

Enabling Access to Climate Data from the Intergovernmental Panel on Climate Change

Climate research is fundamentally multidisciplinary. As researchers strive to understand the complexity of our climate system they form multinational teams to tackle "Grand Challenge" problems. These multidisciplinary virtual organizations need a common software infrastructure to access the many large global climate model datasets and tools. It is critical that this infrastructure provide equal access to climate data, supercomputers, simulations, visualization software, whiteboard, and other resources.

The Earth System Grid II (ESG) project, funded by the Department of Energy's Scientific Discovery through Advanced Computing program, has turned climate data into community resources by creating a virtual collaborative environment that links climate centers and users around the world to models and data via a computing Grid, which is based on the Department of Energy's supercomputing resources and the Internet. Its success stems from partnerships between climate scientists and computer scientists to advance basic and applied research in earth, atmospheric, and ocean science.

In Fall 2004, ESG started its production service to distribute the Intergovernmental Panel on Climate Change (IPCC) / Working Group on Coupled Models (WGCM) data to the greater climate community. The IPCC, which was jointly established by the World Meteorological Organisation (WMO) and the United Nations Environment Programme, carries out periodic assessments of the science of climate change. Fundamental to this effort is the production, collection and analysis of data from climate model simulations carried out by major international research centers. Analysis of a set of standard climate-change simulations from many modeling centers provides crucial understanding of the strengths and weaknesses of climate models. The IPCC and WGCM therefore have requested PCMDI at LLNL to collect model output data from these numerous IPCC simulations, and to distribute these to the community via ESG.

The ESG project has become internationally recognized for these efforts. Since December 2004 IPCC model runs published to the climate community from the ESG portal totaled over 18 terabytes (i.e., 40,200 files) and over 288 projects have registered to receive IPCC data for analysis. Overall, the number of files downloaded by the climate community totals over 125,000, which is equivalent to over 22 terabytes of data. The daily download rate is now averaging over 300 gigabytes (see figure). At the recent IPCC Workshop held March 1-4, 2005, over 130 scientists presented their analysis results of the IPCC data, which was distribute to them via ESG.

