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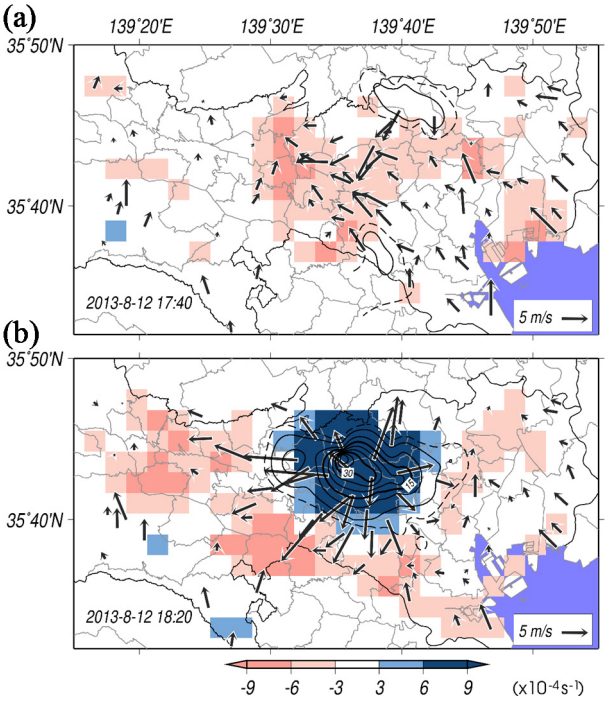

Figure 1. Distributions of 10-min rainfall (contours: 5-mm interval, dashed line is 2.5 mm), wind (vectors), and divergence (shading) on 12 August 2013. (a) 1740 JST; (b) 1820 JST.

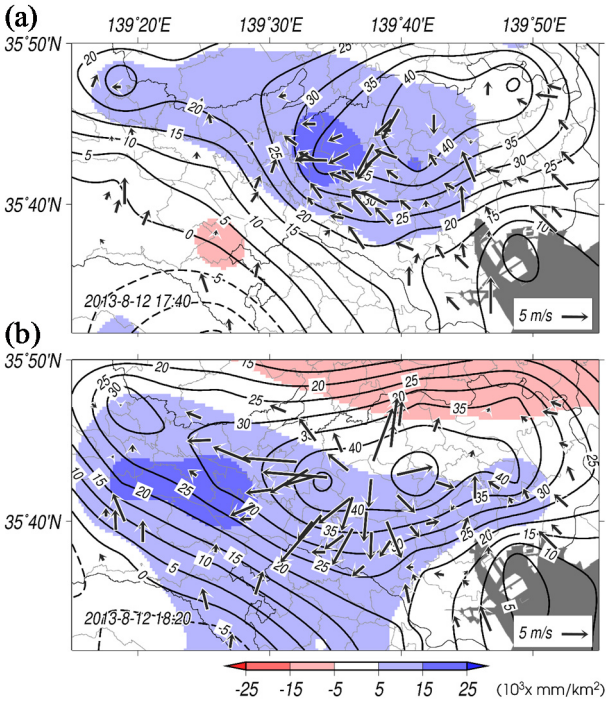

Figure 2. Distributions of the water vapor concentration (WVC) index (contours), deviation of the WVC index relative to 40 min previously (shading), and wind (vectors) on 12 August 2013. (a) 1740 JST; (b) 1820 JST.

- The relationships between the occurrence of intense rainfall and the convergence of surface winds and water vapor concentration for typical heavy-rainfall cases were examined using data from July to August in 2011–2013, obtained from high-density meteorological observations in Tokyo, Japan.
- Corresponding to heavy-rainfall areas, the convergence of surface winds tended to increase for several tens of minutes prior to the heavy rainfall (Fig. 1). The peak time of wind convergence was 10–30 min before the heavy-rainfall occurrence, and the increasing convergence continued for approximately 30 min until the convergence peak time.
- Around the heavy-rainfall area, the increase in the water vapor concentration (WVC) index coincided with the increase in convergence (Fig. 2).
- From these results, by monitoring the temporal variations and distributions of these parameters using a high-density observation network, it should be possible to predict the occurrence of heavy rainfall rapidly and accurately.