NASA Center for Climate Simulation (NCCS) Presentation
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The NASA Center for Climate Simulation (NCCS) offers integrated supercomputing, visualization, and data interaction technologies to enhance NASA's weather and climate prediction capabilities. It serves hundreds of users at NASA Goddard Space Flight Center, as well as other NASA centers, laboratories, and universities across the US.

Over the past year, NCCS has continued expanding its data-centric computing environment to meet the increasingly data-intensive challenges of climate science. We doubled our Discover supercomputer's peak performance to more than 800 teraflops by adding 7,680 Intel Xeon Sandy Bridge processor-cores and most recently 240 Intel Xeon Phi Many Integrated Core (MIC) co-processors.

A supercomputing-class analysis system named Dali gives users rapid access to their data on Discover and high-performance software including the Ultra-scale Visualization Climate Data Analysis Tools (UV-CDAT), with interfaces from user desktops and a 17- by 6-foot visualization wall. NCCS also is exploring highly efficient climate data services and management with a new MapReduce/Hadoop cluster while augmenting its data distribution to the science community.

Using NCCS resources, NASA completed its modeling contributions to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report this summer as part of the ongoing Coupled Model Intercomparison Project Phase 5 (CMIP5). Ensembles of simulations run on Discover reached back to the year 1000 to test model accuracy and projected climate change through the year 2300 based on four different scenarios of greenhouse gases, aerosols, and land use.

The data resulting from several thousand IPCC/CMIP5 simulations—as well as a variety of other simulation, reanalysis, and observation datasets—are available to scientists and decision makers through an enhanced NCCS Earth System Grid Federation Gateway. Worldwide downloads have totaled over 110 terabytes of data.

Additional science highlights include a 10-kilometer-resolution simulation of global aerosols, modeling support for flight-based field campaigns by NASA and collaborating agencies, and study of the factors leading to Spring 2011 extreme weather events including floods and tornadoes.