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Uncertainties in Decadal Model Evaluation due to the Choice of Different Reanalysis Products

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In recent years decadal predictions have become very popular in the climate science community. A major task is the evaluation and validation of a decadal prediction system. Therefore hindcast experiments are performed and evaluated against observation based or reanalysis data-sets. That is, various metrics and skill scores like the anomaly correlation or the mean squared error skill score (MSSS) are calculated to estimate potential prediction skill of the model system.

Our results will mostly feature the Baseline 1 hindcast experiments from the MiKlip decadal prediction system. MiKlip (www.fona-miklip.de) is a project for medium-term climate prediction funded by the Federal Ministry of Education and Research in Germany (BMBF) and has the aim to create a model system that can provide reliable decadal forecasts on climate and weather.

There are various reanalysis and observation based products covering at least the last forty years which can be used for model evaluation, for instance the 20th Century Reanalysis from NOAA-CIRES, the Climate Forecast System Reanalysis from NCEP or the Interim Reanalysis from ECMWF. Each of them is based on different climate models and observations.

We will show that the choice of the reanalysis product has a huge impact on the value of various skill metrics. In some cases this may actually lead to a change in the interpretation of the results, e.g. when one tries to compare two model versions and the anomaly correlation difference changes its sign for two different reanalysis products. We will also show first results of our studies investigating the influence and effect of this source of uncertainty for decadal model evaluation. Furthermore we point out regions which are most affected by this uncertainty and where one has to cautious interpreting skill scores. In addition we introduce some strategies to overcome or at least reduce this source of uncertainty.