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Understanding of Processes in Decadal Climate Variability

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The quality of decadal climate predictions rests fundamentally on the ability of the forecast models realistically to simulate climate and its variability, in particular at decadal timescales. Therefore, the improvement of the Max Planck Institute for Meteorology Earth System Model (MPI-ESM) for decadal predictions is one of the goals of the new German research project "MiKlip – Decadal Predictions" (http://www.fona-miklip.de/en/). In MiKlip different aspects of decadal climate predictions are considered like initialisation strategies, the predictive skill on the regional scale with focus on Europe and Africa and the systematic evaluation of the prediction system. Beside these aspects MiKlip deals with the incorporation of those processes in climate models that are important for the realistic representation of decadal climate variability, and the understanding of the important processes in the numerical prediction system. Processes that have the potential to improve decadal climate predictions are related to e.g. Arctic sea ice, atmospheric chemistry, large volcanic eruptions, atmosphere-ocean coupling, stratosphere and land-atmosphere interaction. The work dealing with the processes can be categorized into assessing the effects of enhanced resolution and of advanced parameterizations and numerics, investigating mechanisms of decadal variability, improvement of existing system components and coupling of additional climate subsystems.