Daily OLR climatological oscillation of the tropical Indian Ocean

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The Madden-Julian Oscillation (MJO) is the dominant mode of intraseasonal variability characterized by eastward propagation of convective activity in the tropical troposphere. Although the MJO undergoes significant seasonal variability it has not been widely discussed how different MJO cycles are distributed each year nor the regularity of the MJO cycles in different years. Here we ask the question of the regularity of intraseasonal variability of the tropical troposphere on interannual timescales by examining a daily climatology of the outgoing longwave radiation (OLR) over the tropical region. We found an approximately 40-day oscillation over the tropical Indian Ocean from May to November, which appears in the OLR daily climatology for the period of 1979-2020.
When a relationship of this daily OLR climatological oscillation (DCO) is investigated in conjunction with the Indian summer monsoon (ISM) the OLR time series of the Indian Ocean sector adjusted for the onset date of the ISM has a smaller interannual variation than that of the original time series has. A stronger phase matching in individual time series of different years was also found after the ISM onset. Those results suggest that the DCO is likely resulted from a modulation effect of the intraseasonal variability in the convective activity of the tropical Indian Ocean by the ISM. We shall discuss possible mechanisms for this modulation of the DCO by the ISM.

Keywords: Madden-Julian Oscillation, Intraseasonal Oscillation, Indian Summer Monsoon

