



Impacts of IPO and AMO on Global Ocean Heat Content Distribution

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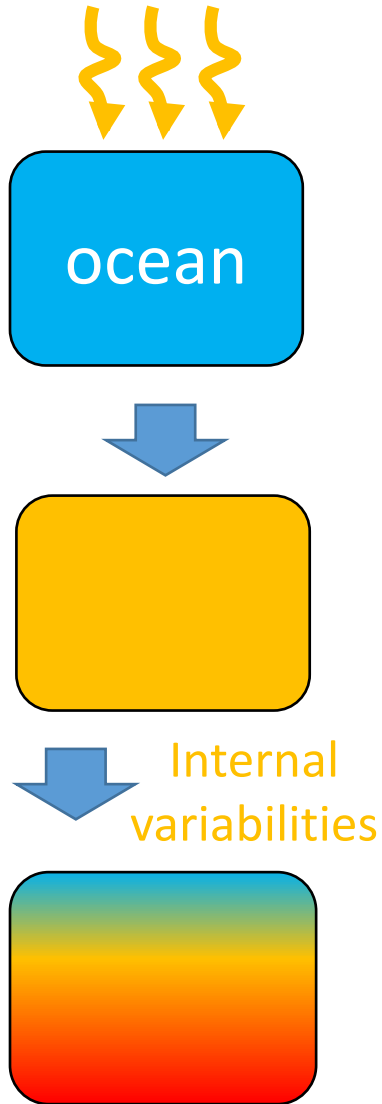
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22nd Annual CESM Workshop



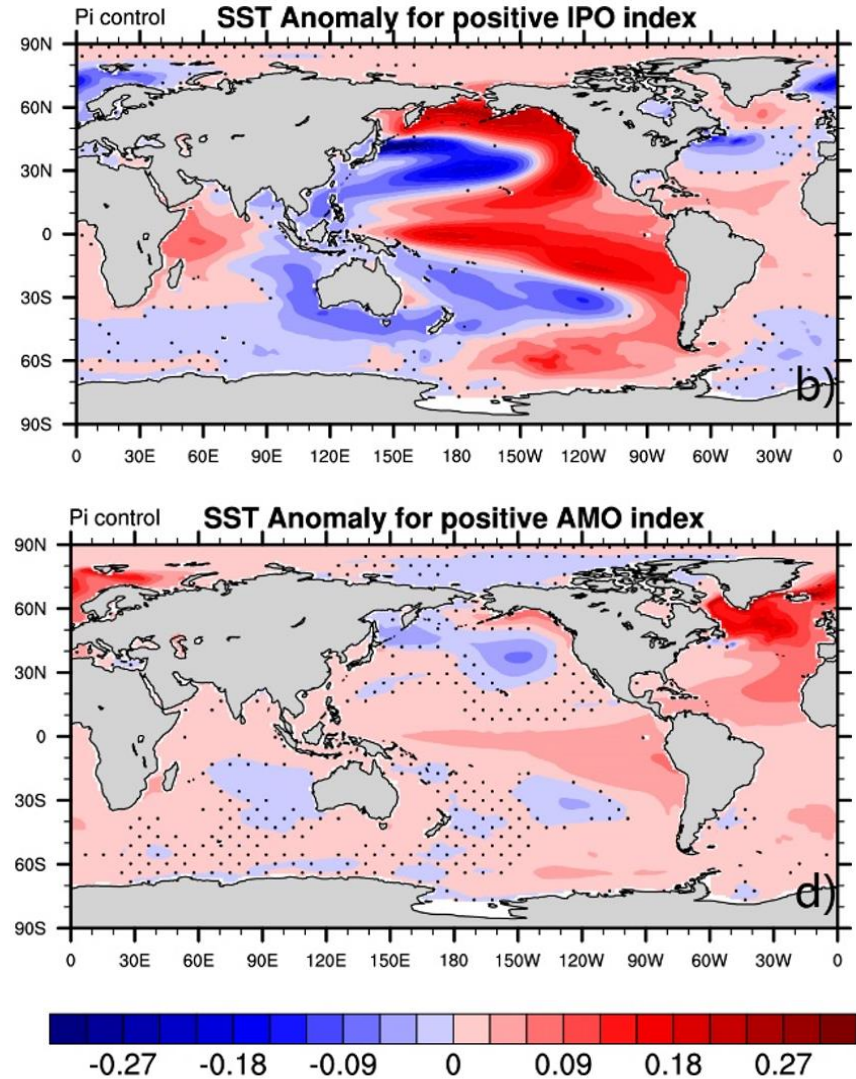
Energy view for “hiatus”

