

Plain Language Summary: A tornado hit Nobeoka city on the southeast coast of Kyushu Island, Japan on 22 September 2019 when Typhoon Tapah was located about 500 km to the southwest of the Kyushu Island and moving northeastward. Numerical simulations are performed to reproduce the typhoon, a parent storm, and associated tornadoes. The simulation with the finest resolution reproduces three tornadoes. They are accompanied by mini-supercells, which are typical structures that cause tornadoes associated with tropical cyclones. A unique feature is that new tornadoes form to the forward left of the old tornado.

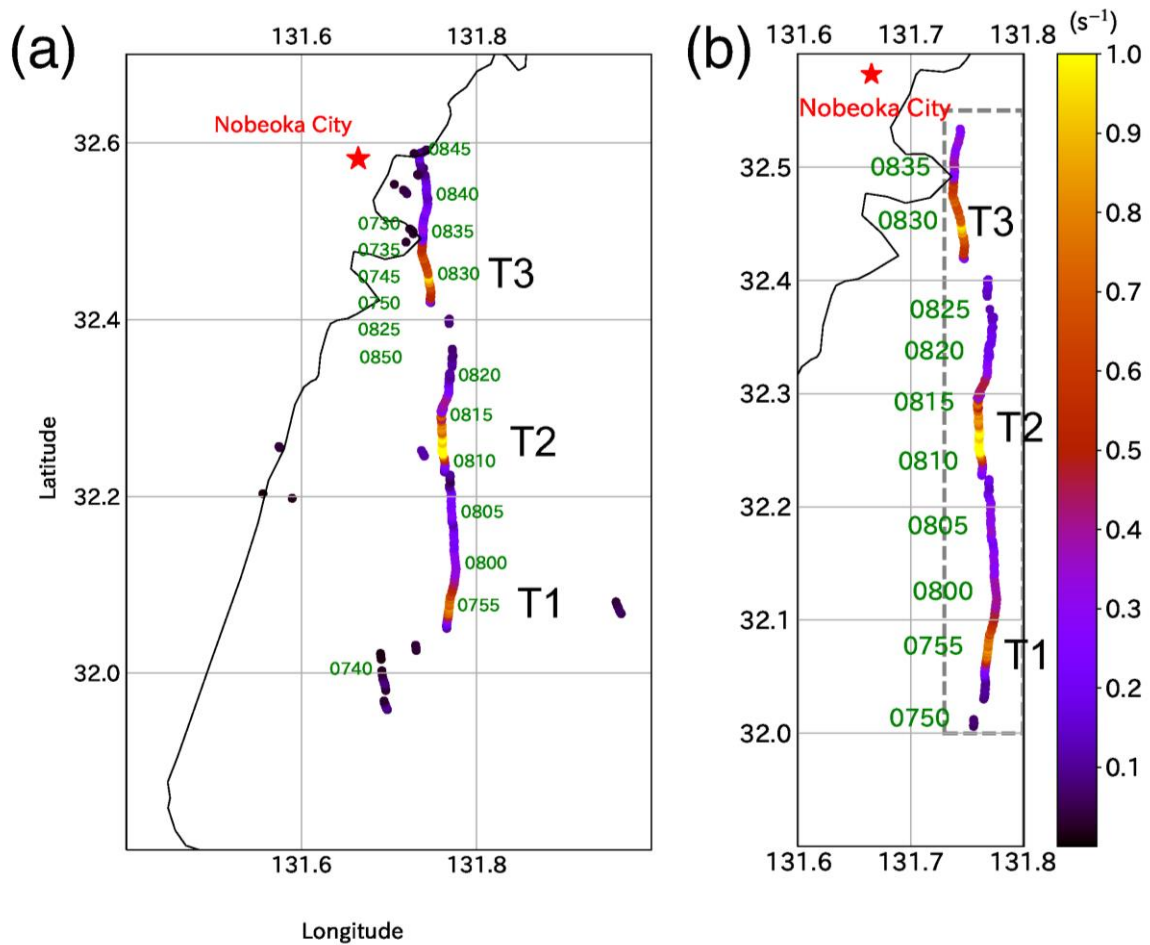


Figure 1. (a) Footprints of the maximum vertical vorticity at the height of 20 m at every 10 seconds (four-digits numbers indicate time in JST) in the calculation domain between 0750 and 0840 JST; (b) same as (a) but in the limited area enclosed by dotted line.

- Triply-nested numerical simulations were performed to reproduce the Nobeoka tornado accompanied by Typhoon Tapah on 22 September 2019.
- Three tornadoes were reproduced, and the second tornado was the strongest, reaching a minimum central pressure of 950 hPa and a maximum wind speed of over 80 m/s at its peak strength.
- A unique feature of the present non-occluding cyclic mesocyclogenesis is that the new mesocyclones and tornadoes developed in the forward left.