AOGS 2006

Numerical Simulation of Wind Structure in the Inner-Core of Typhoon MA-ON (2004)

WATARU MASHIKO

Meteorological Research Institute, Japan

The record-breaking number 10 of tropical cyclones made landfall on Japan in 2004 and caused a lot of damage throughout Japan due to strong winds, severe flooding, and storm surges. Among them, Typhoon MA-ON (2004) was characterized by strong winds in the left-rear quadrant near the storm center during its passage over the southern Kanto district, central Japan. The Kanto region was broadly occupied by cold air at the low-level, which was sustained during the passage of Typhoon MA-ON. To elucidate the structure and generation mechanism of the strong winds, numerical simulations were conducted using a cloud resolving nonhydrostatic model with a 2 km horizontal grid spacing . The strong winds observed in a narrow area in the left-rear quadrant of MA-ON were simulated fairly well. The strong wind area was seen only at the low level and it corresponded to the cold air mass quite well. The simulation results showed that the typhoon with high equivalent temperature moved over the cold air mass at the low-level in the Kanto Plain. The flow of the cold air mass at the low-level formed just like 'gap flow' between the typhoon center and the mountains in the west of the Kanto Plain. A strong wind area greater than 60 ms-1 was seen over Sagami Bay, corresponding to the outflow region of gap flow. The flow of the cold air mass decreased in depth in the left-rear quadrant of the typhoon. Trajectory analysis from the model out-put revealed that the parcels associated with the strong winds descended with diffluent flows and acceler-ated. The experiment eliminating the mountains on the western side of the Kanto region showed that the strong winds of the left-rear quadrant decreased by about 25 ms-1.