Recent Advances in Global Hurricane Modeling after Katrina

Science Mission Directorate

NASA's major hurricane research activities focus on improving our understanding of how tropical storms form, develop, and intensify. Knowledge gained from this research could ultimately save lives and reduce property damage.

Since Hurricane Katrina (2005), we have worked on "discovering predictive relationships between meteorological and climatological events and less obvious precursor conditions from massive datasets," one of the top priorities of the National Research Council 2007 Decadal Survey report, *Earth Science and Applications from Space: National Imperatives for the Next Decade and Beyond.*

To achieve this, we integrate NASA's high-resolution global model and concurrent visualization techniques on the Pleiades supercomputer to produce high-resolution simulations that improve our understanding of mesoscale predictability for tropical cyclones (TCs), and to extend the lead time of predicting TCs by the interactions of (for example) different kinds of large-scale tropical waves.

Each high-resolution simulation requires hundreds or thousands of processors and up to 4 terabytes of disk space per run. 3D visualizations of high-resolution temporal and spatial simulations are generated using NASA's concurrent visualization tools to improve our understanding of complicated multi-scale interactions.

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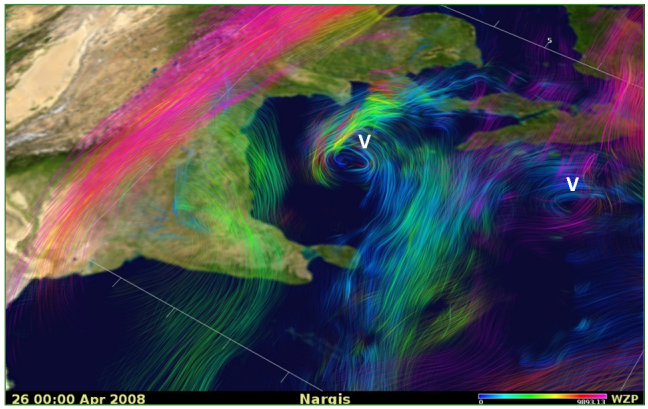

Genesis of the very severe cyclonic storm Nargis (2008) associated with the equatorial Rossby wave: (a) A pair of low-level vortices at 96h simulation (labeled with 'V') indicate formation of the Rossby wave. Cyclone Nargis formed when the northern vortex strengthened. *Bryan Green, NASA/Ames; Bo-wen Shen, NASA/Goddard*