

(137)

Impact of Madden Julian Oscillation (MJO) Phenomena on the Heavy Precipitation and Flood Disaster in May 2017 in Sri Lanka

Sathiyamohan G.

*Department of Basic Sciences, University of Peradeniya, Peradeniya, Sri Lanka
National Institute of Fundamental Studies, Kandy, Sri Lanka
gobishankarsathiyamohan@gmail.com*

Abstract

Sri Lanka experiences south west monsoon normally about 200-3,000 mm from May-September. In this case, Sri Lanka experienced heavy rainfall in the last decade during the latter part of May 2017. Over 0.5 million people were affected and over 230 people were killed. The deep depression formed in May over the south west of Sri Lanka intensifies into a tropical storm event. During the 24 hour period on 25th May recorded rainfall of 300-500 mm, led to heavy floods in the western part of the country where Rathnapura received nearly 453 mm rainfall leading to flood and landslides across the region. This study is conducted to examine the Madden Julian Oscillation (MJO) impact on record-breaking precipitation, tropical storm, and floods. Daily rainfall data from 20th to 31st May obtained from the NOAA IRI site. During the period April, May and June average monthly Outgoing Longwave Radiation (OLR) shows negative anomalies and active MJO index for the May on 15th, 16th, 27th, 28th, 29th, 30th and 31st can be observed over Sri Lanka. The convective phase of the MJO favoured the conditions for the tropical storm. Easterly winds were observed in the southern part of Sri Lanka, which carry the moisture air parcels from the east of Sri Lanka. Horizontal wind analysis at different levels shows that the wind from the east of Sri Lanka and west of Sri Lanka have converged in the south west of Sri Lanka. This converging wind pattern induces surface upwelling of moisture over the north eastern part of the Indian Ocean and Sri Lanka. Also, over the Indian Ocean counter clockwise formation of deep depression was encountered at that period. This deep depression brings the cross-equatorial moisture flux over the south western part of Sri Lanka. Thus, a positive environment for the tropical storm surge was created by the MJO. The easterly wind associated with MJO phases 3 and westerly winds formed the deep depression over south western Sri Lanka. The moisture mass movement over the south western part of Sri Lanka further enhance the depression into the tropical storm surge. Because Sri Lanka is highly prone to tropical extreme climate events natural disasters claim lives, and properties. There is an urgent need for timely weather forecast information for better disaster preparation.

Keywords: Flood, Climate extremes, MJO, Storm surge, Disaster preparation