

Three dimensional wind field in Rain-Shaped Rain Band around Sapporo 2014 using three radars.

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The heavy rainfall special warning was alerted to some area in September 2014 by Line-Shaped Rain Band (LSRB), and it is important to clear up the cause of the developing process of cumulonimbus cloud structure LSRB. The rainfall area extended to about 60 km from the southwest, and the total rainfall exceeded 400 mm. It is an impressive rainfall event in Hokkaido where heavy rainfall other than typhoon is few. To explain this phenomena, water vapor inflow and wind velocity in the lower troposphere are important.

Three dimensional wind field can be calculated by using variational method. In this study, by using the three Doppler radar observational data around Sapporo, characteristics of heavy rainfall event called Line-Shaped Rain Band is investigated. The observation data are Doppler velocity and Reflection intensity, and these data are calculated from electromagnetic waves scattered by the precipitation particle and received from radar antenna. The reflection intensity can be replaced by rain intensity, in this study use C-band radar at New Chitose airport, Doppler velocity of each Radar are calculated by three equations. In this method, it is said that the accuracy of high altitude wind velocity is high and comparisons using the mesoscale model of the Japan Meteorological Agency to check the high accuracy.

By this method, we can reproduce the wind velocity field at the southwest end of the rainfall area, which is the origin of cumulonimbus clouds. In addition, in part of the rainfall area, the inflow from the southeast in the troposphere middle layer may cause vertical circulation. From the Hovmöller diagram, it can discussed how these wind fields contribute to the development of cumulonimbus clouds.