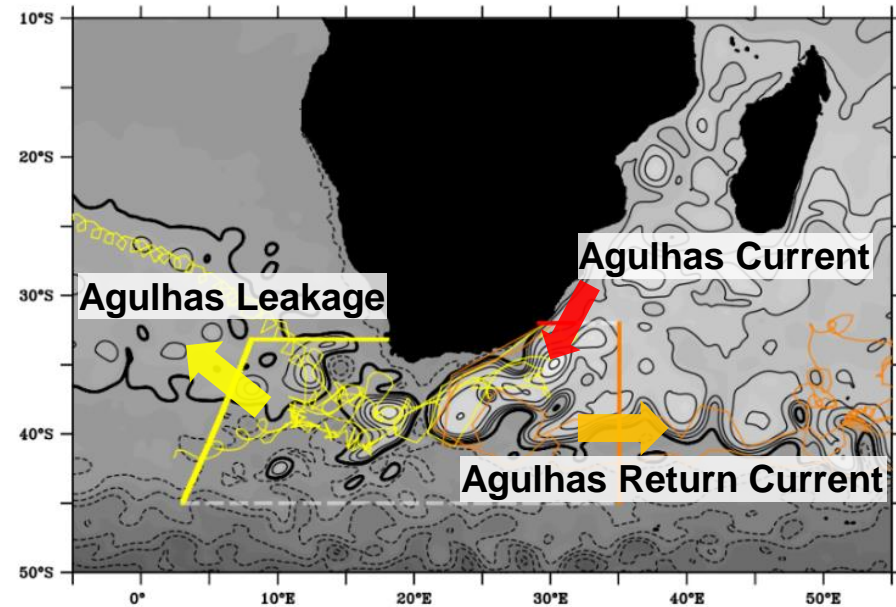


Mean: contours
5d variance: shading

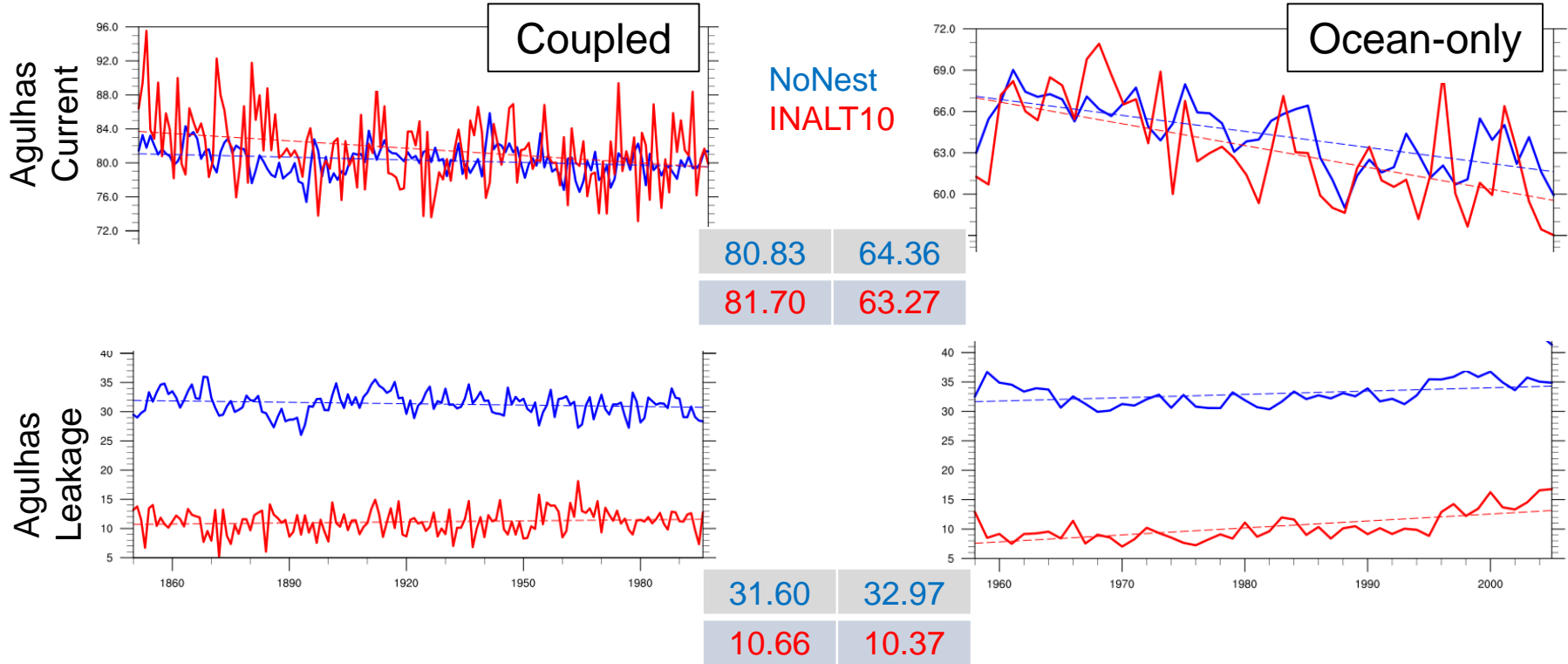
Agulhas Current



- Seed particles at 32°S
- 5-daily mean velocities
- Track for 4 years until leaving through section



Agulhas Leakage



Agulhas – Wind stress

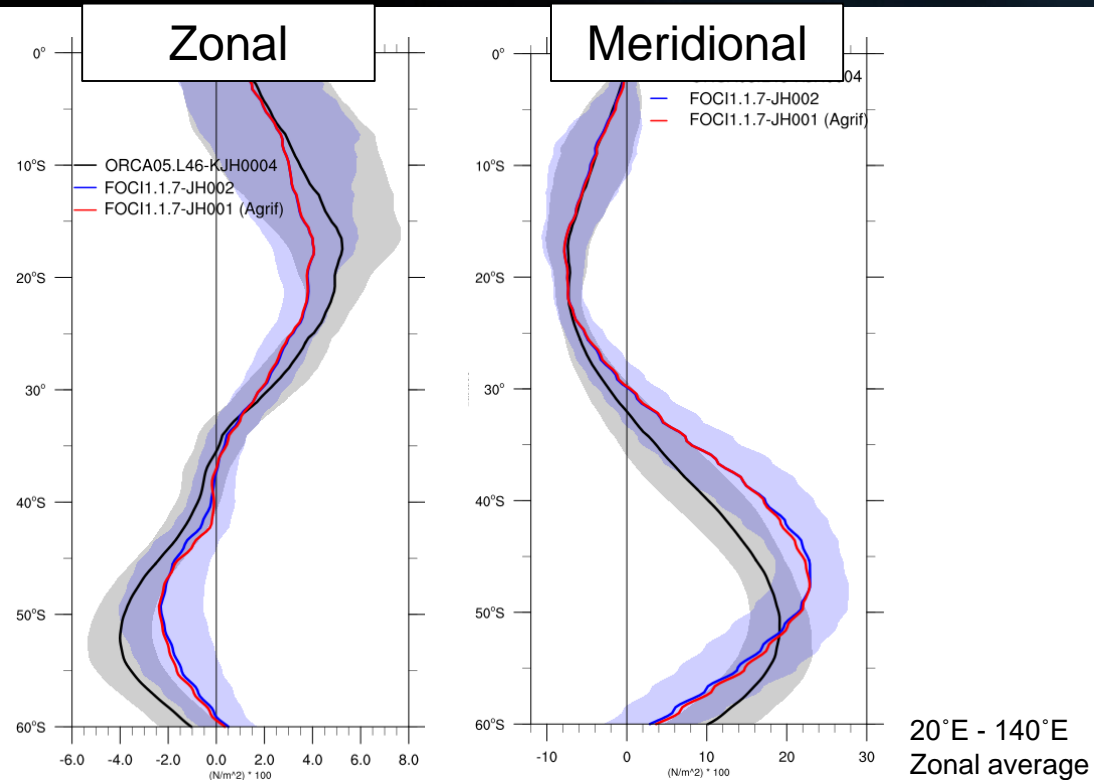
Coupled NoNest Ocean-only

INALT10

Agulhas
Current

Agulhas
Leakage

80.83	64.36
81.70	63.27
31.60	32.97
10.66	10.37



- Highly flexible and efficient model system
- High-resolution AGRIF nests in a fully coupled model
- Key quantities very well resolved

Ongoing:

- Agulhas Regime impact on AMOC
- Transient runs starting 1850, present day & CMIP6 protocol