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Characteristics of the supercell causing Saitama tornado on 2 September 2013

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Supercell tornadoes are rare in Japan. The Saitama tornado causing F2 damage on 2 September 2013 was an example of supercell tornado. This tornado and its parent supercell were captured on video by many citizens. The present study aims to clarify the characteristics of the supercell and the tornado by using such video and the data obtained by the Doppler radar and environmental sensor network.

The supercell was generated on the convergence line elongating from southwest to northeast. The convergence line was formed by southerly warm wind from Tokyo Bay and cold northwesterly wind. Therefore temperature gradient across the convergence line was very large. The water vapor was supplied not from Tokyo Bay but from northeast.

The forward and rear flank gust fronts were clearly observed from arc cloud and precipitation particles, respectively. Especially rear flunk gust front was remarkable. Such feature was observed from the Doppler radar and the environmental sensor network. The wall cloud of mesocyclone was also clearly observed but it was very thin and even blue sky appeared. The funnel cloud of the Saitama tornado did not touch down and the tornado was mainly visualized by debris. Debris column twice changed to be arch shape, which shows that rear flank gust front intruded into tornado vortex.