Surface temperature forecast with the MPI-M decadal prediction system

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The latest MPI-M decadal forecast experiments are examined regarding their prediction skill of surface temperature. The experiments are based on a model configuration as provided to the CMIP5 of the low resolution version of MPI-ESM (LR: T63L47/GR15). Yearly initialisation is applied with initial conditions determined by an assimilation experiment in which we nudged 3-dimensional temperature and salinity from ocean forced runs.

Prediction skill is found globally due to the initialization in the first prediction year. However, thereafter (years 2-5) the initialization causes a reduction in prediction skill compared to the uninitialized simulations especially over the tropical oceans. Different initialization methods are tested to improve the skill especially in these regions. Over the North Atlantic positive skill is found for all lead times. Simulated surface air temperatures over the European area also suggest skill for distinct regions. Here we further investigate the skill for the North Atlantic European region by considering multi-year seasonal averages. We find a seasonal dependence of forecast skill. For the multi-year summer average, forecast skill is found over the central to eastern part of Europe. Winter means show highest skill over Northern Europe. The skill during summer months may be linked to a East-West pressure gradient that geostrophically advects temperature in South-North direction as shown in observations.