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## WORKSHOP/MEETING SUMMARIES

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### GLASS SCIENCE PANEL MEETING (Recent Results and New Initiatives)

25–27 August 2003  
Tucson, Arizona USA

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The GEWEX Global Land-Atmosphere System Study (GLASS) Science Panel meeting was held in conjunction with the Project for Intercomparison of Land-surface Parameterization Schemes (PILPS) San Pedro/Sevilleta kick-off workshop. The meeting was hosted by the Sustainability of semi-Arid Hydrology and Riparian Areas (SAHRA) Project, the National Science Foundation Science, and the Technology Center at the University of Arizona (UA).

GLASS is the element of the GEWEX Modeling and Prediction Panel (GMPP) concerned with simulation of the terrestrial state variables and fluxes using land surface schemes (LSS) and the interactions between land and atmosphere. GLASS is ostensibly divided into four actions that constitute a two-by-two matrix; one axis being coupled (land-atmosphere) versus offline (land-only) modeling, and the other being local (point, plot and catchment scale) versus large-scale (continental to global) modeling.

PILPS is the local uncoupled component of GLASS. Much of the workshop was given to the planning and assessment for the PILPS San Pedro/Sevilleta experiment, set to begin in October. PILPS San Pedro/Sevilleta is a multi-model comparison in the PILPS vein, led by Luis Bastidas (Utah State University), Hoshin Gupta and Bart Nijssen (UA), and Eric Small (University of Colorado). PILPS San Pedro/Sevilleta is a unique experiment in three ways. It is the first PILPS study in a semi-arid region, with study sites in Arizona and New Mexico. Second, code for performing a multi-criteria optimization procedure developed by Gupta and Bastidas will be made available to all model participants for calibration of their schemes. Third, the experiment will be a direct test of spatial transferability of surface parameters, as is commonly practiced but not validated in weather, climate and hydrologic models. Terri Hogue (University of California, Los Angeles) also presented some test-bed results for the experiment using the NOAA LSS. The website for the experiment is <http://www.sahra.arizona.edu/pilpsanpedro/>.

Updates on other PILPS activities, past and future, were also presented. **Nicolas Viovy (Laboratoire des Sciences du Climat et de l'Environnement) presented a summary of results from the PILPS C-1 experiment, which was the first to compare the abilities of LSSs with explicit carbon cycles.** A well monitored and documented wooded EuroFlux site in the Netherlands was used as the setting for the modeling experiment. Participants were asked to simulate the growth of the forest stand over the last 100 years (from the time it was planted at a previously cleared site), and then to simulate the fluxes of water, energy and carbon over the last few years, when intensive monitoring has been in place. **Some of the more outstanding results include the divergence among the dynamic vegetation models in their simulation of biomass growth and carbon fixation over the last century while simulating similar net ecosystem exchange, and the happy fact that incorporation of carbon components into LSSs appeared to have no deleterious effect on their simulation of the surface energy balance.** Han Dolman (Vrije Universiteit Amsterdam) gave an overview of FluxNet sites that could be used for follow-on studies that could examine the link between carbon and water.

Ann Henderson-Sellers (Australian Nuclear Science and Technology Organization) presented a summary of the PILPS program to date, and put forward a proposal for an isotopic PILPS study in the future, where the ability of LSSs to simulate the fluxes of traceable chemical constituents could be tested. The panel encouraged a proof-of-concept exercise to be conducted, with an eye towards marrying carbon and water isotopic modeling, as well as nutrients and other passive tracers.

There were several reports on projects that are currently underway. Paul Dirmeyer and Xiang Gao [Center for Ocean-Land-Atmosphere Studies (COLA)] reported on progress with the second Global Soil Wetness Project (GSWP-2), which is a multi-model large-scale offline simulation of the land surface state variables and fluxes over the period 1986-1995. Over a dozen modeling groups are completing baseline simulations, and will be submitting their results to the project's Inter-Comparison Center (ICC) at the University of Tokyo by the end of October. **One of the new elements in GSWP-2 is a focus on remote sensing applications. The project will test the ability of multiple LSSs to simulate infrared (thermal) and microwave (soil wetness) brightness temperatures as**

