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Evaluation of decadal predictions using a satellite simulator for the Special Sensor Microwave Imager (SSM/I)

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Decadal climate predictions are commonly evaluated focusing on geophysical parameters such as temperature, precipitation or wind speed using observational datasets and reanalysis. Alternatively, satellite based radiance measurements combined with satellite simulator techniques to deduce virtual satellite observations from the numerical model simulations can be used. The latter approach enables an evaluation in the instrument's parameter space and has the potential to reduce uncertainties on the reference side.

Here we present evaluation methods focusing on forward operator techniques for the Special Sensor Microwave Imager (SSM/I). The simulator is developed as an integrated part of the CFMIP Observation Simulator Package (COSP). On the observational side the SSM/I and SSMIS Fundamental Climate Data Record (FCDR) released by CM SAF (http://dx.doi.org/10.5676/EUM_SAF_CM/FCDR_MWI/V002) is used, which provides brightness temperatures for different channels and covers the period from 1987 to 2013.

The simulator is applied to hindcast simulations performed within the MiKlip project (http://fona-miklip.de) which is funded by the BMBF (Federal Ministry of Education and Research in Germany). Probabilistic evaluation results are shown based on a subset of the hindcast simulations covering the observational period.