

## Abrupt cooling associated with the oceanic Rossby wave and lateral advection during CINDY2011

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The cooperative Indian Ocean experiment on intraseasonal variability in the Year 2011 (CINDY2011) was conducted to capture atmospheric and oceanic characteristics of the Madden-Julian Oscillation (MJO) in the central Indian Ocean from late 2011 to early 2012. During CINDY2011, the research vessel (R/V) MIRAI stayed at 8° S, 80.5° E for two months during the special observing period (SOP). Intraseasonal convection associated with the MJO was organized in the central Indian Ocean in late October and late November during the SOP. In the middle of November, both sea surface temperature (SST) and mixed layer temperature decreased suddenly when cold low salinity water intruded into the upper layer around the R/V MIRAI. This intrusion was accompanied by a surface current change from southwestward to westward/west-northwestward associated with the passage of the annual oceanic downwelling Rossby wave. The mixed layer heat budget analysis shows that horizontal advection plays an important role in the abrupt cooling whereas the net surface heat flux cannot account for the cooling. This is an interesting result because the associated downwelling Rossby wave is usually considered to increase SST through a reduction of entrainment cooling. In addition, for the second MJO event convection was activated around 20 November over the central north and equatorial Indian Ocean but not in the south. It is suggested that the cooler surface waters (as seen at the location of the R/V MIRAI) tended to suppress the initial atmospheric convection, resulting in the lagged convective onset in the end of November over the central south Indian Ocean.

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