



## **Weakening of the relationship between the Indian Ocean Dipole and the ENSO in recent decades**

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This study reports, on the 20th century the relationship between the El Nino Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD) was weaker than late 1990s. We show that 15-yr moving correlation between the Nino3.4 index during the December to February (DJF) and IOD index during the September to November (SON) season. At this result we divided previous decades (1979 to 1998) and late decades (1999 to 2014). The correlation coefficient was 0.64 in the previous decades and 0.21 in the late decades. Late decades were suddenly weaker than previous decades. Because, there is a big difference between previous decades and late decades in the ENSO regressed precipitation anomaly spatial distribution during the El Nino developing the MAM season. There were positive precipitation anomalies over the off-equatorial western Pacific. It induced the cross-equatorial southerly flow over the eastern Indian Ocean and maritime continent. It means cross-equatorial southerly flow was a key point to understanding the ENSO-IOD coupling system. In addition, using the climate models participated in the Coupled Model Intercomparison Project phase 5 (CMIP5) supports the observational results.