Geophysical Research Abstracts
Vol. 15, EGU2013-9534, 2013
EGU General Assembly 2013

Grid for Earth Science Applications

Monique Petitdidier (1) and Horst Schwichtenberg (2)

(1) IPSL/ LATMOS, CNRS, UVSQ, 78280 GUYANCOURT, France (monique.petitdidier@latmos.ipsl.fr), (2) Fraunhofer-SCAI, Sankt Augustin, Germany (horst.schwichtenberg@scai.fraunhofer.de)

The civil society at large has addressed to the Earth Science community many strong requirements related in particular to natural and industrial risks, climate changes, new energies. The main critical point is that on one hand the civil society and all public ask for certainties i.e. precise values with small error range as it concerns prediction at short, medium and long term in all domains; on the other hand Science can mainly answer only in terms of probability of occurrence. To improve the answer or/and decrease the uncertainties, (1) new observational networks have been deployed in order to have a better geographical coverage and more accurate measurements have been carried out in key locations and aboard satellites. Following the OECD recommendations on the openness of research and public sector data, more and more data are available for Academic organisation and SMEs; (2) New algorithms and methodologies have been developed to face the huge data processing and assimilation into simulations using new technologies and compute resources. Finally, our total knowledge about the complex Earth system is contained in models and measurements, how we put them together has to be managed cleverly. The technical challenge is to put together databases and computing resources to answer the ES challenges. However all the applications are very intensive computing. Different compute solutions are available and depend on the characteristics of the applications. One of them is Grid especially efficient for independent or embarrassingly parallel jobs related to statistical and parametric studies.
Numerous applications in atmospheric chemistry, meteorology, seismology, hydrology, pollution, climate and biodiversity have been deployed successfully on Grid. In order to fulfill requirements of risk management, several prototype applications have been deployed using OGC (Open geospatial Consortium) components with Grid middleware. The Grid has permitted via a huge number of runs to decrease uncertainties by increasing the probability of occurrence and to create large database devoted for future satellite instrument. Some limitations are related to the combination of databases-outside the grid infrastructure like ESGF (Earth System Grid Federation) and grid compute resources; and to real-time applications that need resource reservation in order to insure results at given time. However some solutions have been developed. The major lesson we learnt with Grid is the impact of e-collaboration among various scientific technical domains on the development of ES research in Europe.