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Intercomparison of anthropogenic ocean heat uptake processes in AOGCMs

Matthew Couldrey[1] and Jonathan Gregory[1,2]
[1]University of Reading, Reading, United Kingdom of Great Britain and Northern Ireland (couldrey.matthew@gmail.com)
[2]Met Office Hadley Centre, Exeter, United Kingdom of Great Britain and Northern Ireland (j.m.gregory@reading.ac.uk)

Thermosteric sea level change, resulting from ocean heat uptake, is a key component of recent and future sea level rise. The various atmosphere-ocean general circulation models (AOGCMs) used to predict future climate produce diverse spatial patterns of future thermosteric sea level rise. Most of this model spread occurs because the representation of ocean circulation and heat transport is different across models. These effects can be analysed through new simulations carried out as part of the Flux Anomaly Forced Intercomparison Project (FAFMIP), in which the exchanges of heat and salt are attributed to specific ocean circulation processes, namely the vertical dianeutral processes (convection, boundary layer mixing, shear instability mixing etc), isopycnal diffusion and residual-mean advection. Here, we present an intercomparison of ocean heat content change in FAFMIP experiments from a water-mass following perspective, to distinguish oceanic heat redistribution and uptake. We find that the redistribution of heat is a key difference across AOGCMs.