Geophysical Research Abstracts,
Vol. 11, EGU2009-12312, 2009
EGU General Assembly 2009


# On the balance of precipitation and evaporation over global oceans in satellite based and reanalysis data sets

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Over the global oceans, precipitation should be smaller than evaporation and the balance should be compensated by the global runoff from land surfaces. But to which extent do satellite climatologies and reanalysis products reproduce this basic feature of the global water cycle?
The Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite Data set, HOAPS-3 (www.hoaps.org), contains fields of precipitation and evaporation over the global ocean and all basic state variables needed for the derivation of the fluxes. Except for the NOAA Pathfinder SST data set, all variables are derived from SSM/I satellite data over the ice free global ocean between 1987 and 2005. Special emphasis has been put into quality control and inter-satellite calibration in order to derive the data fields as homogeneous as possible. One of the major design goals of HOAPS was to provide a data set that is based exclusively on retrieval procedures which avoid any additional model or reanalysis input. On a global scale, the average evaporation since 1987 exceeds precipitation rate over the oceans in HOAPS-3 systematically, with almost negligible yearly cycle and small monthly variations. While the globally averaged precipitation time series does not exhibit any significant trend over the study period, evaporation shows a continuous increase during this time. Regionally, this increase concentrates in the subtropics and is, together with some reduction in precipitation, consistent with a strengthening of the Hadley circulation during the observation period.
These results are compared with similar data fields of the same period from various satellite climatologies to insure the consistency of our results and to the NCEP and ERA40 as well as ERAInterim reanalysis products. Remarkable similarities and differences between the different information sources have been found and will be discussed in the presentation.