ALMIP AMMA Land surface Model Intercomparison Project Phase 2

ALMIP2 Workshop , 15-17 April, 2013, Toulouse, France

Proceedings

All the presentations are available on the ALMIP2 FTP site. :
ftp.bddamma.ipsl.polytechnique.fr,
login : almip2
Password : please contact us if you need this (it is the download passwd)
cd documents/Workshop_Toulouse/

Below is a synthesis of comments or suggestions that came out during the meeting.

1 Meso-scale

1.1 General issues

- models will be given the opportunity to rerun (if errors were found in their simulations or in the input data: see the next item). If a group reruns, the new simulations will replace the original simulations IF THE SAME FILENAMES are used. If not, reruns will be considered as additional runs (sensitivity tests, etc...).

- There was some confusion about forcing levels (for the input meteorological variables) : in the NetCDF, the levels for all variables (wind, temperature, relative humidity...) is given as 10 m. However, on the ALMIP2 web page (Input Data), the forcing level was erroneously stated to be 2m for air temperature and specific humidity. This has since been corrected. If you used 2m in place of 10m, please rerun. We are sorry for any inconvenience this might cause, but the impact of this change is likely significant.

- The ordering of ECOCLIMAP2-v2 data was found to be reversed in the latitudinal direction compared to the original ECOCLIMAP2 files. If one used the lat-lon coordinates, then this caused no problem. But if one used the coordinates indexes (as given in the NetCDF file), then the vegetation and soil parameters were potentially reversed (which is incorrect). We have uploaded new ECOCLIMAP2-v2 files and they are now available on the ALMIP2 server (in the same location as previously). The new filenames begin with « new_ ». Please rerun if your parameters were reversed. In addition, it was found that the patch fraction sum could exceeded unity at some pixels : it seems that the participants using patch information already corrected for this : if not, the new ECOCLIMAP2-v2 files have renormalized patch fractions at the pixels in question.

- Please give any feedback to the core group on any questions regarding the forcings or ECOCLIMAP data base.

- The models did not necessarily use the same input data (eg : soil data base). Modellers will be asked to fill in a template with the specifications the used for the meso simulations

(soil/surface properties, ...). We request that you send us spatially distributed parameters on the ALMIP2 grid in NetCDF format. Please contact us with any questions.

- The baseline detailed analysis for each of the sites will be done by the team of researchers who are PIs for the corresponding site. (Benin: Cohard, Seguis, Peugeot, Mali: Grippa, Kergoat, Niger: Demarty, Cappelaere)

1.2 Supplementary analyses.

1.2.1 Spatial analyses with satellite products:

- EvapoTranspiration
  - Chris Hain (U. Maryland) and Martha Anderson (USDA) will generate the ALEXI product on the three domains, using the same values of parameters / variables used by the models (as much as possible: i.e. ECOCLIMAP2), for the sake of consistency. Clear-sky data and/or periods with no gap-filling will be released first. Extended series including gap-filling will be provided later on.

  - **Action** : C. Hain provides a list of the variables/parameters needed for the ALEXI product and the core group documents the most common values used by the ALMIP2 models.

  - Some other groups producing ET spatially distributed products have been contacted and will be asked to provide their products to be accounted in the inter-comparison process. **PI : L. Kergoat**

- Surface temperature
  - Soil and vegetation temperatures (or raw surface temperature) simulated by the ALMIP models will be used in a radiative transfer model (thermal IR) and the resulting brightness temperature will be compared to MSG data, for year 2008. (**PIs : C. Ottlé**, **J. Demarty)**

- Ground Flux
  - A satellite-derived ground flux product derived from MSG data for 2008could be made available for the project (Coll A. Verhoef, Univ. Reading, UK) but a soil moisture mapping is needed for that purpose. The methodology is still under discussion (**PIs : C. Ottlé-A. Verhoef)**

- Soil moisture
  - Model intercomparisons ; comparison to local observations, comparisons to satellite products : eg.s ESA – CCI Soil moisture? Others? . **PI** Kazuazki Yorozu.

