

## GLASS Report to the 2010 GEWEX SSG Meeting

**Panel Name (Acronym):** Global Land Atmosphere System Study

**Reporting period:** 2009

**Chair(s):** Bart van den Hurk and Martin Best, co-chairs

**Objective(s):**

Coordinate the development of improved land-surface schemes for coupled land-atmosphere models at all scales.

**Progress Report:**

The new structure of GLASS, focusing on the areas of Land Model Benchmarking, Model Data Fusion and Land-Atmosphere Coupling, can be considered to be successful. It has attracted new membership (see list below), and enables the grouping of existing and newly planned projects and activities with great flexibility. Some major activities are in an exploratory/preparation stage (like the benchmarking activities, land data assimilation intercomparison and the invocation of a third phase of the Global Soil Wetness Project (GSWP) – see below), and the role of the GLASS panel is to make inventories of existing activities and making connections between these. Some other activities (isolated projects) are well underway, such as the Global Land-Atmosphere Coupling Experiment (GLACE-2) and the Land-Use and Climate, Identification of robust impacts (LUCID) Project (see below). GLASS chairs will contribute actively to the inventory of “outstanding research issues” endorsed by the Working Group on Numerical Experimentation (WGNE) and the World Weather Research Programme (WWRP), and to ongoing discussions on the need for benchmarking and engaging research activities in the field.

**Progress per Activity:**

*GLACE-2:* a draft paper on first results has been submitted to GRL, focusing on additional prediction skill related to realistic soil moisture initializations in the US. Results show that up to lead times of more than a month temperature skill increases considerably, and precipitation skill somewhat when focusing on extreme initial soil moisture conditions.

*LUCID:* the GRL paper with first results has appeared this year, demonstrating that the way different climate models interpret land use change information varies widely, giving rise to fairly different responses to the imposed (radiative) forcing.

*Benchmarking:* the Exeter workshop in June brought together developers of various benchmarking systems around the world (mainly focusing on carbon models), and an inventory of possible benchmarking standards was made. Later discussions focus on a discrimination between (a) providing standard infrastructure to collect observations and model results and performing standard statistical tests (like the Protocol for Atmosphere-Land Studies – PALS), and (b) a conceptual model where the potential predictability of any modelling system is to be used as the ultimate benchmark. In that case, benchmarking comes down to assessing the potential predictability, and determining the degree to which a particular modelling system is skilful in this respect.

*Data assimilation:* During the ECMWF/GLASS workshop a clear recommendation was issued to organize a Project for Intercomparison of Land Data Assimilation Systems (PILDAS), which was embraced by NASA, ECMWF, MeteoFrance and CanadaEnv. Collaboration with the University of Tokyo is sought. A work plan will be drafted before summer 2010.

*GSWP-3:* various groups are interested in creating an offline land surface forcing dataset, covering a longer period than GSWP-2. The University of Princeton and the European project WATCH have prepared datasets based on different input data and covering different periods. ECMWF was

recommended to contribute actively to such a data set. University of Tokyo has announced a workshop (July 2010) to initiate a 3<sup>rd</sup> GSWP activity, and the GEWEX Radiation Panel LandFlux Project has expressed interest in this. We are seeking ways to combine these activities into a coordinated effort.

**Panel membership:**

Bart van den Hurk and Martin Best will continue to co-chair GLASS until well into 2010. Many new members are found with active participation in each of the working groups, with representatives from US, Europe, Australia and Japan. Membership will continue to change during 2010, as new activities mature. For instance, Gianpaolo Balsamo and Patricia de Rosnay will be co-member to represent ECMWF. Extension of the panel with a groundwater hydrologist (Ger de Rooij) is initiated.

**Main meetings in 2009:**

- GLASS/QUEST benchmarking meeting, Exeter, June 2009
- GLASS/WATCH land-atmosphere feedback meeting, Wallingford, June 2009
- GLASS panel meeting, Melbourne, 22 Aug 2009
- WGNE meeting, Offenbach, 2-4 Nov 2009
- GLASS sub-panel meeting, ECMWF, Reading, 11 Nov 2009
- ECMWF/GLASS workshop on land modelling, data assimilation and predictability, Reading, 9-12 Nov 2009

**Upcoming meetings:**

- GLASS panel meeting, attached to the Pan-GEWEX meeting (N. Hemisphere Fall 2010)
- A WGNE/WWRP meeting on parameterization requirements
- Planning meeting of GSWP3, Tokyo (July 2010)