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Importance of TRMM and QuikSCAT daily forcing of the Indian Ocean to trigger ocean-atmospheric events in the Andaman Sea and Bay of Bengal

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This study is based on satellite data and an Indian Ocean thermodynamic model coupled to a tropical Atmosphere/Land model. Over the Indian ocean, TRMM rainfall and QuickSCAT wind data have 70% and 33% of their total variance between 1999 and 2004 at periods shorter than 30 days. By contrast TOPEX/Poseidon/Jason (TPJ) sea level data over the same period have less than 5% at periods shorter than 30 days. Most of the TPJ energy being in the annual, semi-annual and intraseasonnal oscillations. The latter have pronounced peaks at 60 and 90 days in the equatorial ocean and in the eastern Bay of Bengal. These peaks are explained by the travel of equatorial Kelvin and Rossby back and forth between Africa and Indonesia which takes 180 days and resonates at harmonics 90 and 60 days. Coastal Kelvin waves propagate along the eastern coast of the Bay of Bengal and penetrate the Andaman Sea. The latter, almost closed by the Nicobar islands, also resonates at a period close to 60 days. Using TRMM and QuikSCAT data to force the Indian Ocean model from 1999 to 2004, we perform two twin experiments: Run1 is forced by monthly averages, whereas Run2 is forced by daily values. Run2 agrees much better with TPJ than Run1. Even though the forcing of the 2 runs differ by signals shorter than one month, it is the [30-to-90-day] variations of sea level, salinity and SST which are most impacted. In addition these oceanic changes trigger changes in the atmosphere at all time scales. Run2 agrees very well with data in the equatorial ocean, but there is a major discrepancy for both runs in the eastern Bay of Bengal. This is because the land-mask of the Indian Ocean model does not adequately represent the Andaman Sea. So we improve the land-mask and perform a third experiment, presenting results in terms of how TRMM and QuickSCAT daily forcing of the whole Indian Ocean contributes to trigger the ocean-air events in the Andaman Sea and Bay of Bengal.