

## **Intraseasonal wind bursts and the evolution of Indian Ocean Zonal Mode Events**

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Indian Ocean 'zonal mode' (IOZM) events, a cooling of sea surface temperatures (SST) off the coast of Sumatra in boreal fall and a later warming of the western tropical Indian Ocean, coupled to anomalies in the equatorial winds and precipitation over Indonesia and East Africa, have been the subject of a number of studies in recent years. The two IOZM events of 1994 and 1997 terminated rather differently, with a large warming of the western tropical Indian Ocean in 1997-98 for the most part absent in the 1994 event. An excess in precipitation over East Africa and drought over Indonesia were also stronger and persisted longer in 1997-98. One notable difference between the two years is the presence of intraseasonal westerly wind bursts, related to the Madden-Julian Oscillation, over the equatorial Indian Ocean in 1994, absent in the 1997 event until well into the spring of 1998.

The role of a particularly timed intraseasonal wind burst in November 1994 on the termination of the 1994 IOZM event is studied using an ad-hoc coupling of a forced tropical ocean model and global atmospheric model. The response to the wind burst is first examined in a comparison of two forced oceanic simulations, one with the wind burst removed from the forcing and one with observed winds. Keeping all other fluxes constant between the two runs, the dynamical effect of the wind burst is isolated, and shown to hasten the termination of the event. Without the wind burst, SSTs off the coast of Sumatra stay cooler, and a mild warm anomaly develops in the western tropical Indian Ocean. These differences persist well into the spring of 1995. A suggestion of the coupled atmosphere-ocean response to this wind burst is then evaluated using twin ensembles of global atmospheric model simulations, forced with the two oceanic signatures. This allows an exploration of the changed surface wind, flux, and precipitation response, and its contribution to the early termination of the 1994 IOZM event.

Since these intraseasonal wind bursts are rather stochastic in nature, their strong effect on the evolution of the IOZM event suggests that there might be a limit to the seasonal predictability of equatorial Indian Ocean SSTs, and for related precipitation predictions for East Africa and Indonesia, and other parts of the Indian Ocean basin.

**Meteorology (Poster)**