

*Note: Presentations are only briefly summarized, if at all, in these minutes, since the original presentations are available electronically. These minutes focus mainly on the panel discussions and action items. -PAD*

25 August 2003

Attendance: Houser, Koster, Bastidas, Dirmeyer, Polcher, Best, Dolman, Henderson-Sellers – PM: Shuttleworth.

## **INITIALIZATION OF SOIL MOISTURE**

**Element:** Global Coupled

**Context:** K. Mitchell presented at last year's panel meeting – Koster & Best said yes, good topic).

**Presentations:** [Dirmeyer\_ics.ppt]

Dirmeyer gave a quick summary of proposal as presented to S. Schubert's sub-seasonal workshop (how to transform soil wetnesses between models based on standard normal deviates). Randy points out his linear model is along the same lines. But LDAS or GSWP with own model is always best solution for consistent ICs.

### **Discussion:**

Jan: SSG in Bangkok, tried to convey that can't transfer soil moisture because it is really a parameter and not a state variable, as modeled.

Houser: Models are too imperfect to represent LS – fudges are stopgap, need improved models and theory.

### **Action Items:**

‡ Martin and Pedro are to test exchange of soil moistures (item from last year's agenda) – will follow thru after this meeting – soliciting more details of what we'd like to see.

Point – Proof of concept of the lack of direct transferability of SW without some "treatment". Randy will do the analysis.

‡ Randy will write an outline for general summary paper with placeholders for Martin/Pedro runs and other relevant bits.

## **REGIONAL/LAND MODELING & AVISSAR**

**Element:** Local Coupled

**Context:** Past discussions have been about how to connect the land surface modeling community better to the regional modeling community.

**Discussion:** What to do about lack of progress in this area. This community not well connected to our GCMers, and land models not well initialized, etc. KNMI workshop hit on this problem. Question of scale – same parameterizations, but "more acute problem"

for regional models – can't do self-contained spin-up. Soil moisture initialization is the tricky bit – regional modelers not terribly aware of this, it seems.

**Action Items:**

‡ Workshop? Not a lot of enthusiasm for calling another meeting.

‡ This may resolve somewhat with the GMPP initiative on diurnal cycle. Local Coupled will be the logical interface with GABLS and GCSS. Should we let this be the avenue for addressing this problem?

**GSWP OVERVIEW**

**Element:** Large-scale Uncoupled

**Presentations:** [Dirmeyer\_gswp\_glass2003.ppt, Gao\_NC\_ws.ppt]

**Presenters:** Dirmeyer, Xiang Gao

Showed GEWEX context and background.

GSWP2 update:

ICC: Online data submission not viable after all: CD & DVD will be used.

Possibility of putting data on DODS server? Yes.

Soil wetness scaling issue brought up again (transform soil product from one to another)

**Discussion:**

Hoshin: can we make a definition of soil wetness that we can all agree on and represents reality fairly well? A: no. Compromise – normalized anomaly (state variable) or stick to  $dw/dt$  (the flux term in the water eqn). Range of soil wetness and temporal derivative of soil wetness is the best we can do.

Make a model perform like reality? The problem is we don't have a "real" reality.

Houser: Use model to simulate a model, as opposed to obs (explore error issues, gets into Koster & Milly and Gupta-eqsue approaches). If you have two models to be considered as reality, can you make one model perform as another model?

Jan: GEWEX Goal: Production of consistent state variables to be given to GEWEX community.

GEWEX goal is to address supplying state vars and fluxes for global E/W bals. What can GLASS provide? (GSWP- SW, what else?)  $\sigma$ ,  $dw/dt$ , stress (ET/PET), Snow (cover), LH??? Soil wetness, can use standardized anomaly

Besides soil wetness, other important state variables include snow, ground water level, surface saturation...

Q: For GSWP2, what is the diagnosis of snow production? Probably it is mostly related to the validation and just deal with snow coverage, anomaly, not actual depth.

Is there any community regarding radiative transfer model, microwave dealing with snow at climate modeling resolution?

Contribution of GSWP2 to GEWEX community with confidence for distribution:

Fluxes (evaporation), close E and W bal?

State variables (soil wetness, dw/dt, standard anomaly, time derivation of water storage, snow coverage, vegetation stress)

Quality control: sanity check (no model should fail), units, ALMA-range.

