Subseasonal and interannual variability in the Indian Ocean

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The tropical Indian air-sea interface exhibits strong non-seasonal variability on a variety of time-scales, from subseasonal to interannual, in many climatically important parameters (e.g. wind stress, precipitation and sea surface temperature). Variability on these timescales connects to significant weather and climate variability over land. Analysis of satellite and in situ data raise questions about our knowledge of climate variability, these results will be presented and discussed.

Indian Ocean regions of strong subseasonal air-sea variability generally correspond to regions of significant interannual variability. The extent to which our understanding of interannual variability is affected by undersampling the subseasonal variability needs to be explored. Subsampling experiments using satellite data indicate that there is potential for such aliasing in historical in situ data.

Analysis of the GTS dataset indicates that there may be systematic problems with even the seasonal description of certain variables. Specifically, in certain regions of the Indian Ocean (actually globally), there is a significant overabundance of ship SST measurements which are whole or half degrees - in some regions as many as 70% of all observations. Analysis of the statistical distribution of these data indicates that many of these whole (and half) degree retrievals show greater scatter than expected from mere truncation or rounding.

Further, the COADS monthly-mean SSTA and wind anomaly variability in the Indian Ocean (and actually in many regions of the world) very strongly show the variability in sampling: the strongest SSTA (and wind anomaly) variability is in regions of lowest sampling. This is suggestive that sampling errors and sub-gridscale variations represent much of the estimate of SSTA variability in the COADS gridded dataset over much of the world. Potential sources and impacts of the SSTA variance / sampling density covariability are examined.