

Signal to noise ratio applied to COADS ship-measured variables

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Given the large variation in time and space of ship traffic across the world's ocean, there is a need to identify locations where the Comprehensive Ocean Atmosphere Data Set (COADS) can satisfy research requirements for specific objectives. Before embarking on a research project using COADS it is important that the researcher know in advance what the signal to noise ratio of ship box averages is in the area and scales of interest. In an effort to provide such information we have developed a 3 dimensional statistical scheme which can provide COADS box metrics regarding the ratio of the signal variance to the noise variance for any COADS variable over any scale. A measure of the standard error for box averages has also been developed. These metrics could potentially be incorporated into the COADS data base as useful measures for the research community.

Although, the statistical scheme does not apply to measurement bias, it does take into account sampling error as a result of ship position in time and space and the time period to time period variation. The routine has been applied to several COADS box location across the global to illustrate its usefulness and as a proof of concept.

An example of the metric's use is to put error bounds about long-term trend analysis as a function of varying ship density over time in a given location.