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Estimation of rainfall from the amount of water vapor in the atmosphere

The objective of the study was to estimate the rainfall from the amount of water vapor in the air. The relationship between the upper air data and the surface data from 2007 to 2017 was used to create a mathematical model at the same station to determine the amount of water vapor. The findings indicated that, the relationship has a relatively high level of reliability, the correlation coefficient was 0.891. The amount of water vapor from upper air data nearly was equal to the value from the model. The difference in the root mean square error was 0.528 cm. The results showed that the rainfall is related to the amount of water vapor in the air in mathematical models which are different for each region. When tested against an independent data set, monthly average of daily rainfall from the model agree with that obtained from the measurements showed that both were consistent, which are not significantly different at the level of 0.05. The root mean square error was 38.693 mm. The correlation coefficient was 0.879.

Keywords: water vapor; rainfall; cloud cover; upper air data; mathematical model

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