Radiative imbalance

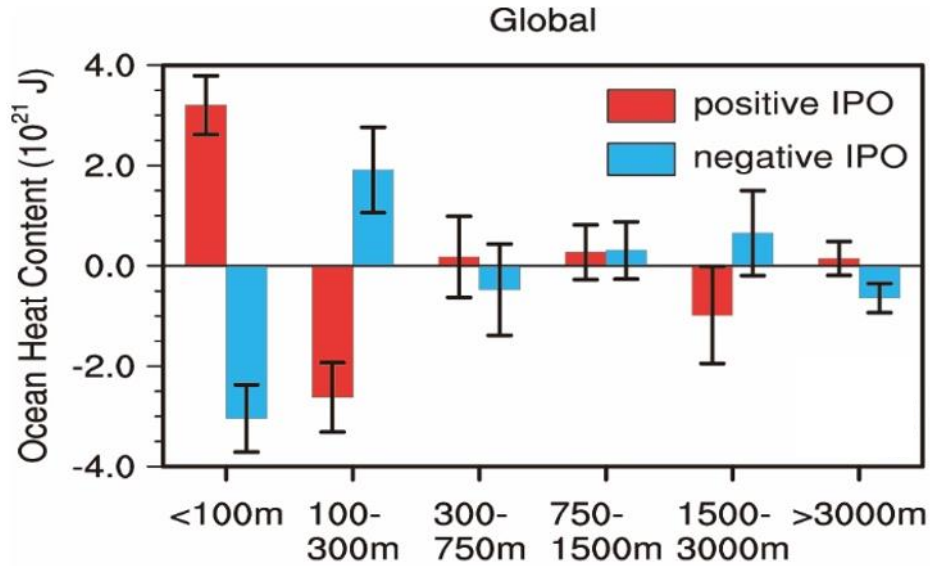


The pattern of heat redistribution for different internal variabilities?

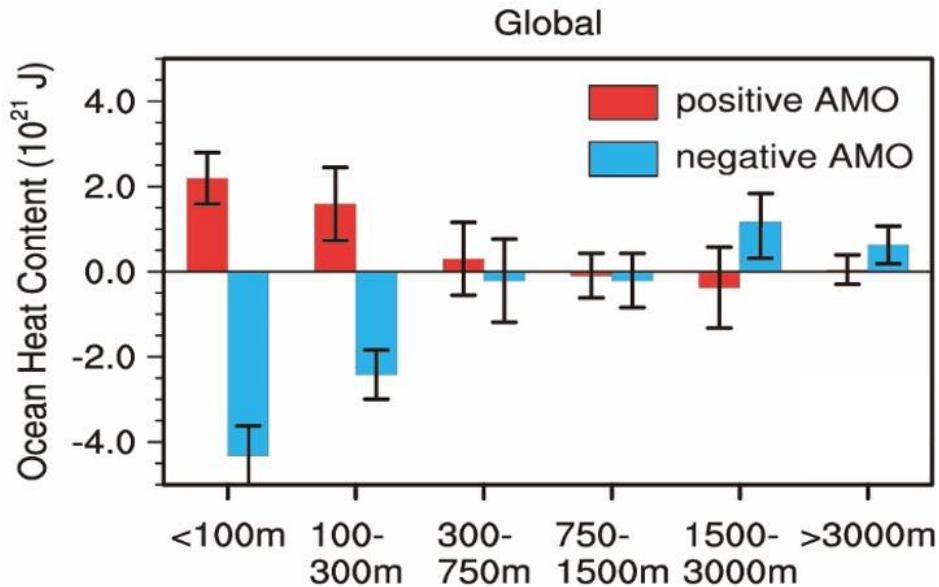
Data we analyze:
A fully coupled preindustrial control run in CESM LENS Project