**observed from remote sensing platforms.** For more information about GSWP-2, see <http://www.iges.org/gswp/>.

Randy Koster (NASA/GSFC/GMAO) and Zhichang Guo (COLA) compiled an update of the Global Land-Atmosphere Coupling Experiment (GLACE), a joint project with the CLIVAR Working Group on Seasonal-to-Interannual Prediction. The experiment aims to quantify the strength of land-atmosphere coupling and its variability among most of the major climate models in use around the world. Integrations from five GCMs had been completed, with a total of 10–12 expected to be available by the end of September. Preliminary results showed the expected spread among models of the sensitivity of simulated precipitation to the land surface thermal and moisture state. (See GLACE article on Page 6.)

Proposals from Paul Houser and Christa Peters-Lidard (NASA/GSFC/HSB) were heard regarding the local coupled action. A workshop was held in De Bild, Netherlands last year to initiate progress in this area, which is responsible for exploring the local interplay between the land surface and planetary boundary layer (PBL) with an eye toward improved assimilation of both surface and atmospheric data. Houser argued the need for a field study to isolate conditions when land-atmosphere interactions are most important, to study whether the absence of coupling in PILPS-type experiments compromises their general applicability, and to discern the important differences between land data assimilation in coupled versus offline configurations. Peters-Lidard proposed a project for testing coupled LSS-PBL models. The panel encouraged collaboration with the GEWEX Atmospheric Boundary Layer Study (GABLS). Peters-Lidard and Bart van der Hurk will write a white paper to motivate an implementation workshop.

GLASS is also addressing crosscutting issues in the climate modeling community. One involves the continuing problem of initialization of soil wetness in climate models, and the lack of transferability of soil moisture data sets from one model to another. GLASS is preparing a summary paper on the issue to educate the broader modeling community as to the pitfalls of treating soil moisture as a uniformly defined quantity across models, with some proof-of-concept simulations to illustrate the point.

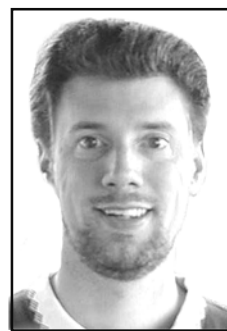
Another issue of concern to the panel is the application of LSSs in regional models. The re-

gional modeling community is not well connected to the global modeling community who seem to do much of the land model development work. LSSs in regional models are often not well initialized, and the panel perceives that the regional modeling community underestimates the severity of this problem. This is particularly worrisome because of the question of scale – the same parameterizations are used but land surface errors are a more acute problem for regional models as they cannot perform a self-contained spin-up. A workshop on the topic is being considered to bring the land surface and regional modeling communities together. A potential stage for such a workshop may be the African Monsoon Multidisciplinary Analysis (AMMA) Project. (See Page 8 for a description of AMMA.)

Other topics discussed included a briefing on urban modeling from Martin Best (UKMO), a briefing on the Integrated Land Ecosystem – Atmosphere Processes Study and discussion of the status of the International Satellite Land Surface Climatology Project with Pavel Kabat (Alterra). There was also discussion of a proposed new initiative within GMPP focusing on modeling of the diurnal cycle, brought up by Jan Polcher (CNRS/LMD). The initiative is aimed to improve communication and collaboration across the three modeling studies in GMPP (land surface, cloud, and boundary layer).

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## NEW GLASS CHAIR



Dr. Paul Dirmeyer, Research Scientist at the Center for Ocean-Land-Atmosphere Studies (COLA), is the new chair of the Global Land-Atmosphere System Study (GLASS). Paul chaired and oversaw the successful completion of the first Global Soil Wetness Project (GSWP) and is now chairing the follow-on, GSWP-2. He replaces Dr. Jan Polcher, Laboratoire de Météorologie Dynamique du CNRS, the founder and first chair of GLASS. Jan is chairman of the GEWEX Modeling and Prediction Panel (GMPP) and remains involved in GLASS activities, including the data standardization effort and open-source software bazaar he co-founded as an instrument to aid GLASS research, which has been adopted and used by many land modeling projects outside of GEWEX.