

## 1. Introduction

On the morning of 21 August 2011, a tornado (call "the Fukuoka tornado") struck the downtown area of Fukuoka City located in northern Kyushu, Japan. This tornado showed multiple-vortex structure. Multiple-vortex tornado has been rarely observed in Japan. Several Doppler radars observed the Fukuoka tornado, the mesocyclone and precipitation patterns of its parent storm.

We aim to describe relationship between the tornado vortex and the mesocyclone (MC), and their vertical profile of the Fukuoka tornado by using different radars' data.



 TABLE 1.
 Specifications of radars.

		JMA	DRAW	MLIT
Frequency band		C-band	C-band	X-band
Observation range		240km	120km	80km
Resolutions	Range	500m	150m	150m
	Azimuth	1.0°	0.7°	1.2°
Volume scan	No. of elevations	26	20	12
	Time interval	10 min	6 min	5 min

## **Structure of the Fukuoka Tornado Observed by Different Radars**

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maximum and minimum of Doppler velocities. If a vorticity was greater than  $1.0 \times 10^{-2} \text{ s}^{-1}$ , we identified it as a mesocyclne.

and Tourism (MLIT radars).

The MLIT radar data were interpolated to a Cartesian coordinate with a grid spacing of  $0.5 \times 0.25$  km (horizontal  $\times$  vertical).

