



**UNIVERSITY OF THE PHILIPPINES**

**INFLUENCE OF THE MADDEN-JULIAN OSCILLATION  
ON BOREAL WINTER MONSOON EXTREME PRECIPITATION EVENTS  
IN THE BICOL REGION, PHILIPPINES**

**by**

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## ABSTRACT

In the Philippines, the MJO has been shown to have an effect on seasonal rainfall in both *habagat* (boreal summer monsoon, months of JJAS) and *amihan* (boreal winter monsoon, months of NDJF) seasons. During the *amihan* season, rainfall probability distribution functions during RMM Phase 5 and 6 (3, 7, and 8) are skewed higher (lower) compared with mean NDJF at the 75th (wet) and 90th (extreme wet) percentiles. Percentage change of likelihood of exceeding the 90th percentile rainfall threshold rises by 23% (falls by 11%, 17%, and 31%) and the 95th percentile threshold by 59% (falls by 20%, 54%, and 14%) in Phase 6 (Phases 3, 4, and 7).

For further analysis of MJO events, active tropical cyclone (TC) days were separated from inactive TC (non-TC) days. TC days generally bring more precipitation (between 17% and 160%) compared with non-TC days although it is only in Phases 4-7 where this difference is significant. The likelihood of extreme wet events rises by at least 100% in Phases 3-6 during TC days and at least 15% in Phase 6 during non-TC days.

An anomalous cyclonic (anticyclonic) circulation emerges over central Philippines in Phases 3-7 (Phase 1 and 8) during extreme wet (dry) events. This cyclonic circulation persists in extreme wet events occurring in non-TC days.

Because the MJO can be forecasted with skill for up to 2 weeks, this research on the modulation of the MJO on extreme precipitation events may aid in disaster risk preparation and water resource management.

Keywords: MJO, extreme precipitation, tropical cyclones