Comparison of models for sea surface temperature (SST) diurnal warming and foundation SST in reanalysis systems

Upper ocean temperatures exhibit diurnal cycles that have been observed by various measurements (from ships, buoys, satellites, etc). Accurate representation of such diurnal cycling of sea surface temperature (SST) is essential for modeling, analysis, prediction and retrieval from satellite radiometer measurements of skin SST. In addition to observations, two essential inputs are needed to derive skin SST. In atmospheric models or uncoupled (to the ocean) reanalysis: a) "foundation" SST, and b) a prognostic (or diagnostic) model for diurnal warming and cool-skin layer to obtain skin SST. In the case of ocean models or coupled reanalysis, these two are replaced by "sufficient" vertical resolution of the ocean model. As we develop atmosphere-ocean coupled models and reanalyses, we would like to compare their estimates of foundation/skin SSTs with those from observations and atmosphere-only reanalyses. This presentation has two objectives: (i) Compare estimates of foundation SST from ocean-only (GLO12v4, GOFS) and atmosphere-only (ERA5) reanalyses with those from field campaigns to identify areas of improvements and systematic biases; (ii) What would be the minimum ocean model vertical resolution that is needed to sufficiently resolve foundation/skin SSTs? This topic is of potential interest to members of various OceanPredict task teams (Data Assimilation, Coupled Prediction, Intercomparison and Validation, Observing System Evaluation).

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