Triggering the Indian Ocean Dipole from the Southern Hemisphere

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This study identifies a new triggering mechanism of the Indian Ocean Dipole (IOD) from the Southern Hemisphere. This mechanism is independent from the El Niño/Southern Oscillation (ENSO) and tends to induce the IOD before its canonical peak season. The joint effects of this mechanism and ENSO may explain different lifetimes and strengths of the IOD. During its positive phase, development of sea surface temperature cold anomalies commences in the southern Indian Ocean, accompanied by an anomalous subtropical high system and anomalous southeasterly winds. The eastward movement of these anomalies enhances the monsoon off Sumatra-Java during May-August, leading to an early positive IOD onset. The pressure variability in the subtropical area is related with the Southern Annular Mode, suggesting a teleconnection between high-latitude and mid-latitude climate that can further affect the tropics. To include the subtropical signals may help model prediction of the IOD event.