Abstract View

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Sensible and Latent Heat Flux Measurements over the Ocean

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ABSTRACT

This papar presents an extensive act of sensible heat (Reynolds flux and dissipation methods) and latent heat (dissipation method) flux measurements from a stable deep water tower and from ships on the deep sea. Operational difficulties associated with ship spray and flow distortion and with sensor calibration, response and contamination are discussed. The influence of atmospheric stability on the dissipation measurements and the bulk transfer coefficients is considered and a parameterization of Z/L in terms of wind speed and the sea-air potential temperature difference is found to be adequate. Temperature variances, Stanton numbers and w–t cospectra from the Roynolds flux measurements are compared to previous results.

The dissipation method is shown to be a viable means of measuring the heal fluxes over the deep sea by comparison with simultaneous Reynolds flux measurements, using our data for the sensible heat and the data of others for the latent heat. The neutral drag coefficient at 10 m height, CDN, because it is relatively well established, is used to check the performance of the shipboard measurements The dissipation sensible and latent heat fluxes are well described, on average, by the neutral transfer coefficients at 10 m height, CTN and CEN, respectively: Previously published results are considered, indicating that 10^3 CTN = 0.75 may be preferable in stable conditions Some data suggest a slight wind-speed dependency above 10 m s^{-1}, which is mostly accounted for with CTN and CEN proportional to $CDN^{1/2}$, as implied by constant roughness lengths

A bulk aerodynamic method of estimating the heat fluxes from CDN, CTN and CEN, wind speed, sea temperature, and air temperature and humidity is described and compared to time series of the dissipation method boat fluxes. Potential problem with the data are discussed using the time series.

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