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Evaluation of Climate Model Ocean Surface Fluxes Using HOAPS Satellite Data

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Today several satellite-based data set of atmospheric and ocean surface parameters exist that cover a time period of nearly twenty years. With the availability of such long term satellite data records the evaluation of model simulations on climatological scale has become possible. In particular the ocean surface freshwater flux parameters are key variables in the climate system, and their representation in climate model systems is essential for the successful modeling of the earth system.

The HOAPS-3 climatology (Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data) contains fields of precipitation, surface fluxes and atmospheric parameters over the global ice-free ocean between 1987 and 2005. All basic state variables needed for the derivation of the fluxes are calculated from on an intercalibrated SSM/I brightness temperatures and the NODC/RSMAS Pathfinder SST. A sophisticated processing chain, including multi-satellite averages, inter- sensor calibration, an efficient sea ice detection procedure, and well validated retrieval algorithms make HOAPS a suitable data set for climatological applications as well as for case studies.

However, the comparison of the satellite retrieved data with climate model simulations is complicated by differences in the temporal and spatial resolution. Hence, a statistically consistent representation of the spatial and temporal sampling of the compared variables has to be achieved. Furthermore, not all quantities that are derived from the satellite data may be directly available from the model output and need to be estimated from other quantities.

This presentation will cover first results from the implementation of a model evaluation framework, which has been set up to compare freshwater flux parameters from the HOAPS data set with results from climate model simulations. The impact of different transformations of the climate model output in order to achieve a consistent representation of the satellite-retrieved fields is investigated and results of the comparisons between model and satellite data are discussed.