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Interaction of Atlantic Meridional Overturning Circulation and Sub-Polar Gyre on decadal timescale

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North Atlantic climate variability is dominated by two important subsystems, the Atlantic Meridional Overturning Circulation (AMOC) and the Sub-Polar Gyre (SPG). While the AMOC is responsible for the transport of mass and heat into higher latitudes, SPG has been linked with large-scale changes in the subpolar marine environment. The changes in strength, intensity and positions of the constituent currents of the SPG impose variabilities in the distribution of heat and salt in the North Atlantic Ocean. Consequently, the predictability on decadal scales of the two subsystems is of huge importance for the understanding of variability in the North Atlantic.

Our contribution investigates the decadal and multi-decadal predictability of these subsystems within the Max Planck Institute for Meteorology Earth System Model (MPI-ESM). We analyse the model's capability to predict these subsystems as well as the dependence of the two subsystems on each other. These investigations open new opportunities for a better understanding of the impact of the North Atlantic onto important marine ecosystems and its changes in the upcoming decade.