



Precipitation Ground Validation over the Oceans

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Recent evaluations of different state-of-the-art satellite derived and re-analysis based precipitation climatologies show remarkably large differences in detection, amount, variability and temporal behavior. The uncertainties are largest in the ITCZ and the cold season high-latitudes. Our HOAPS (Hamburg Ocean Atmosphere Parameters and Fluxes from Satellite data, www.hoaps.org) precipitation retrieval exhibits fairly high accuracy in such regions. However, the statistical basis for a conclusive validation over the ocean has to be significantly improved with comprehensive ground validation efforts. Existing in-situ instruments are not designed for precipitation measurements under high wind speeds on moving ships; hence virtually no ground validation data exists over the ocean, especially for snow.

This changed with the development of the optical disdrometer ODM470 by our KlimaCampus cooperation partners at Geomar (Univ. Kiel) and the company Eigenbrodt (Hamburg). A prototype instrument for snow was tested during two field campaigns in 2005 and 2008 in the cold season Norwegian Sea. Point to area validation shows a dichotomous detection accuracy of 0.98 for HOAPS precipitation. Quantitative collocation between the disdrometer and HOAPS shows a correlation up to 0.6. However, as these collocated campaign data comprise only snowfall intensities below 1 mm/h.

A more systematic data collection effort with redesigned automated ODM470 instruments on multiple ships in climate system hotspots and high impact weather events started in 2009. The long-term in-situ data gathering period started in June 2010 with the permanent installation of the first automatic disdrometer on the German research icebreaker R/V Polarstern. The other two instruments were mounted both in early September 2010, permanently on R/V Akademik Ioffe (P.P.Shirshov Institute of Oceanology, RAS, Moscow, Russia) in western Greenland and temporarily on R/V Aranda (Finnish Meteorological Institute, Helsinki, Finland) in the context of the LPVEX (Light Precipitation Validation Experiment) campaign. The core regions for these long-term precipitation measurements comprise the Arctic, Nordic Seas, Baffin Bay, ITCZ, the Southern Oceans, and the Antarctic. This paper outlines first results of the long-term measurements and gives an overview on the current status of the project.