Global mean OHC change

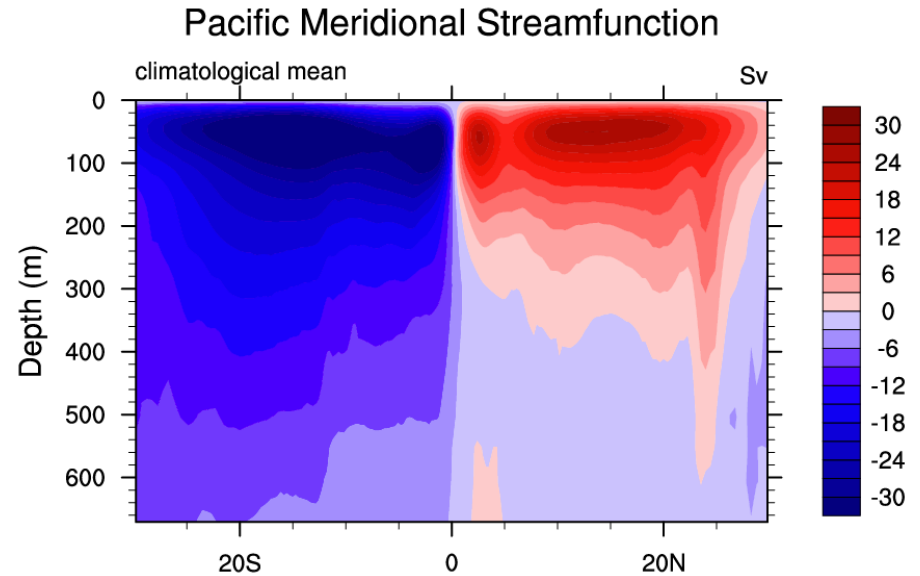
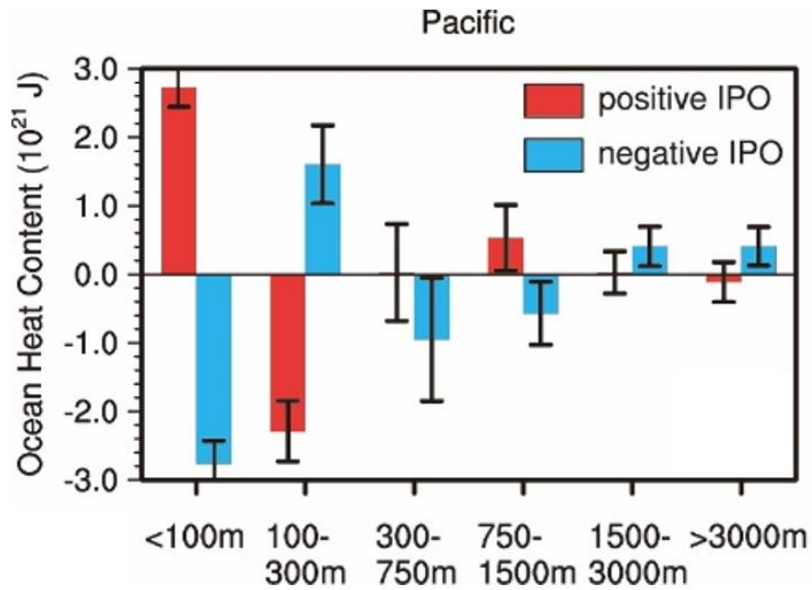


