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# North Atlantic heat transport and AMOC: Potential predictability in the subtropical and subpolar gyre

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We investigate the time scales of potential predictability of the North Atlantic meridional heat transport (MHT) and the meridional overturning circulation (AMOC) on interannual time scales using hindcast ensembles based on an oceanic data assimilation product. We analyze the prognostic potential predictability (PPP), using the GECCO synthesis as the initial conditions and the boundary conditions.

Within the employed model set-up, the MHT is potentially predictable in the subtropical and subpolar gyre but not at their boundary. The underlying mechanisms which characterize the PPP of the MHT differ in the gyres: The influence of the gyre component of the MHT and the temperature field variability on the PPP of the total MHT are mostly restricted to the subpolar latitudes. The influence of the overturning component of the MHT on the PPP of the total MHT is mostly restricted to the subtropical latitudes. At the gyre boundary, dynamics of the Ekman heat transport limit the PPP time scales of the total MHT.

The PPP of the AMOC differs from the PPP of the MHT. The PPP of the AMOC is only similar to the PPP of the MHT where the overturning component controls the PPP of the MHT (subtropical gyre), while the PPP of the AMOC is not similar to the PPP of the MHT where the gyre component controls the PPP of the MHT (subpolar gyre). In the present model set-up, the latitude dependence of the PPP time scales of the AMOC with the Ekman contribution removed is similar to the latitude dependence of the PPP time scales of the basin wide zonal density gradients.

The demonstrated gyre-dependence of the PPP time scales of the MHT the AMOC requires caution when interpreting either single latitude and/or model-based potential predictability