1.2.2 Other analyses

- Energy cycle evaluation : it was suggested that the partitioning of the energy balance (eg QH/QLE, QH/QG, ..) is analyzed in addition to the raw values
- diurnal cycle
- soil moisture **(PI K. Yorozu)** : comparison of meso-scale simulations with local site observations

- Water table dynamics. On the Niger and Benin sites, the observed groundwater levels can be used to evaluate the drainage/ground dynamics in the model. **PIs : C. Peugeot, B. Cappelaere.**
- Analyse the spread in model surface temperature, and look at the dry season dynamics ; relationships between atmospheric surface pressure and net radiation. Comparison with the behaviour observed in atmospheric models over the same area. **PIs : F. Guichard, A. Boone.**
- Use ALMIP2 results as a test bed to evaluate surface-atmosphere coupling in global climate models **PIs : S. Ait-Mesbah, others ?**

- Dynamic LAI and CO2 fluxes.
  Since vegetation variability is high at the interannual et decadal scale over much of West Africa, and since it is recognized that vegetation impacts land surface-atmophere coupling, it is of great interest to inter-compare and to evaluate the ability of current models to simulate LAI and vegetation growth in ALMIP2. Most models simulate LAI or biomass based on the carbon balance, therefore it is also of interest to look at the simulated CO2 fluxes, with or without dynamic LAI. L. Kergoat and a small group (A Boone, S. Lafont, F Maignan, J Demarty, M. Grippa ...) will perform these analyses for the 3 meso sites and all local sites (see the presentation with preliminary results). Other participants are welcome to join the effort. All models which have LAI and CO2 fluxes (GPP especially) are invited to submit these variables in the reruns.

- Flow routing for Benin (**PI Augusto Getirana with A. Boone and C. Peugeot**)

- Any other analyses are welcome (open data policy), But please inform the ALMIP2 organizers (to make sure there are no duplicate efforts, etc.)

1.2.3 Re-Runs and sensitivity studies

- A positive bias in model Net Radiation as compared to local observations has been evidenced on all the meso sites. A monthly bias correction on radiative forcing (LW and SW down) based on local observations will be made and re-runs with these corrected forcing, and the impact on simulation results will be evaluated.

- Increasing soil and rooting depth for the Benin site is perceived as a way to improve the water balance in the models. The specifications for this test will be detailed in a dedicated document . **PI : C. Peugeot**

- An alternative soil map has been developed for the Mali soils, with properties closer to field observations than the values in the ECOC LIMAP data base. Re-runs with this new soil map are proposed (again, only for the Mali site)

2 Local scale

2.1 Overview

- The experimental protocol for the local scale runs was discussed. It is based on the same principle than the meso-scale experiment:

- (1) “blind” local simulations with the **local forcing** and **local parameter** sets provided
- results analyses and feedback to participants
- local evaluation datasets made available (over certain time periods) with the possibility to re-run the models with tuning

A more detailed document describing the modelling protocol will be proposed in a couple of weeks, along with all the files needed for local simulations.

A discussion was undertaken with reference to complementing this set of “standard” protocol runs by additional runs and analyses. Several propositions were made:

- (2) “blind” local simulations with the **local forcing** and **meso parameter** sets (ECOCLIMAP2)
- (3) “blind” local simulations with **meso forcing** and **local parameter** sets

Analysis of the results:

- comparison of (1) to observations (un-tuned and tuned models) to assess the model physics, the best forcing/parameters being used)
- comparison of (0) (where (0) represents mesoscale results for the corresponding grid box) and (2) (only changes : local vs meso-forcing) to assess the effects of forcing fields
- comparison of (0) and (3) (only changes : local vs meso soil and vegetation parameters) to assess the effects of soil/veg prescription

The final objective is to separate the effect of the forcing fields, the soil and surface parameters, and the model physics in the model results.
This is still under discussion, and any suggestions are welcome.

NOTE: As of the writing of this report: After further discussion, we request that participants do the (0) blind runs (mandatory) and the (1) tuning runs (optional, but strongly suggested).

2.2 Discussed issues

- Benin site: it is proposed to extend the local simulations to year 2009, as more flux data are available this particular year, especially in dry season.

- The representation of soil crusting in the models was discussed. Soil crusting is very common in the Sahel, and has been evidenced to play a key role in water partitioning at the surface (runoff vs infiltration) at the local scale. On the one hand, it suggests that soil crusting should be accounted for in local simulations. On the other hand, as Sahelian hydrology is dominated by endorheism, runoff hardly occurs at the meso-scale. It is important to represent the processes occurring at each scale/resolution, and thus the representation of soil crusting seems not relevant at the meso-scale as it will result in the simulation of meso-scale runoff. Moreover, the models already tend to over-estimate runoff without any specific representation of soil crusting.

