

WG2: Water Cycle

Understanding the water cycle & its change due to natural & anthropogenic factors is critically important :

- Availability of water is one of the most limiting parameters for life, agriculture & economic development in the Sahel: need better climate predictions (Link with WG4)
- Central role in monsoon dynamics & its variability (Link with WG1)
- Important role in high-impact forecasts (Link with WG5)

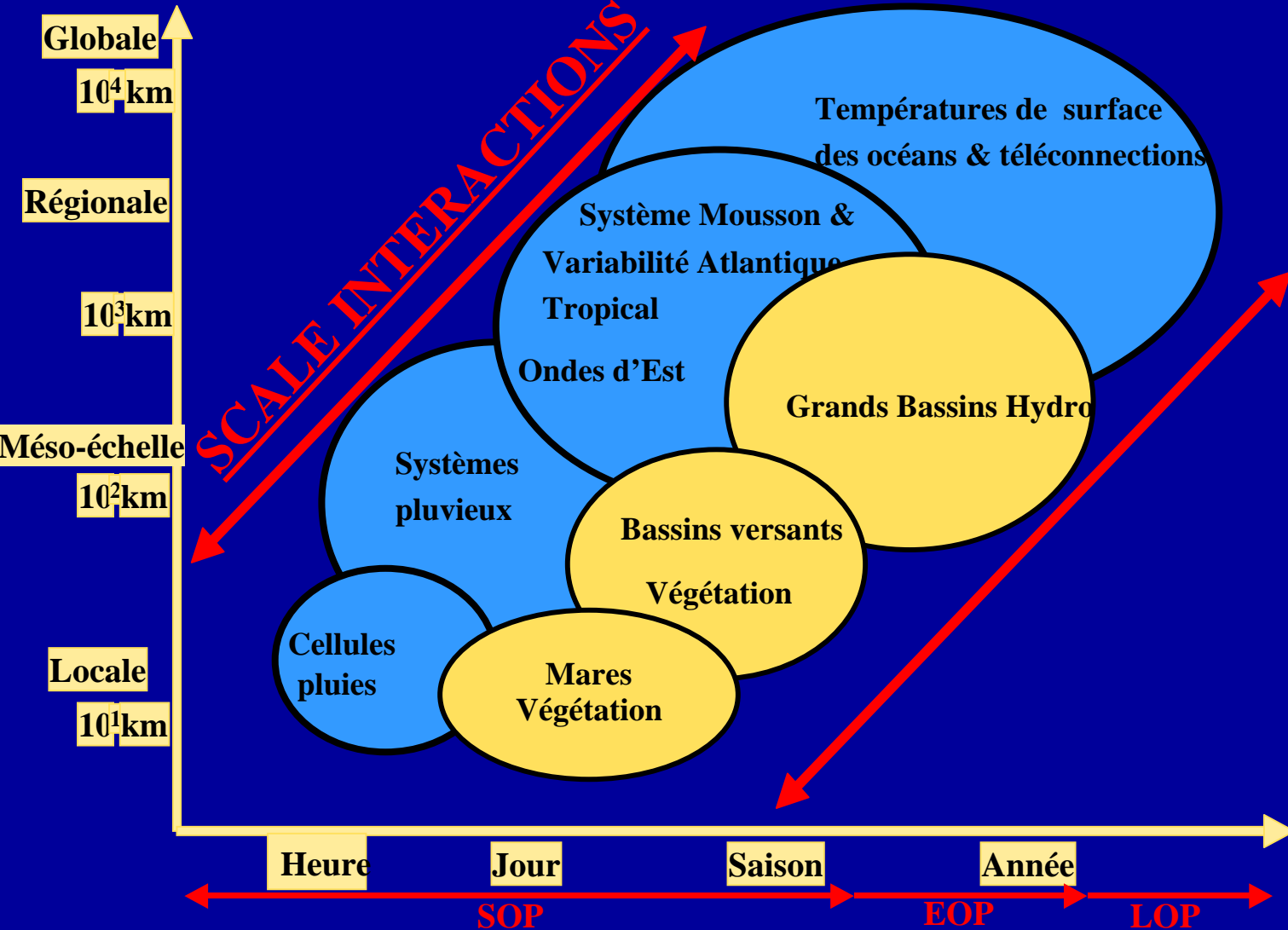
Understanding of the water cycle is difficult

- Lack of data concerning a very large number of processes at a great variety of spatial & temporal scales (Link with TTs)
- Coupling between these processes induces complex feedbacks, which can either amplify or reduce the impact of oceanic, atmospheric or continental perturbations on water availability (Link with WG3)