For IPO, heat redistributes between surface and subsurface ocean

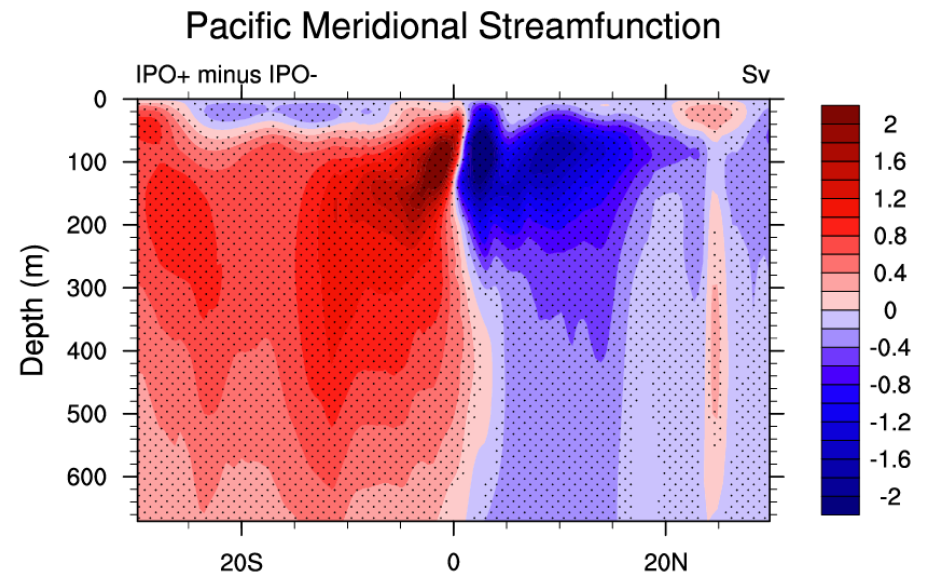
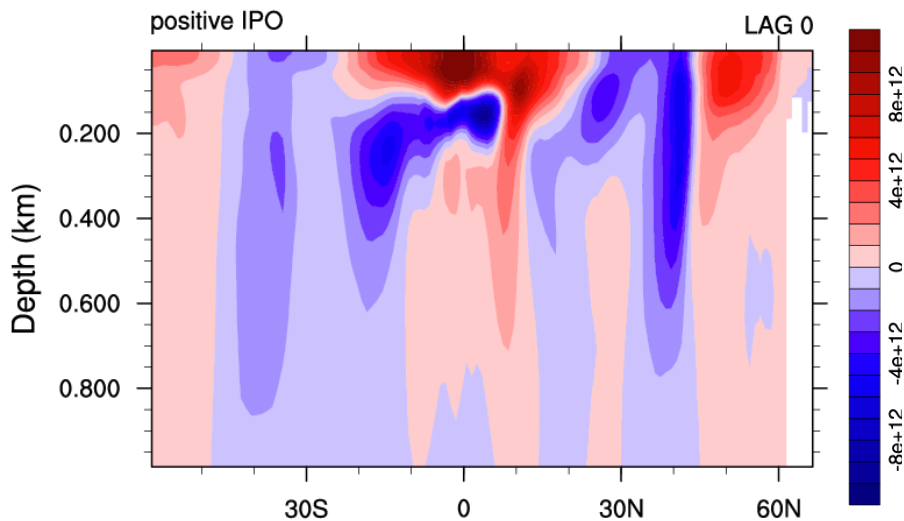


