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熱帯インド洋におけるダイポールモード現象と季節内変動との相互作用
Possible interactions between Indian Ocean Dipole and intraseasonal variability in the tropical Indian Ocean

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Variations in the tropical Indian Ocean cover a wide range of spatial and temporal scales. Indian Ocean Dipole (IOD) is one of the dominant interannual climate modes there, and several intraseasonal variations are believed to have interaction with IOD through oceanic bridges and/or air-sea interactions. Two of such examples will be explored in this presentation.

The first example is influence of meso-scale ocean eddy activity in the southeastern tropical Indian Ocean, which is generated by baroclinic instability in the northern part of the South Equatorial Current. Strong meridional temperature gradient associated with the IOD event results in anomalously energetic eddy activity. This causes stronger-than-normal northward eddy heat transport, which tends to reduce the meridional temperature gradient, hence a negative feedback on the IOD event itself.

Another example is impact of intraseasonal equatorial Kelvin waves on initiation of the IOD events, particularly in 2006 case. During May to August, before the 2006 IOD event, several upwelling equatorial Kelvin waves were excited by easterly wind anomalies in the equatorial central Indian Ocean. Negative subsurface temperature anomalies at the thermocline depth appeared associated with penetration of these Kelvin waves along the Sumatra coast, creating favorable conditions for cooling of the surface layer due to monsoonal upwelling in August. Constructive interaction between the two processes may set a critical condition for the generation of the 2006 IOD.

Such scale-interactions in the tropical Indian Ocean should be investigated in more detail for better understanding of mechanisms responsible for the IOD evolution and the skillful prediction of IOD.

Keywords: Indian Ocean Dipole, Intraseasonal variations, interactions, meso-scale eddy, Kelvin waves