ICC will be in charge of it. ICC QC – if can't do an online-based QC check, distribute the sanity code (from Rhone or 2e) – Jan will check that correct version goes onto the ALMA site

L-band microwave emission model – other possible L-band data sets – HAPEX-Sahel, Reading folks (Xiang Gao getting contact names).

S.O. asked if we will go to other bands – other models (e.g. Schmugge can do many bands – A: eventually).

**Action Items:**

- ‡ List of data deliverables to GEWEX at large.
- ‡ Jan will check that correct version of QC check code goes onto the ALMA site

**Lunch**

**LOCAL COUPLED ACTION:**

**Element:** Local Coupled

**Presentations:** [Houser\_GLASS-LocalCoupled2.ppt]

**Presenters:** Houser, Gupta

**Discussion:**

Houser presentation – strategy for coupled LSS and atmospheric column, including the need for an accompanying field campaign to observe the hydrologic components completely from water table through the PBL – close budget over a small catchment.

Jan: Role of PBL-land interactions; prepare community for coupled DAS.

Phase 1 – partial coupling (not P or Rad down)

Phase 2 – common coupling (a la PILPS4c)

Phase 3 – throw in data assimilation (is there sufficient data to assimilate?)

ELDAS – coupling 3 LSSs to a common SCM.

PRISM – surface layer turbulence at the surface resolution (higher for OGCM e.g.). This is why Jan wants forcing data above the surface in GSWP-2.

Gupta: NCAR SCM and LSM used by student for a column study. 95IOP and 97IOP.

Basic problem: Not have a lot of data to constrain problem – thus the need for a new field campaign?

Best: Might it be worth skipping phase 1 and go to the common atmosphere & coupling to get to useful results?

Jan: Alternative approach: instead raise the boundary of a GSWP to 100m aloft or so, and follow GSWP approach (reanalysis-based forcing) to get around the data issue that otherwise constrains this to being a point study.

Ann, Han and Shuttleworth – tap GABLS to get more into this.

Paul H. (& Bart van den Hurk) arguing for the usefulness of a tool that a coupled PBL/LSS provides for DAS, feedback impacts on LSS, avoidance of ridiculous surface gradients and fluxes, etc.

**Action Items:**

‡ Pending Christa’s presentation (Paul H. must leave for HYDROS meeting at JPL) draft a plan for the local coupled action.

‡ Pursue contacts with GABLS.

**GLACE**

**Element:** Large-scale Coupled

**Presenters:** Koster, Guo

**Presentation:** [Koster\_glance\_glass2003.ppt]

Includes soil moisture memory analysis in coupled models, seasonal forecast studies update at GSFC.

Timeline for remaining GLACE actions presented. Panel is relatively happy with progress.

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*26 August 2003*

Attending: Gupta, Bastidas, Henderson-Sellers, Koster, Peters-Lidard, Dirmeyer, Polcher, Viovy, Nijssen, Best, Dolman, Terri Hogue.

**PILPS-SanPedro, or “semi-arid”**

**Element:** Local Uncoupled

**Presenters:** Bastidas, Gupta

**Presentation:** [PILPS\_SemiArid\_082403.ppt]

Arizona – 2 locations in Walnut Gulch (San Pedro) – grassland and shrubland, plus 1 Tucson site with cacti and mixed vegetation.

New Mexico: Sevilleta – similar vegetation type, climatology, altitude as San Pedro sites – use for transferability study.

Tucson only 14 months (Apr 93-May94), Sevilleta 2-years (2001-2002) , SP 5 years (1996-2000)

B. Cosgrove providing LDAS LWdown and surface pressure to fill out forcing data sets.

For Sevilleta, LDAS spin-up data for 2000 (how consist with in situ measurements?)

Multi-criteria parameter estimation is an option for all participants.

**Discussion:**

Ann: What's to motivate participants?

Luis & Hoshin – it's semi-arid, calibration will improve model, likely transferable to other semi-arid areas (Shuttleworth modeling study) – apply to GCMs perhaps?!?

Christa: Few months OK for E, Water, but how spin up carbon?

Luis: Could calibrate a best IC, just as with a best parameters.

Christa: Consistency of LDAS – in situ was checked (but do the clouds pass over in the LDAS LW at the same time as in the SW obs??)

