

## GMPP TO FOCUS ON THE DIURNAL CYCLE

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Attempts are underway to create **pan-GEWEX Modeling and Prediction Panel (GMPP) activities** that would intensify the interactions among the working groups on cloud processes (GEWEX Cloud System Study-GCSS), on land surface processes (Global Land/Atmosphere System Study-GLASS) and on the planetary boundary layers (GEWEX Atmospheric Boundary Layer Study-GABLS). The proposed cross-cut activities within GMPP are a common theme for the analysis of models and the selection of a common site for model intercomparisons.

**The common theme for the proposed analysis is the diurnal cycle.** It is expected that this choice will guide the activities in all three groups and encourage a closer study of the couplings that exist among them. Through collaboration with the Atmospheric Model Intercomparison Project (AMIP), the theme will also strengthen the link with global climate models. Although a number of studies have already been carried out on the ability of general circulation models to represent the diurnal cycle, there is still a lack of systematic analysis, which would identify the regions and processes where problems are most common in Global Circulation Models (GCM).

**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 on to the analysis of the interactions between clouds, the atmospheric boundary layer and land-surfaces. Three phases can thus be identified in the implementation of this GMPP proposal:

1. In a first phase GCSS, GLASS and GABLS will evaluate in off-line model intercomparisons (i.e., with limited feedbacks) currently underway or planned, the ability to reproduce the diurnal cycle.
2. During this period, AMIP should identify the geographical regions, seasons and weather regimes for which atmospheric models show the most significant deficiencies in the diurnal cycle.

3. Once the problems have been identified in the off-line mode and the large-scale atmospheric model environment, then attempts should be undertaken to reproduce them in a limited coupled environment by progressively introducing feedbacks in the GCSS, GLASS and GABLS intercomparisons.

The plan was well received by the Working Group on Numerical Experimentation (WGNE) panel, which proposes to call this a common GMPP/WGNE theme. In collaboration with WGNE the analysis of diurnal cycle could be extended to National Weather Prediction (NWP) models

It is hoped that the diurnal cycle theme and the interactions will act as a trigger to loosen the “implementation bottleneck” that exists between GMPP developments and their implementation in large scale models.

**The diurnal cycle theme also offers some opportunities for the collaboration between GMPP and the Coordinated Enhanced Observing Period (CEOP).** With the first data sets available through CEOP, the ability of some NWP models to reproduce the diurnal cycle on the locations chosen for the Model Output Location Time Series (MOLTS) have been evaluated. As these areas are covered by a large set of in-situ observations they would ideally be suited for more in-depth analysis through GMPP led model intercomparisons.

Another opportunity to encourage pan-GMPP collaborations and work on the coupling of cloud, land-surface and Planetary Boundary Layer (PBL) processes could be achieved if a **common site for model intercomparisons** could be found. Because of the very different needs in the three GMPP groups, the choice of a common site could prove difficult. Still the advantages that it would bring are important enough to pursue the idea. A pre-selection of possible common sites will be submitted to the GMPP panels in 2004.

The activities and plans for all of the individual components of GMPP are described in the full GMPP status report prepared for the GEWEX Scientific Steering Group meeting and can be found at <http://www.gewex.org/reports.htm>.

### Acknowledgments

The author wishes to acknowledge the contributions of the following GMPP members in developing the diurnal cycle theme: Bert Holtslag (Wageningen University), Paul Dirmeyer (COLA), Steve Krueger (University of Utah), Peter Gleckler (PCMDI), and Christian Jacob (ECMWF).