



## **Ship-based remote sensing observations of clouds and aerosol over the Atlantic Ocean**

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Within the framework of the OCEANET project, ship-based remote sensing observations of the atmosphere above the Atlantic Ocean have been performed on board of the German research vessels Polarstern and Meteor. Since 2007, twelve cruises took place, mostly between Bremerhaven (Germany) and Cape Town (South Africa) or Punta Arenas (Chile), respectively. In 2014 and 2015, two additional cruises will be performed.

The goal of these ship-based measurements is a better understanding of water vapor, cloud and aerosol interaction over the open sea where data are scarce. The project was designed to measure the full atmospheric energy budget in different climate zones, including exchange processes at the sea surface. The main instrumentation on all cruises consisted of a passive microwave radiometer, a full sky imager, sun photometer, lidar ceilometer and broadband solar and infrared radiation measurements. In addition a multi wavelength Raman lidar (PollyXT) was on board of six cruises. Spectral solar radiance and irradiance observations have been performed on four cruises. With this dataset, a variety of topics can be addressed.

This presentation will focus on marine stratocumulus clouds which are widespread over oceans and still pose a large uncertainty for determining the Earth's energy budget. Detailed studies for the northern trade wind zone off the West African coast will be presented. The emphasis lies on stratocumulus cloud properties, such as frequency, size, variability, liquid water content as well as their impact on surface radiation. Additionally, the influence of Saharan dust on the cloud occurrence will be addressed. Dust outbreaks over the ship could be observed in several years, including also at a cruise from the Caribbean Sea to Cape Verde in 2013.

Furthermore, we will give a statistical overview of the meridional distribution of atmospheric water vapour and clouds over the Atlantic Ocean. With six years of measurements, always at the same time of the year, the variability of the atmospheric conditions in subtropical and tropical regions can be quantified.