Koster – Who does the calibration exercise and how? (Shown in following workshop)

Jan: Need an implementation plan and timeline.

Data will be 20min time step. Luis wanted 20 minute output – the panel talked them into requesting 1-hour output.

- Phase 1: Default parameter run (no calibration) San Pedro only
- Phase 2: Calibration output periods provided – calibrated runs San Pedro (and Tucson run)
- Phase 3: Sevilleta (transferability)

Randy: Can do a transferability test to HAPEX-Sahel on the side with a couple of models – more severe test of the transfers. Han can dig up data.

**Presentation:** [Hogue\_PILPS\_presentation\_Aug03.ppt]

Terri Hogue showed some preliminary results with the NOAH model.

Dirmeyer: Looks like E bal issues in forcing data? Are these checked?

Jan: what are the rules of calibration? What can be calibrated? What are metrics?

Randy: Very interested in partitioning of P into E and R (not just SH/LH). Apparently no R data – need assurances about E data being balanced.

**Action Items:**

‡ Luis: Produce an implementation plan and timeline in order to proceed, considering the questions and concerns raised by the panel.

‡ Han: HAPEX-Sahel data for a more extreme transferability study.

**PILPS-C1**

**Element:** Local Uncoupled

**Presenter:** Viovy

**Presentation:** [Viovy\_pilps-tucson.ppt]:

**Discussion:**

Big spread exists among models in terms of fixed carbon, biomass, in 100y integration.

No nitrogen – nutrients in these models!?!

Ann: Amazing how well the C models still do LH/SH – no slide in skill with adding C, tuning W&E.

Nicolas: Loobos is a simple forest without moisture stress – easy problem.

Han: Net flux compared – could separate soil respiration from photosynthesis – can add to analysis. Also add analysis of more plant metrics beyond biomass.

SM exists from 1995 on – groundwater at 3-4m depth – forest taps it in dry times.

Spread is alarming – consequences for IPCC!

**FUTURE PILPS PROPOSAL**

**Element:** Local Uncoupled

**Presenter:** Dolman

**Presentation:** [Dolman\_pilps\_future.ppt]

FluxNet sites – gain breadth (31 appropriate sites) but loose depth (100y total).

Han: Investigate NEE versus conductance/E – get at C versus water (Ball-Berry relationship) Do slopes agree?

**Discussion:**

Christa: US carbon modeling WG could be tapped – get people like Denning, Running, Field, to participate (it's now Eurocentric) – Denning as a prime bridge to this community.

Han: Science article – his perspective on eddy correlation approaches (published last week)

**Action Items:**

| Han is stepping off the panel – who will carry the torch on this? Nicolas?

**PILPS UPDATE**

**Element:** Local Uncoupled

**Presenter:** Ann Henderson-Sellers

**Presentation:** [AHS\_GLASS talk.ppt]:

PILPS review

**Isotopic PILPS** – new proposal. Comparison of the modeling of land chemistry cycles.

**Discussion:**

Is there sufficient data? (isotopes and fluxes at same place)? Can a distributed experiment be done (forcing data problems are squared)?

Unclear on just what experiments are to be done – still in formative stages.

The idea does have strong future potential. Good philosophy to it.

It's the chemistry-tracer folks who would drive this – need to connect to that community.

Han: what about the carbon isotopes (not just water-oxygen).

Jan: what about both – how do the two correlate?

**Action Items:**

‡ The panel gives support for a proof-of-concept exercise, and reevaluate next year – keep in mind combining carbon and water.

**SAHRA**

**Presenter:** Gupta

There is a pFT connection to hydraulic lift and recharge (water flowing down roots), so can use veg types as proxy for groundwater recharge.

Doing 100m hydrol, 5km link to ATM, and a lumped decision support model (a la MEDUSA).

Jan: Land surface is the one most affected by human action – but we model it as a natural system. Need to include management as a component of the land surface models.

**URBAN MODELING**

**Element:** Local Coupled

**Presenters:** Best, Peters-Lidard

CPL – evidence of different climatologies over urban areas. Experiment over Houston.

Han: Isn't ILEAPS supposed to do this kind of thing? How about jointly with them?

**Action Items:**

‡ Jan: to Martin – urban areas modeling conference.

**RIVER SCHEME – ORCHIDEE**

**Element:** Large-scale Uncoupled

**Presenter:** Polcher

The precipitation over W Africa (Niger uplands) too large in GSWP – compared to discharge.

