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インド洋 ITCZ 上の熱帯波動擾乱に対する中緯度からの強制
Extratropical Foricng of Tropical Wave Disturbances along the Indian Ocean ITCZ

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The role of extratropical waves in the excitation of tropical waves along the Indian Ocean Intertropical convergence zone (ITCZ) during Austral summer is investigated using Japanese Reanalysis (JRA25-JCDAS) products and NOAA OLR data. The analysis period is December–February for the 29 years from 1979/80 through 2007/08. The ITCZ waves have zonal wavelengths of about 3000–5000 km and exhibit westward and southwestward phase propagation from the west of Sumatra into Madagascar, and eastward and northeastward wave energy dispersion from the southwestern to eastern Indian Ocean. Their timescales span submonthly (6–30 days) range. The horizontal structure of the wavetrain along the ITCZ may be interpreted as that of a mixture of equatorial Rossby waves and mixed Rossby-gravity wavelike gyres. The origin and initiation mechanism of the tropical wave train remain uncertain. The linkage between the tropical and extratropical waves which is responsible for the formation and strengthening of the tropical wave train is examined by performing an extended singular value decomposition (ESVD) analysis of daily meridional wind anomalies at 850 and 200 hPa and a composite analysis based on the ESVD result. Daily lagged composite analysis results show the progression of the mid- and high latitude Rossby wavetrain propagating eastward and northeastward from the South Atlantic into the subtropical Indian Ocean in the upper level. As troughs and ridges that are part of the extratropical wavetrain approach the southern Africa-Madagascar region, a low-level wavetrain originating from those subsequently extends toward the tropical eastern Indian Ocean. A southwest-northeast oriented wavetrain extending across the subtropical–tropical Indian Ocean is established and strengthened. Wave activity flux diagnostics indicate that wave energy dispersion from the extratropics toward the tropics occurs along this wavetrain. These results suggest that the extratropical–tropical interaction associated with the extratropical Rossby wave propagation plays an important role in the development of the tropical waves along the Indian Ocean ITCZ.

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