



## Measured and parameterized energy fluxes estimated for Atlantic transects of RV Polarstern

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Even to date energy fluxes over the oceans are difficult to assess. As an example the relative paucity of evaporation observations and the uncertainties of currently employed empirical approaches lead to large uncertainties of evaporation products over the ocean (e.g. Large and Yeager, 2009). Within the frame of OCEANET (Macke et al., 2010) we performed such measurements on Atlantic transects between Bremerhaven (Germany) and Cape Town (South Africa) or Punta Arenas (Chile) onboard RV Polarstern during the recent years.

The basic measurements of sensible and latent heat fluxes are inertial-dissipation (e.g. Dupuis et al., 1997) flux estimates and measurements of the bulk variables. Turbulence measurements included a sonic anemometer and an infrared hygrometer, both mounted on the crow's nest. Mean meteorological sensors were those of the ship's operational measurement system. The global radiation and the down terrestrial radiation were measured on the OCEANET container placed on the monkey island.

At least about 1000 time series of 1 h length were analyzed to derive bulk transfer coefficients for the fluxes of sensible and latent heat. The bulk transfer coefficients were applied to the ship's meteorological data to derive the heat fluxes at the sea surface. The reflected solar radiation was estimated from measured global radiation. The up terrestrial radiation was derived from the skin temperature according to the Stefan-Boltzmann law. Parameterized heat fluxes were compared to the widely used COARE-parameterization (Fairall et al., 2003), the agreement is excellent.

Measured and parameterized heat and radiation fluxes gave the total energy budget at the air sea interface. As expected the mean total flux is positive, but there are also areas, where it is negative, indicating an energy loss of the ocean. It could be shown that the variations in the energy budget are mainly due to insolation and evaporation. A comparison between the mean values of measured and parameterized sensible and latent heat fluxes shows that the data are suitable to validate satellite derived fluxes at the sea surface and re-analysis data.

### References

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