Variability of surface meteorology and air-sea fluxes observed by R/V *Mirai* during CINDY2011/DYNAMO campaign

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As a part of the CINDY2011/DYNAMO observation campaign, Research Vessel (R/V) *Mirai* was deployed at 8°S, 80.5°E in October and November of 2011. In this study, we investigate variability of surface meteorological variables and air-sea fluxes caused by atmospheric cumulus convective activity. Characteristics of convective systems observed by R/V *Mirai* in first half of October were quite different from those in second half of October and November.

In the former period, four mesoscale convective systems (MCSs) produced most of precipitation around R/V *Mirai*, associated with large-scale lower-tropospheric cyclonic circulation anomalies. Composite of the four events show that sensible heat flux was increased by ~20 W m^{-2} only during the passage of the MCS due to both increase in air-sea temperature difference and increase in surface wind speed. On the other hand, latent heat flux started to increase when the MCS reached the R/V *Mirai*, and continued to increase even after the passage of the MCS due solely to the increase in the surface wind speed. A difference in latent heat fluxes before and after the MCS events was ~70 W m^{-2} on average.

In the latter period, most of the observed convective events were sporadic sub-MCS-scale ones. By detecting sharp drop of surface temperature and its subsequent recovery period, we identify 22 events. Among them, 13 events consisted of only one temperature drop, while the other 9 events consisted of two times of temperature drops. We examine composite behavior of these two groups, as well as individual cases. We compare surface meteorological variables and radar reflectivity data, and find that minimum temperature is well correlated with maximum surface wind and ratio of radar echo area around R/V *Mirai*. Sensible and latent heat increases averaged for all the events were ~15 and ~50 W m^{-2}, respectively.