- At the Benin fallow site, the footprint of the flux tower must be accounted for in the analyses (See presentation by JM Cohard). The Footprints could be made available for the interpretations of local simulations on this site. **PIs : J-MCohard**

- At the Benin site, the lateral water flow in the soil can not be neglected, but as it is not simulated by the models (local scale), it will induce an error in the water balance closure. Assessments of this lateral flux will be made from water balance closure with observed data and will be provided for the local-scale analyses. **PIs : J-M Cohard and L Séguis**

- There is at least 1 local site on each meso-site with bare-soil conditions in dry season, which will permit the evaluation of bare soil evaporation in the models

3 Calendar (Tentative for 2013)

Local/Meso	Action	deadline
L	local forcing released	Early June
M	all "mandatory" runs done (re-runs)	1 Sep
L	local simulations done	1 Aug
M	sensitivity runs done	1 Sep
L	feedback to modellers	mid-Sep
L	evaluation data released (1 year)	mid-Sep
L	Re-runs done	End of Oct
M	final analyses done / write publications	Nov-Dec
	AGU (within existing sessions)	9 – 13 Dec
	EGU (ALMIP2 or AMMA session?)	April 2014
M, L	Full eval. dataset provided to participants	End of Project

4 Publications – dissemination strategy

- In terms of conferences, we will likely submit ALMIP2 papers to AGU, but it is a bit soon to have a devoted ALMIP2 session. However, we are tentatively planning to request a fully devoted ALMIP2 session for next years EGU. Again, more information will be provided at the next update.

- In terms of publication, the possibility for en open special issue has been discussed.
  - The *Journal of Hydrometeorology* seems best adapted to the scope of ALMIP2, but publication cost are rather high (~ 3000 $ each paper) and financial support would be needed.
  - *HESS* or *JGR* are other possible journals
  - The communities towards which we wish to disseminate ALMIP2 results (eg. Hydrology, surface-atmosphere coupling, …) have to be identified prior to the choice of journal to publish ALMIP results in.

– **Action** : check if these journal accepts open special issues or special collections, and under which conditions. If you have any comments, suggestions etc., please feel free to contact us.

5 Contacts :

Aaron Boone aaron.boone@meteo.fr)
and CC to
Christophe Peugeot christophe.peugeot@ird.fr

APPENDIX 1 : Workshop AGENDA

Notice : Lunches on Mon., Tues. and Wedn. as well as Dinner on Tuesday evening are offered to participants

Mon, April 15.
Session 1 : Introduction *(Chair : C. Peugeot)*

10:00 – 10:30 Welcome at the CIC at Météo-France, coffee will be offered

10:30-10:45 Overview of ALMIP2 Objectives (A Boone),
Workshop aims and overview (A. Boone)

Session 2 : Model/product presentation *(Chair : C. Peugeot)*
10:45-12:30 Model/products presentations by the Participants *(model presentation, difficulties encountered in doing the ALMIP2 runs, explanation of any additional sensitivity tests, etc...)*
15'+5' each

- ISBA *(A. Boone)*
- SIBUC *(K. Yorozu)*
- CLASS *(D. Verseghy)*
- MATSIRO *(X. He / H. Kim)*

12:30 – 14:00 Lunch

14:00-15:40 Model/products presentations (ctd) *(Chair : M. Grippa)*
15'+5' each

- CLM *(M.H. Lo)*
- CLSM *(A. Ducharne)*
- SETHYS *(C. Ottlé)*
- ORCHIDEE *(C. Ottlé)*
- off-line runoff routing *(A. Boone)*

15:40-16:00 Coffee break

16:00-17:20 Model/products presentations (ctd) *(Chair : J. Demarty)*
15'+5' each

- NTOP-AMMA *(A. Richard)*
- STEP *(M. Grippa)*
- DHSVM *(T. Vischel)*
- Rainfall product *(T. Vischel)*

Tues., April 16.
Session 3 : Presentation of preliminary results *(Chair : A. Ducharne)*

9:15 – 10:10 Mali Site *(M. Grippa/L. Kergoat)*
9:15 – 9:35 (15' + 5') Site presentation
9:35 - 10:10 (25 +10') Model intercomparisons

10:10 – 11:05 Niger Site *(J. Demarty/B. Cappelaere)*
10:10 - 10:30 (15' +5') Site presentation
10:30 - 11:05 (25 + 10') Model intercomparisons

11:05 - 11:25 Coffee break

11:25 – 12:20 Benin Site *(C. Peugeot)*
11:25 – 11:45 (15' +5') Site presentation
11:45 - 12:20 (25 +10') Model intercomparisons

12:00 – 13:00 (30+10') Synthetic overview across sites and variables *(A. Boone)*

13:00 – 14:30 Lunch

Session 3 : (Ctd) *(Chair : A. Boone)*
14:30 – 14:50 ECOCLIMAP (15'+5') *(JL Roujean)*
14:50 – 15:20 ALEXI Evap product (25+5) *(C. Hain)*

