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The Impact of Vertical Velocity Parameter Conditions and Its Relationship with Weather Parameters in the Hail Event

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Abstract : Hail happened in Sukabumi (August 23, 2020), Sekadau (August 22, 2020), and Bogor (September 23, 2020), where this extreme weather phenomenon occurred in the dry season. This study uses the ERA5 reanalysis model data, it aims to examine the vertical velocity impact on the hail occurrence in the dry season, as well as its relation to other weather parameters such as relative humidity, streamline, and wind velocity. Moreover, HCAI product satellite data is used as supporting data for the convective cloud development analysis. Based on the results of graphs, contours, and Hovmoller vertical cut from ERA5 modeling, the vertical velocity values in the 925 Mb-300 Mb layer in Sukabumi, Sekadau, and Bogor before the hail event ranged between -1.2-(-0.2), -1.5-(-0.2), -1-0 Pa/s. A negative value indicates that there is an upward motion from the air mass that trigger the convective cloud growth, which produces hail. It is evidenced by the presence of Cumulonimbus cloud on HCAI product when the hail falls. Therefore, the vertical velocity has significant effect on the hail event. In addition, the relative humidity in the 850-700 Mb layer is quite wet, which ranges from 80-90%. Meanwhile, the streamline and wind velocity in the three regions show the convergence with slowing wind velocity ranging from 2-4 knots. These results show that the upward motion of the vertical velocity is enough to form the wet atmospheric humidity and form a convergence for the growth of the convective cloud, which produce hail in the dry season.

Keywords : hail, extreme weather, vertical velocity, relative humidity, streamline
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