For AMO, upper layers' OHC increases (decreases) in positive (negative) phase

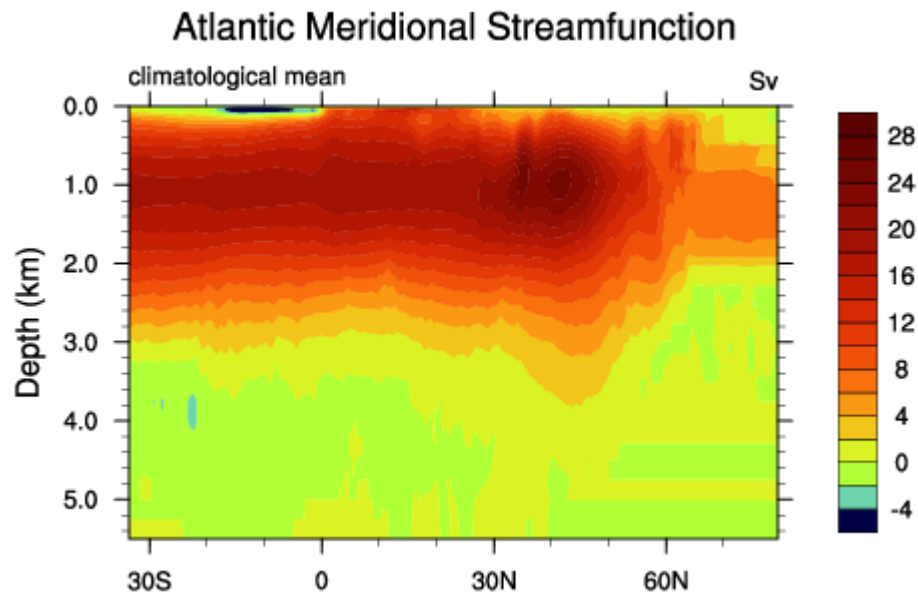
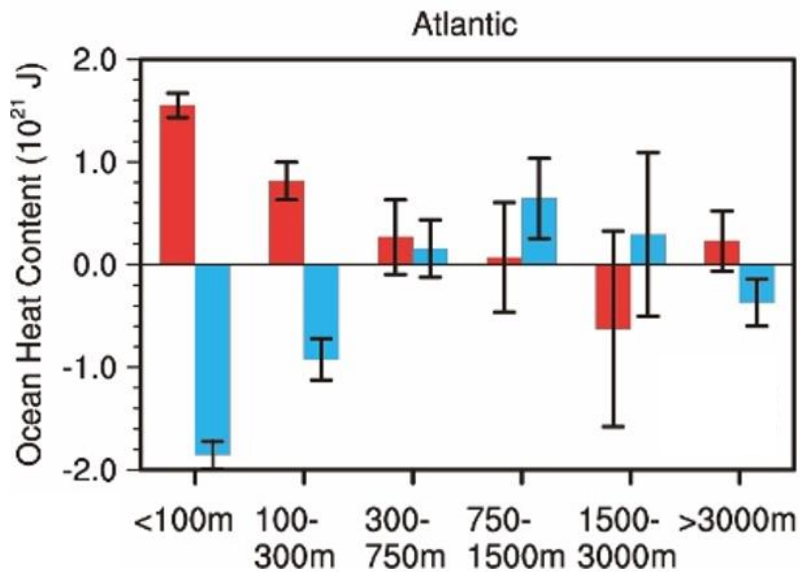
Basin-scale influence of IPO



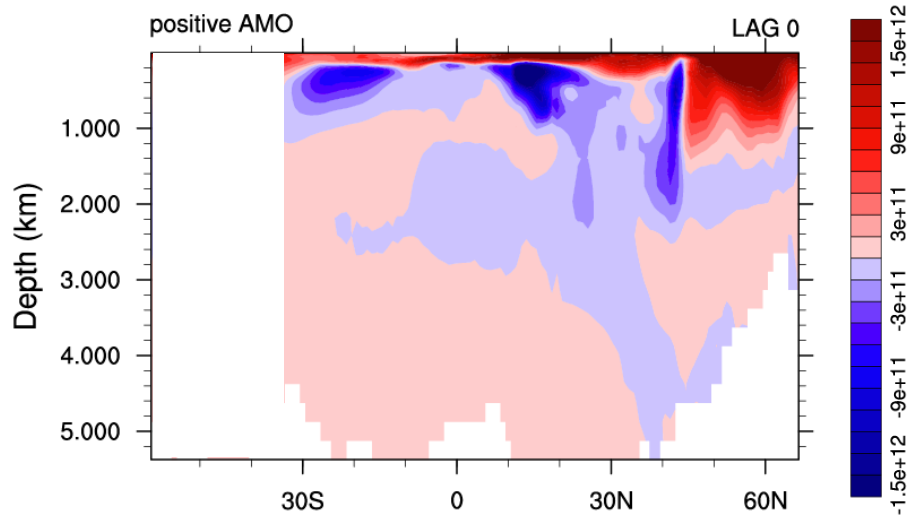
Pacific zonally integrated heat density (J/m^2)



