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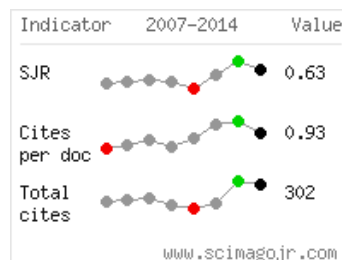
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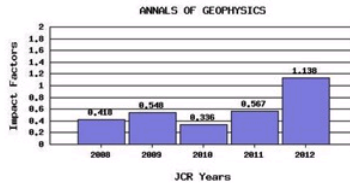
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Atmospheric Physics and Chemistry

Nowcasting the lightning activity

in Peninsular Malaysia using the GPS PWV during the 2009 inter-monsoons

Wayan Suparta, Ja'afar Adnan, Mohd. Alauddin Mohd. Ali

Abstract

The spatial and temporal radio wave delay of the Global Positioning System (GPS) signal can be manipulated to estimate the precipitable water vapor (PWV) which favorable for meteorological applications. A rapid change of the water vapor amount was a precondition for the unbalanced atmospheric charges, which noticeably associated with the development of convective cloud as a lightning chamber. According to this fact, GPS derived PWV will be utilized to nowcasting the lightning event for the next couple of hours. The variances of PWV of four-selected station of the Peninsular Malaysia during the past two inter-monsoons events in May and November 2009 were analyzed. To clarify the response, the changes of PWV in hourly Δ (max-min) before the lightning event was investigated with minimum value 2 mm and is maintained at least three consecutive hours. There are 177 samples were extracted from this method and 69% of the sample showed the lightning occurrence with an average duration was after the six consecutive hours. The lightning day with 2 mm Δ was also higher than the fair weather of 6.3%. These findings suggest that the GPS data can be proposed further as a guide to nowcast the occurrence of lightning activity.

Keywords

GPS PWV; Lightning; SAFIR; Inter-monsoon; Nowcasting

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