15:20-15:40 Coffee break

Session 4 Discussions *(Chair : A. Boone)*
15:40 – 18:00 First conclusions and discussions

19:00 – 20:30 *Social evening (restaurant dowtown, tbc)*

Wed., April 17
Session 5 : Reruns, additional simulations, local experiments *(Chair : C. Peugeot)*

9:15-10:30 Discussion of reruns, Additional simulations, Supplemental Analysis

10:30 – 10:40 Coffee break

10:30-11:00 Ct'd

11:00-12:30. Local scale experiment (presentation, goals, set-up)

12:30 – 14:00 Lunch

<u>Session 6 : Discussion of follow-on actions</u> *(Chair : C. Peugeot)*
14:00-15:30 Calendar, publication timetable and strategy, conferences, ..

15:30-15:45 : closing session

Appendix 2 : Attendee list

Name	Surname	email	Affiliation (institution/lab-group, place, country)	model/focus
Boone	Aaron	aaron.boone@meteo.fr	CNRS/CNRM-GAME, Toulouse, France	ISBA, off-line routing
Cappelaere	Bernard	bernard.cappelaere@univ-montp2.fr	IRD/HSM, Montpellier, France	ISBA, SiSPAT
Cohard	Jean-Martial	jean-martial.cohard@ujf-grenoble.fr	UJF/LTHE, Grenoble, France	field datasets
Demarty	Jérome	jerome.demarty@univ-montp2.fr	IRD/HSM, Montpellier, France	ISBA, SiSPAT
Ducharne	Agnès	Agnes.Ducharne@upmc.fr	CNRS/SISYPHE, Paris, France	CLSM-Sysiphe
Galle	Sylvie	sylvie.galle@ird.fr	IRD/LTHE, Grenoble, France	TOP-AMMA, field datasets
Gosset	Marielle	marielle.gosset@ird.fr	IRD/GET, Toulouse, France	precip
Grippa	Manuela	manuela.grippa@get.obs-mip.fr	OMP/GET, Toulouse, France	STEP
Guichard	Françoise	francoise.guichard@meteo.fr	CNRS/CNRM-GAME, Toulouse, France	forcing data-sets
Hain	Christopher	chris.hain@noaa.gov	NOAA/Univ. Maryland, College Park, MD, USA	ALEXI
He	Xiaogang	hexg@rainbow.iis.u-tokyo.ac.jp	IIS/U. Tokyo, Tokyo, Japan	MATSIRO
Kergoat	Laurent	laurent.kergoat@get.obs-mip.fr	CNRS/GET, Toulouse, France	STEP
Kim	Hyungjun	hjkim@rainbow.iis.u-tokyo.ac.jp	IIS/U. Tokyo, Tokyo, Japan	MATSRIO
Kotsuki	Shunji	kotsuki.shunji.42x@st.kyoto-u.ac.jp	U. Kyoto, Kyoto, Japan	SiBUC
Lafont	Sabastien	sebastien.lafont@cnrm.meteo.fr	CNRS/CNRM-GAME, Toulouse, France	Carbon cycle
Le Dantec	Valérie	valerie.ledantec@gmail.com	UPS/CESBIO, Toulouse, France	Vegetation dynamics
Lo	Min-Hui	minhuilo@ntu.edu.tw	Nat. Taïwan U., Taïwan	CLM
Ottlé	Catherine	catherine.ottle@lsce.ipsl.fr	CNRS/LSCE, Gif-sur-Yvette France	SETHYS, ORCHIDEE
Pedinotti	Vanessa	vanessa.pedinotti@meteo.fr	LEGOS/CNRM-GAME, Toulouse, France	ISBA
Peugeot	Christophe	christophe.peugeot@ird.fr	IRD/HSM, Montpellier, France	TOP-AMMA/field datasets
Pierre	Caroline	pierre@get.obs-mip.fr	UPS/GET, Toulouse, France	SARAH crop model
Richard	Aloïs	alois.richard@ujf-grenoble.fr	UJF/LTHE, Grenoble, France	TOP-AMMA
Roujean	Jean-Louis	jean-louis.roujean@meteo.fr	CNRS/CNRM-GAME, Toulouse, France	ECOCLIMAP
Séguis	Luc	Luc.seguis@ird.fr	IRD/HSM, Montpellier, France	TOP-AMMA/field datasets
Verseghy	Diana	Diana.Verseghy@ec.gc.ca	Env. Canada, Victoria, Canada	CLASS
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Ait-Mesbah	Sounia	salmd@lmd.jussieu.fr	LMD, Paris, France	Surface atmosphere coupling