The Effect of Indian Ocean Dipole (IOD) Events on the Second Inter-Monsoonal Rainfall in the Dry Zone of Sri Lanka

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Indian Ocean Dipole (IOD) is an ocean-atmospheric coupled phenomenon associated with the east-west gradient of Sea Surface Temperature (SST) anomalies in the tropical Indian Ocean. The positive (warm) phase of IOD leads to enhanced rainfall in the western Indian Ocean and diminished rainfall in the south eastern Indian Ocean, while the opposite is true for the negative (cold) phase. Any ocean atmospheric variations in the Indian Ocean is strongly associated with the rainfall anomaly of Sri Lanka. Present study examined the influence of IOD on the Second Inter-monsoonal (SIM) rainfall (October and November) as a useful observation for seasonal climate forecasting of *Maha* seasons. Fifteen agro-meteorological stations, scattered in the Dry zone, covering six agro-ecological regions, were selected. Daily rainfall time series for 44-years (1976-2019) were collected. The Dipole Mode Index (DMI), *i.e.* SST gradient between the western equatorial Indian Ocean and the south eastern equatorial Indian Ocean, were used to identify the positive (>+0.4 °C) and negative (<−0.4 °C) IOD events. Eight positive years and four negative years were identified during the SIM season for the study period and compared them with remaining neutral years. Means of five rainfall indices, namely, cumulative seasonal rainfall, maximum rainfall received within a day, number of wet days (rainfall > 1mm), heavy rainfall events (> 90th percentile) and maximum count of consecutive dry days were statistically analysed. The results revealed a significant increase in mean cumulative rainfall, number of wet days and heavy rainfall events during the IOD-positive years ($p<0.05$) and an apparent negative anomaly of those events during the IOD negative years. The mean maximum consecutive dry days showed a distinct negative (positive) anomaly with the positive (negative) IOD events. However, further investigations are suggested to elucidate the anomalous variation of rainfall by the other climatic drivers over IOD impact.

Keywords: Dipole Mode Index, Dry zone, Indian Ocean Dipole, Rainfall anomaly, Second inter-monsoon