Press Release

December 15, 2008
For Immediate Release

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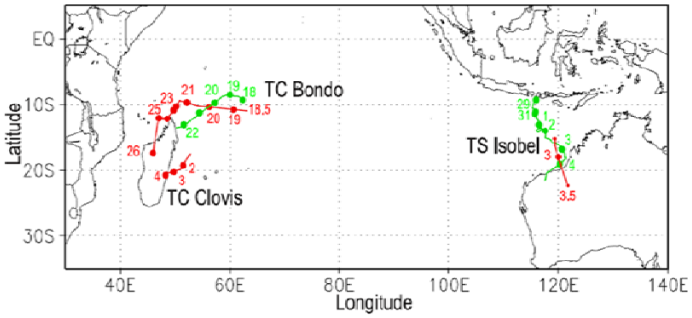
LIFECYCLES of TROPICAL CYCLONES PREDICTED in GLOBAL COMPUTER MODEL THAT REPRESENTS INDIVIDUAL CLOUDS



Tropical storm tracks and dates (December 2006; January 2007): simulated (green), observed (red).

The initial results of the first computer model that simulates the global atmosphere with a detailed representation of individual clouds have been analyzed by a team of scientists at the International Pacific Research Center (IPRC) at the University of Hawai`i at Mānoa, Japan-Agency for Marine Earth Science and Technology (JAMSTEC), and the University of Tokyo.

The model, called the Nonhydrostatic ICosahedral Atmospheric Model (NICAM), was developed for the supercomputer Earth Simulator at JAMSTEC. Given the atmospheric conditions that were present 1-2 weeks before the observed cyclones formed, the model successfully reproduced the birth of two real tropical cyclones that formed in the Indian Ocean in December 2006 and January 2007.

The model captured the timing and location of the formation of the observed cyclones as well as their paths and overall evolution. "We attribute the successful simulation to the realistic representation of both the large-scale circulation and the embedded convective vortices and their merging," says Hironori Fudeyasu, lead author of the study and IPRC postdoctoral fellow.

Atmospheric computer models with sufficient detail to represent clouds have greatly added to an understanding of local and regional climate, but huge computational needs in the past have allowed these models to be run only for small areas. "The high temporal and spatial resolution datasets provided by NICAM in this and future simulations will allow detailed studies of tropical cyclone genesis and evolution, as well as other weather and climate-related phenomena," says co-author Yuqing Wang, UH meteorology professor and IPRC research team leader. He believes the results will usher in a new era in weather and climate prediction.

Citation: Fudeyasu, H., Y. Wang, M. Satoh, T. Nasuno, H. Miura, and W. Yanase (2008), Global cloud-system-resolving model NICAM successfully simulated the lifecycles of two real tropical cyclones, Geophys. Res. Lett., 35, L22808, doi:10.1029/2008GL036003. The study was selected by the journal editors as a research highlight. http://www.agu.org/journals/scripts/highlight.php?pid=2008GL036003

The International Pacific Research Center (IPRC) of the School of Ocean and Earth Science at UHM conducts research to gain greater understanding of the climate system, the nature and causes of climate variations in the Asia-Pacific region, and how global climate changes may affect the region. Established under the U.S.-Japan Common Agenda for Cooperation in Global Perspective in October 1997, the IPRC is a collaborative effort between UH and agencies in Japan and the United States.

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