

The impact of mixed layer variability on SST prediction

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Subseasonal to seasonal forecasts are likely to improve from better sea surface temperature (SST) predictions, as SST is the bottom boundary condition for the marine atmosphere. We present research that extends the analysis and prediction of SST to include variability of upper ocean mixing to explore how the variability of the ocean mixed layer affects the intraseasonal statistics of SST and its covariance with tropical intraseasonal atmospheric variability. We present a conceptual framework to identify the contribution of fast (hourly to daily) co-variations in ocean mixed layer depth and atmospheric fluxes to seasonal to sub-seasonal sea surface temperature prediction. First, metrics from this framework will be analyzed from data collected throughout the tropical and subtropical oceans from moored platforms and profiling instruments to demonstrate how diurnal solar warming, fast wind gusts and rain showers, and daily variable clouds and winds rectify into longer timescale intraseasonal SST variability. We will then focus the pre-monsoon season in the Arabian Sea using observations of the upper ocean collected during the 2023 ASTRraL/EKAMSAT field program, highlighting the role of the diurnal warm layer variability on mean SST.