

U022-P08

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## Case study on the evolution of a severe thunderstorm observed in the south of Saitama Prefecture on 29 June, 2010

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The evolution and structure of the convective system that caused widespread power outages and heavy rainfall in the south of Saitama Prefecture, Kanto, Japan on 29 June 2010 were investigated using two X-band polarimetric radars, a C-band Doppler radar, and dataset of cloud-to-ground (CG) lightning strike locations.

The convective system developed from 1930 LT in the southwestern part of Saitama Prefecture and migrated eastward slowly at a speed of about 2.5 m/s. The system matured during 2030 and 2100 LT and caused heavy rainfall (62.5 mm/hr from 2020 to 2120LT) at Tokorozawa. The system decayed after 2100 JST, when its migration speed was accelerated than that in mature stage.

Three dimensional wind fields of the system in the mature stage were investigated by triple Doppler radar analysis. Northerly and easterly winds were dominant in the northern side of the system, and southerly wind dominated in the southern side of the system. These different winds converged around the center of the system, and caused updrafts to the south of the convergence region. In contrast, downdrafts were dominant in the northern side of the convergence region. Consequently, the system had suitable structure for maintaining the system for long time since updraft region and downdraft one were separated. After 2100 LT, the area of northerly wind associated with the downdraft was expanded and southerly wind became weaker, thereby causing the decay of the system.

Associated with the heavy rainfall around Tokorozawa, 1,068 CG lightning were observed during 2009 and 2209 LT. Most of the lightning had negative charge. The peak time of the number of the negative lightning (the positive lightning) was around 2040 LT (2035 LT), corresponding to the mature stage of the system and widespread power outages. The lightning was mainly observed in the north-side region of radar reflectivity core of the system where the downdraft was dominated.

This study provided preliminary results of the structure and evolution of the convective system observed in the southern part of Saitama Prefecture on 29 June, 2010 using triple Doppler radar analysis and CG lightning dataset. Utilizing these radar data, the relationship of CG lightning strikes to polarimetric radar parameters or the stages of updraft/downdraft evolution will be investigated.

Keywords: thunderstorm, lightning