Why are we interested in Random Errors?

It is important to know the scatter or random error in marine reports from the I-COADS (International-Comprehensive Ocean Atmosphere Dataset). Without information on the random errors and sampling characteristics of the data then the significance of any results derived from analysis of I-COADS (or climatologies derived from I-COADS) cannot be properly assessed. Estimates of the random errors are important for data assimilation, variability analysis, optimal interpolation and inverse calculations.

How do we calculate the Random Errors?

We use the semivariogram method Lindau (1995) to estimate the random errors. Ship's observations made at the same time are paired and the mean square differences plotted against the separation of the ships.

We then perform a linear regression to attempt to isolate the spatial variability from the random observational error. The intercept represents the sum of the errors in the pair at zero distance. Halving this gives us the error in a single ship then taking the square root gives the root-mean-square random error.

More information

Random errors for air temperature, specific humidity and wind speed are presented in Kent et al. (2003). They also show how the error estimates vary with observing method and the quality control applied to the data. Kent and Challenor (2003) demonstrate how data from different sources can vary in quality. The semivariogram was first used in marine climatology by Lindau (1995) and more detail on the method can be found in Kent et al. (1999) and Lindau (2003).