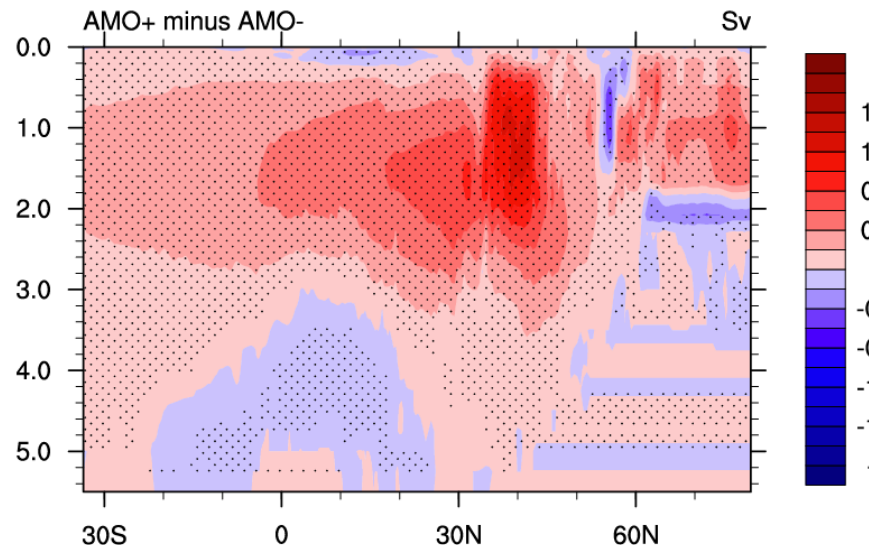
Basin-scale influence of AMO



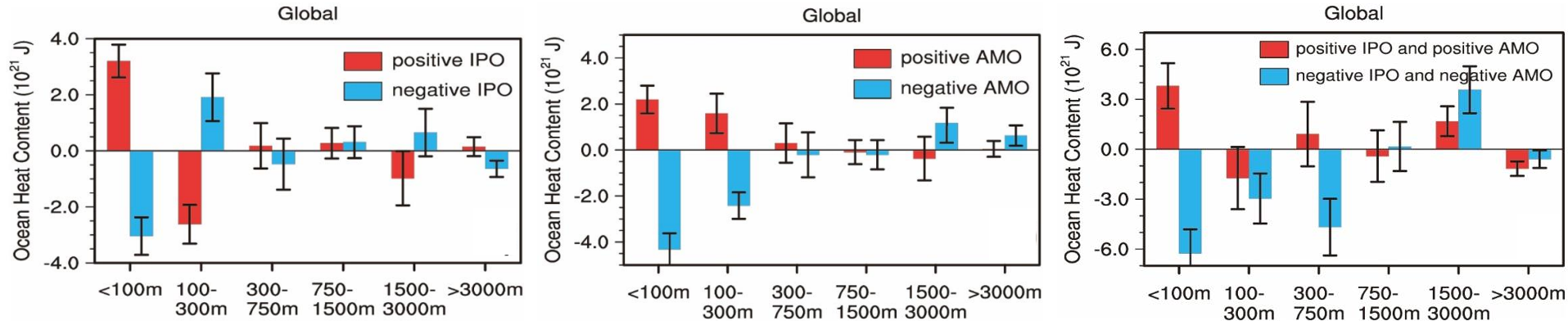
Atlantic zonally integrated heat density (J/m^2)



Atlantic Meridional Streamfunction



In-phase IPO and AMO



Global Mean Surface Temperature change (degC)

IPO+	0.053 (± 0.012)	AMO+	0.040 (± 0.015)	IPO+&AMO+	0.076 (± 0.027)
IPO-	-0.054 (± 0.012)	AMO-	-0.054 (± 0.016)	IPO-&AMO-	-0.087 (± 0.032)

Summary

1. Main feature of OHC change for IPO:
Heat redistribution between surface and subsurface in the tropical and subtropical Pacific ocean through the change of STCs
2. Main feature of OHC change for AMO:
Surface and subsurface OHC increase in positive phase and decrease in negative phase. Strong heat anomaly in subpolar Atlantic ocean through the change of AMOC
3. In-phase variation of IPO and AMO amplifies the surface change of OHC and GMST