National Aeronautics and Space Administration

Goddard Space Flight Center

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Goddard Space Flight Center Showcases Climate Simulation at Supercomputing Conference

By Jarrett Cohen

Climate simulation and supporting high-end computing and networking technologies from Goddard Space Flight Center (GSFC) were prominent at SC09: The International Conference for High-Performance Computing, Networking, Storage, and Analysis, which took place November 14–20, 2009 in Portland, OR. "Supercomputing," as SC is often called, is the world's largest conference of its kind and this year drew attendees from all 50 states and more than 70 countries to the Oregon Convention Center.

Fifteen demonstrations given by scientists and engineers from across the Sciences and Exploration Directorate represented record GSFC participation in the popular NASA research exhibit. GSFC joined Ames Research Center, Glenn Research Center, Langley Research Center, and the Jet Propulsion Laboratory in showcasing NASA R&D. Exhibit demonstrations were organized under the themes Aircraft, Computing Technology, Our Planet, Space Travel, and The Universe.

GSFC presenters hailed from the Computational and Information Sciences and Technology Office (CISTO/606), the Software Integration and Visualization Office (SIVO/610.3), the Global Modeling and Assimilation Office (GMAO/610.1), and the Mesoscale Atmospheric Processes Branch (613.1). Some technical staff represented users of the NASA Center for Computational Sciences (NCCS/606.2). A complete listing of GSFC demonstrations appears later in this story.

GSFC computational results also made their mark on SC09's prestigious Technical Program. The visualization "GEOS-5 Modeled Clouds at 3.5-km Global Resolution for January 2, 2009," produced by Bill Putman and Greg Shirah (both of 610.3), concluded a large-screen visualization theater presentation before former Vice President Al Gore's keynote address, which drew a capacity audience that was the largest of the conference. The simulation used a "cubed-sphere" version of the GMAO's Goddard Earth Observing System Model, Version 5 (GEOS-5) and ran on the recently expanded Discover supercomputer at the NCCS.

In the SC09 Posters area, Bo-Wen Shen (UMCP/ESSIC/613.1) and collaborators presented the electronic poster "**High-Impact Tropical Weather Prediction with the NASA CAMVis: Coupled Advanced Multi-Scale Modeling and Concurrent Visualization Systems**." Using CAMVis on supercomputers and the 128-panel Hyperwall-2 at Ames, they are improving the model's ability to simulate sub-seasonal and seasonal weather and extending the lead time of tropical cyclone prediction. SC09 featured eight electronic posters on 42-inch LCD displays, a first for the conference.

GSFC's NASA exhibit demonstrations and presenters were as follows (Note: each link opens a datasheet PDF):

Associated Images

NASA's research exhibit at the SC09 conference in Portland, OR, featured R&D from five NASA field centers. Goddard Space Flight Center (GSFC) scientists and engineers gave 15 demonstrations centering on climate simulation and supporting high-end computing and networking technologies.
› Larger image

Bill Putman of GSFC's Software Integration and Visualization Office presents "Global Non-Hydrostatic Modeling with the NASA GEOS-5 Atmospheric Model." A visualization of a 3.5-km global GEOS-5 cloud simulation appeared in a large-screen theater presentation to a capacity audience gathered for the keynote address by former Vice President Al Gore.
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FEEDBACK

- **Accelerating Climate Simulations Through Hybrid Computing**, Shujia Zhou (NGIT/610.3)
- **The Chesapeake Bay Forecast System**, Bill Ward (CSC/606.2), representing the University of Maryland's Earth System Science Interdisciplinary Center
- **Climate Simulation Data Analysis**, Tom Maxwell (SAIC/606.2)
- **Data-Centric Simulations Enable Greater Insights Into Global Climate Change**, Phil Webster (606)
- **Earth Science Data Distribution for Climate Research**, Harper Pryor (SAIC/606)
- **Efficient Simulation of Snowflake Growth for Remote Sensing**, Carlos Cruz (NGIT/610.3)
- **Extending the Lead Time of Tropical Cyclogenesis Prediction**, Bo-Wen Shen (UMCP/ESSIC/613.1)
- **Global Non-Hydrostatic Modeling with the NASA GEOS-5 Atmospheric Model**, Bill Putman (610.3)
- **MERRA: The Modern Era Retrospective-Analysis for Research and Applications**, Harper Pryor
- **Modeling Interactions Between Ozone and Climate**, Eric Nielsen (SSAI/610.1)
- **NASA Modeling Guru Knowledge Base and Web Collaboration Tool**, Brent Swartz (AMTI/610.3)
- **NCCS Data Management System for Climate Simulations**, Dan Duffy (606.2)
- **Nehalem Clusters for NASA Climate Simulations**, Dan Duffy
- **Optimizing Wide-Area File Transfers for 10 Gbps and Beyond**, Pat Gary (606.1), Paul Lang (ADNET/606.1), Kirk Hunter (PTP/606.2), and Hoot Thompson (PTP/606.2)
- **Past and Future: Applications for Paleoclimate Research**, Ellen Salmon (606.2), representing the Goddard Institute for Space Studies (611)

More information about NASA's SC09 exhibit, including videos and datasheets from all the NASA demonstrations, is available on the **NASA @ SC09 website**.

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