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SPATIAL INFORMATION ON THE RELATIONSHIP BETWEEN IOD AND TOTAL COLUMN WATER VAPOR IN CLOUD FORMATION IN THE WESTERN WATERS OF ACEH IN 2022

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ABSTRACT

The Indian Ocean Dipole (IOD) phenomenon is one of the important factors affecting climate variability in western Indonesia, particularly in the waters west of Aceh. This study aims to analyze the relationship between negative IOD events and atmospheric water vapor represented by Total Column Water Vapor (TCWV) as well as cloud formation that could potentially affect weather conditions. The research method used is a descriptive qualitative method utilizing ECMWF/ERA-5 reanalysis data for TCWV and HIMAWARI-8 EH infrared channel satellite image data. The analysis focused on the daily period of September 25–26, 2022. The results of the study show that on September 25, 2022, relatively high TCWV values correlated with increased convective cloud formation that had the potential to produce light rain in the waters west of Aceh. Meanwhile, on September 26, 2022, TCWV values and cloud formation intensity tended to be lower, so no significant rain potential was identified. These results indicate that the negative IOD phenomenon affects atmospheric water vapor distribution and cloud formation processes in the waters west of Aceh. This study is expected to contribute to the understanding of regional climate dynamics and serve as a basis for efforts to mitigate the risk of extreme weather in the coastal areas of Aceh.

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