

GEWEX Modelling and Prediction Panel (GMPP)
Status Report for January – June 2003

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GMPP was founded some 3 years ago to coordinate groups working on the numerical representation of key aspects of the water and energy exchanges in the atmosphere and over continents. The fields covered are: cloud processes with the GEWEX Cloud System Study (GCSS), land surface processes with the Global Land/Atmosphere System Study (GLASS) and the planetary boundary layers with the GEWEX Atmospheric Boundary Layer Study (GABLS). All three GMPP groups have learned to take advantage of the diversity of models and have made substantial progress in the understanding of the various conceptual representations by performing model intercomparisons.

The challenge for GMPP now, is to extend the methodology to improve the representation of the interactions between the surface, the atmospheric planetary boundary layer and the cloud processes in large scale models. The first 6 months of 2003 were dedicated to choosing a theme and elaborating a strategy for implementing such a common goal. Through the collaboration with AMIP, the theme will also strengthen the link with global climate models. The proposed theme is the diurnal cycle, an aspect of climate that has not received sufficient attention over the past few years, although it is one of the most prominent cycles in the water and energy exchanges within the system and is considered to be an ideal test bed for general circulation models and their parameterizations.

GMPP proposes to evaluate the ability of our models to represent the diurnal cycle using model intercomparisons as it has proven its value in previous GMPP activities. The strategy envisaged is to diagnose the diurnal cycle in parallel on the processes with which GMPP deals and on the global climate scale before moving onto the analysis of the interactions between clouds, the atmospheric boundary layer and land-surfaces. A first draft of the proposal is currently being distributed to the relevant panels. By the end of the year a more detailed implementation plan will be made available and the potential interactions of GMPP with other GEWEX panels and WCRP projects will become apparent.

GCSS: The revised GCSS Science Plan is described in the article, “Confronting Models With Data: The GEWEX Cloud Systems Study”, published in the April 2003 Bulletin of the American Meteorological Society. The highlight is a new strategy that includes a more active role for the large-scale modeling community, and an explicit recognition of the importance of data integration.

GABLS: The objective of GABLS is to improve the representation of the atmospheric boundary layer in regional and large-scale models. The next step in GABLS is the organization of comparison studies for LES and 1D models. The selected case has already been distributed for a LES intercomparison, where the basic aim is to contribute towards a quantification of the reliability of stable boundary layers in LES. About 10 groups have already agreed to participate in this.

During the first half of 2003 the following milestones were achieved by **GLASS** :

The **PILPS-C1** project lead by Nicolas Viovy gathered data from 16 models and performed a thorough analysis. The scientists involved met in May to discuss the outcome. This has been the first time that the ability of land-surface models to simulate the carbon, as well the water and energy exchanges with the atmosphere was evaluated. The site of Loobos also allowed to evaluate those models, which were able to simulate the vegetation growth from the plantation of the forest, some 80 years ago, up to today. A preliminary report of this workshop is published in the August issue of GEWEX News and a more complete article is in preparation.

During this period, the **Global Soil Wetness Project-2 (GSWP-2)** was launched. Plans are being made for a collaborative effort between GRP and GMPP using GSWP-2 estimates of surface (latent and sensible) heat fluxes over land for helping to close the global surface energy budget. GSWP will also pursue sensitivity studies using ISCCP estimates of surface radiation for model forcing, compared to the Surface Radiation Budget Project and reanalysis estimates, to understand how uncertainty in our estimates of radiation propagate into the terrestrial hydrologic cycle.

GSWP-2 data sets for parameter specification, meteorological forcing, and validation have been produced. The data sets are based on the ISLSCP-Initiative II data, but many of the fields represent additional processing, such as the production of “hybrid” data sets combining gridded observations (low temporal resolution) with model reanalysis (high time resolution). This hybridization removes systematic errors in the reanalysis data, providing a superior set of forcing data for the land surface models. The revised deadline for the baseline simulation for GSWP-2 is 15 September 2003. At least 10 models have begun the baseline simulations as of early July, with as many as 10 more expected to participate. There will be a GSWP-2 session at the AMS 18th Conference on Hydrology, AMS Annual Meeting (Seattle, Washington, USA, 11-15 January 2004) to present preliminary results of the experiment.

As decided at the last GLASS panel meeting (October 2002 at COLA) this year would also see the completion of the first GLASS experiment, which involves land-surface models coupled to their host atmospheric models. The protocol for the **Global Land-Atmosphere Coupling Experiment (GLACE)** experiment proposed by Randy Koster was distributed to the community in February and first results are expected before the end of August. This experiment on the strength of the land-surface/atmosphere coupling in various models is being done in collaboration with CLIVAR. A full description and the current status of the experiment can be obtained from the GLACE web page : <http://glace.gsfc.nasa.gov/>.

The experimental protocol for the **PILPS San Pedro** was prepared during the first 6-months of 2003. This experiment will for the first time evaluate land-surface models in a semi-arid region and measure the importance of the chosen parameters relative to the structure of the models. Because of the complexity of parameter estimation techniques this experiment will be the first one to be preceded by a workshop. During the workshop, which will be held during the last week of August, the participants will be presented with the data sets, which they will use to force their models and they will also be trained to use the various parameter estimation

techniques proposed by the organizing team around Luis Bastidas. The status of this experiment is available on its web site : <http://www.sahra.arizona.edu/pilpssanpedro>