**GMPP DIURNAL CYCLE INITIATIVE:**

**Presenter:** Polcher

**Presentation:** [diurnal.pdf]

Jan has notes.

## **LOCAL COUPLED REVISITED**

**Element:** Local Coupled

**Presenter:** Peters-Lidard

**Presentation:** [CPL\_GLASS\_Aug2003.ppt]

LOCO project proposed. Somewhat different in details than Houser's, but with similar end goals.

### **Discussion:**

Han: need a control volume fixed by state variables and fluxes – if don't have fluxes, can't close the problem. Then go to assimilation to do the problem. How far up in atmosphere to go to constrain the model properly? If put in a LSM in a SCM – find differences between offline LSM and coupling, then the model behaves diff in coupling, it's the coupling (if LSM is properly calibrated in uncoupled mode).

Jan: lift to 10m and give fluxes there, otherwise surface fluxes can go bad because the atmosphere surface state variable (half of gradient) is specified. ("classic" ELDAS argument).

Martin: errors in observations can hurt this approach in the offline problem. Jan's case can overcome the error problem by allowing surface fluxes to evolve naturally.

Luis – sometimes problems in LSM become apparent only in coupling.

Han: if the purpose of LSM is to be used in GCM, then must raise the boundary.

Still arguing the case for many LSS, one PBL, or many LSS, many PBL (or PBL vs SCM vs slab). Clearly a lot of important issues still need to be hashed out. This discussion appears to be converging on – slab atmosphere (?), common interface (Polcher), pile of advection terms (BvdHurk).

### **Action Item:**

‡ Christa, Paul & Bart – anchor a white paper to get an implementation workshop rolling. Tap GABLS also.

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*27 August 2003*

Attending: Bastidas, Gao, Guo, Kabat, Dirmeyer, Polcher, Viovy, Peters-Lidard, Best, Henderson-Sellers.

## **ISLSCP III**



**Context:** ISLSCP is falling out of favor in GEWEX. What should be the GLASS position regarding the future of ISLSCP?

**Presenter:** Dirmeyer

**Presentation:** [Dirmeyer\_ISLSCP\_Perspective.ppt]

Review of GLASS perspective on II3 and latest news.

“data encyclopedia” describes the idea of GLASS toward ISLSCP

ISLSCP valuable to be a reviewer and expert on the data sets – Forrest Hall’s number one defense argument.

**Discussion:**

Revamping of the proposal from last year’s GLASS panel meeting: A Federation between GLDAS and ISLSCP to split data responsibilities between (meteorology versus biogeophysical system) – leverage off of GLDAS expertise.

All to be discussed in the GEWEX retreat w/ Pavel.

## **iLEAPS**

**Presenter:** Kabat

**Presentation:** [iLEAPS-Presentation-Gewex&GlassTucson8.ppt]

Can’t go further in cloud parameterization without considering chemistry.

**Discussion:**

Jan: Past had some BAHC representation on GLASS panel – do same for iLEAPS?

Pavel: yes. Roni and Andy on iLEAPS transition team

As relevant, coordinate modeling between GMPP and iLEAPS.

Complimentary in chemistry (as relevant to E and water)

Christa: dust as future for GLASS – invite expert? iLEAPS?

**Action Item:**

‡ GLASS chair – liaise with iLEAPS.

## **PILPS-SP REVISITED**

**Presenter:** Bastidas

Addressing concerns of panel – motivate participation, (list of others to contact beyond current list of modelers)

Better organization (Bart Nijssen’s expertise will help here).

Argument – provide constraints, but lock some parameters to avoid E/W bal violations.

May 2004 for final workshop.

AMS Jan 2005 for special session.

## **REGIONAL PROJECTS**

**Presenter:** Polcher

Not a lot of links in past, or to CSEs. – not “global”.

Chris Thorncroft (SUNY) AMMA – this is THE classic land-climate region (think Charney) – should not turn them away.

Point to GLACE (regional sensitivity bit for them). (zero add'l effort)

Request measurements from them that will help in our parameterizations?

Data from sites for PILPS experiments.

Carbon – LBA, Chao Phraya transferability among towers

GSWP- help in closing regional budgets.

## **CLOSING**

Passing the scepter.

A memento for Jan.

Next meeting in Japan??