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Wind gust phenomena observed by the X-NET (X-band weather radar network)

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The X-NET is the weather radar network at X-band which is composed of radars in several institutes and universities. Recently, Ministry of Land, Infrastructure, Transport and Tourism are going to place X-band multi-parameter (MP) radars mainly in urban areas and try to open the rainfall information observed by the radars in their web site. Distribution of the wind information is prospected in the near future. Here, we introduce several cases of wind gust phenomena observed by the X-NET.

On 12 July 2008 around 15 JST, gust winds caused some damages to woods and structures in the Tokyo Metropolitan areas, such as Shibuya, Meguro, Minato and Kohtoh wards. From surveys and analysis of a Doppler radar data, Japan Meteorological Agency (JMA) judged that the gust was associated with a downburst. The storm was well observed by two MP radars which has been operated in Ebina city and Kisarazu city by NIED. The observation results showed that the storm started from Tama area and moved easterly. The convective cells have features of multi-cell types and hail stones aloft.

Tornadoes caused 21 injuries and damages to many houses and cars in Tatebayashi city, Japan, at around 14 JST on 27 July, 2009. The storm was captured by the X-band Doppler radar located in Hanyu city, about 10 km to the east from the damaged area, which is one of radars of the X-NET and operated by Japan Weather Association (JWA). The radar observation revealed the multi-cell structure of the storm, existence of a gust front. Strong vortices were identified in the area of main damage and the other area where a house had damages. They seemed to occur on the gust front.

Keywords: X band radar, downburst, tornado, observation, multi-parameter