

Toward GEOS-6, a Global Cloud System Resolving Atmospheric Model Science Mission Directorate

NASA is committed to observing and understanding the weather and climate of our home planet through the use of multi-scale modeling systems and space-based observations. Global climate models have evolved to take advantage of the influx of multi- and many-core computing technologies and the availability of large clusters of multi-core microprocessors.

GEOS-6 is a next-generation cloud system resolving atmospheric model that will place NASA at the forefront of scientific exploration of our atmosphere and climate. Model simulations with GEOS-6 will produce a realistic representation of our atmosphere on the scale of typical satellite observations, bringing a visual comprehension of model results to a new level among climate enthusiasts.

In preparation for GEOS-6, the Agency's flagship Goddard Earth Observing System (GEOS) Model has been enhanced to support cutting-edge, high-resolution global climate and weather simulations. Improvements include a cubed-sphere grid that exposes parallelism; a non-hydrostatic finite-volume dynamical core; and algorithms designed for co-processor technologies, among others.

GEOS-6 represents a fundamental advancement in the capability of global Earth system models. The ability to directly compare global simulations at the resolution of spaceborne satellite images will lead to algorithm improvements and better utilization of space-based observations within the GEOS data assimilation system.

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These images compare clouds as seen via infrared imagery from a 5-kilometer (km) GEOS-5 simulation (bottom) with observations from the Geostationary Operational Environmental Satellite (GOES) (top). The images show a snapshot of clouds 80 hours into a 20-day simulation from February 2, 2010. *William Putman, NASA/Goddard*

