

## Numerical Simulation of Arctic Cyclones using NICAM Installed at CCS, University of Tsukuba, Japan

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A series of numerical experiments are conducted using NICAM with various horizontal resolutions from 224 km (Glevel=5) to 7 km (Glevel=10). An atmospheric blocking is simulated with an initial condition of 27 November 2007 interpolated from the Grid Point Value (GPV) analysis data provided by the Japan Meteorological Agency (JMA) with Glevels from 5 to 9. It is found that the blocking is predicted from the initial condition one week before, but the intensity of the blocking appears to be weak for all resolutions. A pronounced tropical cyclone is simulated over the Gulf Stream with the numerical simulation starting from an initial condition of 21 June 2008 in the model, which is absent in the real atmosphere. The detail of the fine structures of vorticity, vertical motion, and specific humidity is analyzed for this event. Another interesting feature of the Arctic cyclone is analyzed for the numerical experiment starting from the same initial condition. The surface Arctic cyclone stays over the Arctic more than three weeks within the same Arctic air mass. Therefore, the cold and warm front is absent around the cyclone. The vorticity extends up to the lower stratosphere with quasi-barotropic structure. The Arctic cyclone looks similar to the tropical cyclone to some extent, but the warm core is seen at the lower stratosphere associated with the descending motion from the higher altitude in the stratosphere, which is the notable distinction from the tropical cyclone. The detailed structure of the vorticity, vertical motion, and specific humidity is compared with those of tropical cyclones and extra-tropical cyclones.