

## GLOBAL WARMING ALTERS RAINFALL RHYTHM, FINDS STUDY

Relevant for: Environment | Topic: Environmental Degradation - GHGs, Ozone Depletion and Climate Change

Global warming has altered a key weather system and that may be whetting cyclones in the Bay of Bengal, decreasing winter rain in north India and altering global rainfall patterns, a study by a team of Indian and U.S. researchers has found.

The Madden–Julian Oscillation (MJO), as it's called, is a moving band of rain clouds that travels around the globe spanning 12,000–20,000 km across the tropical oceans. In its journey, it interacts with surface waters of the Indo-Pacific ocean, the largest pool of warm water in the globe, and due to this — the authors say — the lifecycle of the MJO gets affected.

The MJO clouds on average are spending only 15 days, instead of 19, over the Indian Ocean.

Over the west Pacific, it increased by five days (from an average 16 days to 23 days). “It is this change in the residence time of MJO clouds that has altered the weather patterns across the globe,” according to the research paper that appears in the latest edition of the journal *Nature*.

When the MJO appears in the Indian Ocean during the monsoon months of June-September, it can increase rains over India. This year, India was poised to receive below normal monsoon rainfall in April but ended up with excessive rain partly due to the MJO.

The study, led by Roxy Mathew Koll, a researcher at the Indian Institute of Tropical Meteorology, Pune doesn't delve into the impact of the MJO during the monsoon months. However, Mr. Koll told *The Hindu*, the change in the MJO could drift warmer surface water towards the Bay of Bengal and increase cyclones. “The MJOs haven't been as extensively studied as say the El Nino. This study shows that we need better observation of the Indian Ocean and improve forecasts that can warn us about a cyclone.”

To compute the reduction in the number of MJO days over the Indian Ocean, the researchers — they included scientists from the U.S. National Oceanic and Atmospheric Administration (NOAA), the University of Washington and the University of Tokyo — compared ocean temperatures from 1981-2018 to compute the changes. Global warming has been expanding the size of the warm pool on average by 2,30,000 sq. km. annually from 1900-2018 and at an accelerated average rate of 4,00,000 sq. km. per year during 1981–2018.

The changes in MJO behaviour have increased the rainfall over northern Australia, west Pacific, Amazon basin, southwest Africa and southeast Asia (Indonesia, Philippines and Papua New Guinea).

At the same time these changes have brought a decline in rainfall over central Pacific, along the west and east coast of U.S. (e.g., California), north India, east Africa and the Yangtze basin in China. The frequent California fires, droughts in Africa and East Asian floods and cyclones in the Bay of Bengal may be linked to these changes in global weather, the study noted.

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