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Initiation of MJO events over the Indian Ocean, and the contribution of observations collected during DYNAMO to MJO predictability

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A 11-year period from 1998 to 2009 is analysed using ERA-Interim and TRMM precipitation data to detect statistically significant features in the formation of MJO events versus non-MJO convective events over the Indian Ocean. Among these signals, some of which can be detected up to 20 days prior to the main convective development, are: i) a persistent low-level easterly wind anomaly extending from the Maritime Continent and its associated moisture transport, ii) a negative temperature anomaly in the mid-troposphere propagating eastward at 7 m s-1, and iii) negative surface pressure anomalies spreading fast eastward from Africa.

The large-scale field campaign DYNAMO, which took place during the boreal winter of 2011-2012 over the tropical Indian Ocean, specifically focused on the MJO initiation. Most of the collected observational data have been routinely assimilated in the ECMWF forecast system. In order to assess whether the data collected contribute to improve MJO forecasts, assimilation/forecast experiments with and without DYNAMO data have been performed. The analysis is shown to draw to the additional sondes data at certain locations. However, overall the DYNAMO observations have little impact on the analysis and the MJO forecasts due to the relatively small number of observational data (compared to routine satellite data) and the small extension of the observational array.