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Visualising uncertainty across three generations of the MiKlip decadal prediction system

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Decadal climate prediction is a relatively young research field; nevertheless, it generates a lot of interest among stakeholders, since the time-frame considered is highly relevant for decision making. From a scientific point-of-view there is a need to clearly quantify the skill and the associated uncertainty of decadal predictions. However, given the stakeholders' interest, there is also a great need to display and communicate these findings in a user-oriented manner.

The goal of this study is to develop graphical and text-based information that can serve as background material for the publication of decadal predictions on the MiKlip webpage – www.fona-miklip.de. This background material should give the visitor easy-to-access information on the possibilities and the limitations of the MiKlip decadal prediction system.

To investigate different approaches for visualising the skill and the uncertainty of decadal predictions, we use the retrospective forecasts (hindcasts) performed with three generations of the MiKlip system. We focus our analysis on two types of regions and variables: (1) those regions and variables, for which predictive skill has already been established, e.g., North Atlantic sea surface temperatures, and (2) those regions and variables of high user-relevance, but for which low to no skill has been detected so far, e.g., annual and seasonal mean temperatures over Europe.

We also discuss how expert knowledge of both the observed climate system and the prediction system itself can be incorporated, either visually or in text form. This expert knowledge could provide a subjective, but still useful, confidence measure for the predicted variable.