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An Observational Study on Intraseasonal Variability of Upper Ocean Temperature in the South China Sea (SCS)

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Based on the weekly mean OISST, the intraseasonal variability of SST in the SCS is examined. Subsurface temperature (50-100m) variations on intraseasonal time scales in the SCS are also investigated by analyzing the ATLAS observational data obtained during the SCSMEX. The results are shown as below.

The intraseasonal SST perturbations and the physical mechanism responsible for them in summer are remarkably different from those in winter. In summer, the spatial correlation pattern of intraseasonal SST variations is zonally distributed in the monsoon region, which bears much resemblance to that of zonal winds. And they are characterized by the northward propagation. Variations of latent heat flux and shortwave radiation associated with convection activity on intraseasonal time scales are important for driving the SST variations. In contrast, the spatial correlation pattern of intraseasonal SST perturbations is meridionally distributed in the SCS without any propagating signal in winter, and is relatively localized, which shares some similarities with that of meridional winds. Variations of latent and sensible heat fluxes associated with cold surge activity on intraseasonal time scales are important for driving the SST variations.

It can be concluded that the intraseasonal variability of SST in the SCS is of prominent monsoonal characteristic, which completely differs from the corresponding variability in the equatorial Indo-Pacific. The response time of SST to Q_{net} on intraseasonal time scales is about 5-10 days, which is slightly shorter than that in the equatorial Indo-Pacific. The intraseasonal SST variability in the SCS is regional.

The subsurface temperature variability on intraseasonal time scales is much stronger than the SST variability. It is primarily induced by local wind stress curl via adjusting the vertical displacement of thermocline, and the response time is 20-30 days. With the elevation (fall) of thermocline, the subsurface temperature becomes lower (higher).

Key words: the SCS; SST; subsurface temperature; intraseasonal variability.