Summary

Rigorous global ocean state estimation methods are required to produce dynamically consistent model/data syntheses from which time-varying ocean transport of heat, freshwater, and momentum can be computed, as well as their regional divergence.

All results shown below are quantities that can not directly be observed; ocean state estimation is important for obtaining estimates of all climate relevant observable and unobservable, time-dependent fields. These include the flow field, transports, mixed layer depths, overturning, and especially the surface heat, freshwater, and momentum fluxes that are consistent with ocean observations.

Methodology

The ECCO global WOCE synthesis is used here to analyze ocean volume, heat, and freshwater transports. Time-varying barotropic transports, estimated from the fully time-dependent model, are used to produce a dynamically consistent model/data synthesis. All results shown below are quantities that can not directly be observed; ocean state estimation is important for obtaining estimates of all climate relevant observable and unobservable, time-dependent fields. These include the flow field, transports, mixed layer depths, overturning, and especially the surface heat, freshwater, and momentum fluxes that are consistent with ocean observations.

Volume Transports

Mean and SD Estimated Volume Flux (Sv)

Mean Heat and Freshwater Transports

Mean and SD Estimated Heat Transport (PW)

Mean and SD Estimated Freshwater Transport (Sv)

References


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