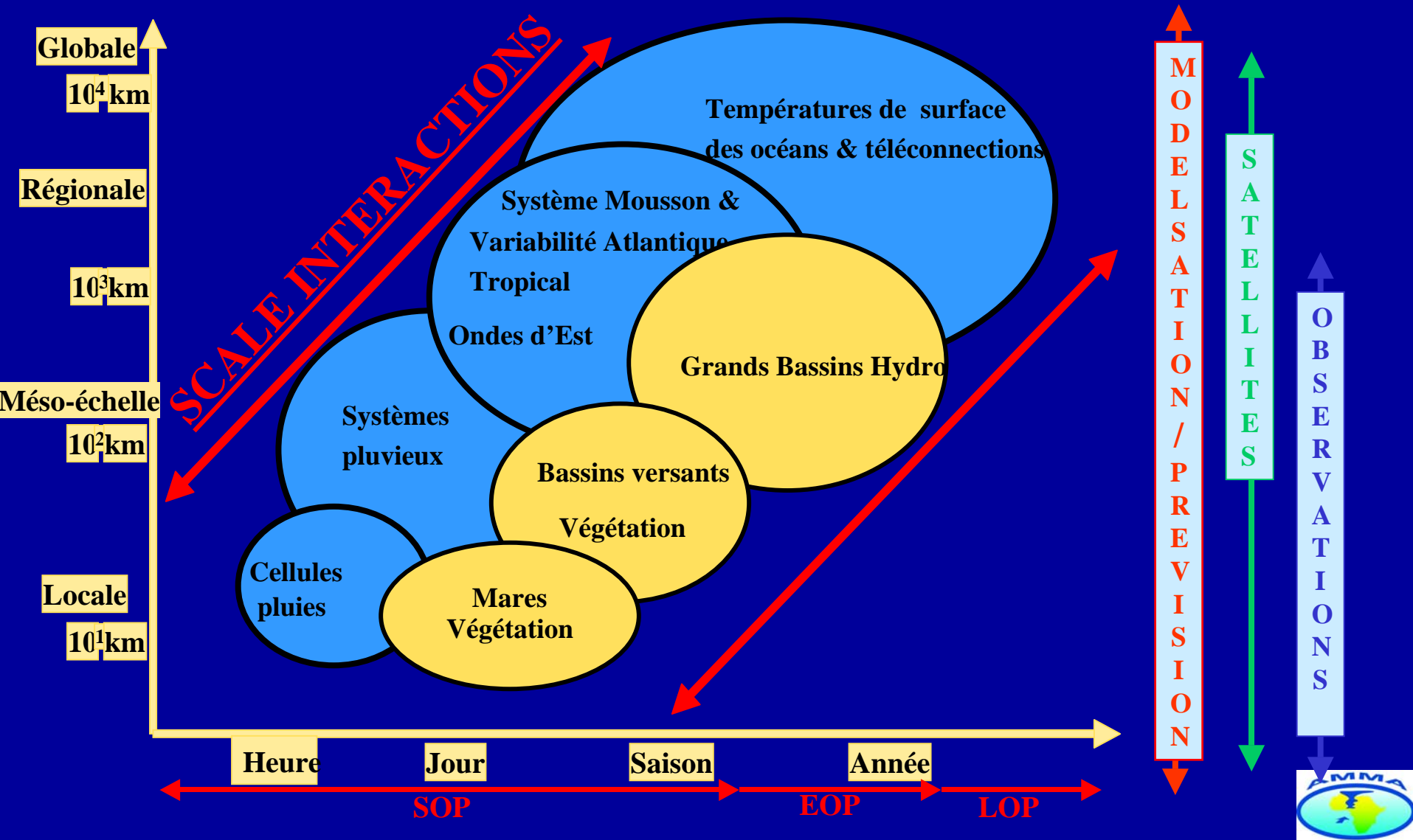
WG2: Water Cycle

From International Science Plan



Overall Approach of WG2: Four Research Activities

WG2 organized along three nested spatial domains with scales relevant to the processes occurring in the water cycle + scaling issues



Major objective of AMMA: To determine water budget & their interannual variability on WA for few hundred kms and 10-day to month resolutions

Large uncertainties exist to these scales and with these resolutions (Guichard & Previous studies, Roucou, Lafore, ..)

Activities in coming year

***To improve knowledge of some constraints (e.g. precip & surface fluxes observations) AMMA-SAT including PRECIPAMMA (Adeyewa Chopin, Grimes, ...), EOP/SOP observations**

***To decrease of uncertainties in processes representation in global/regional models specially thanks to studies at mesoscale (GCM group, Grandpeix, ...)**

***Paper making state of (un)knowledge**

***To exchange with WG1: interannual variability**

Leader: F. Guichard & P. Roucou

Need to involve more people from other countries to work on water budget at regional cycle: link to WG1 ???, "GEWEX community"



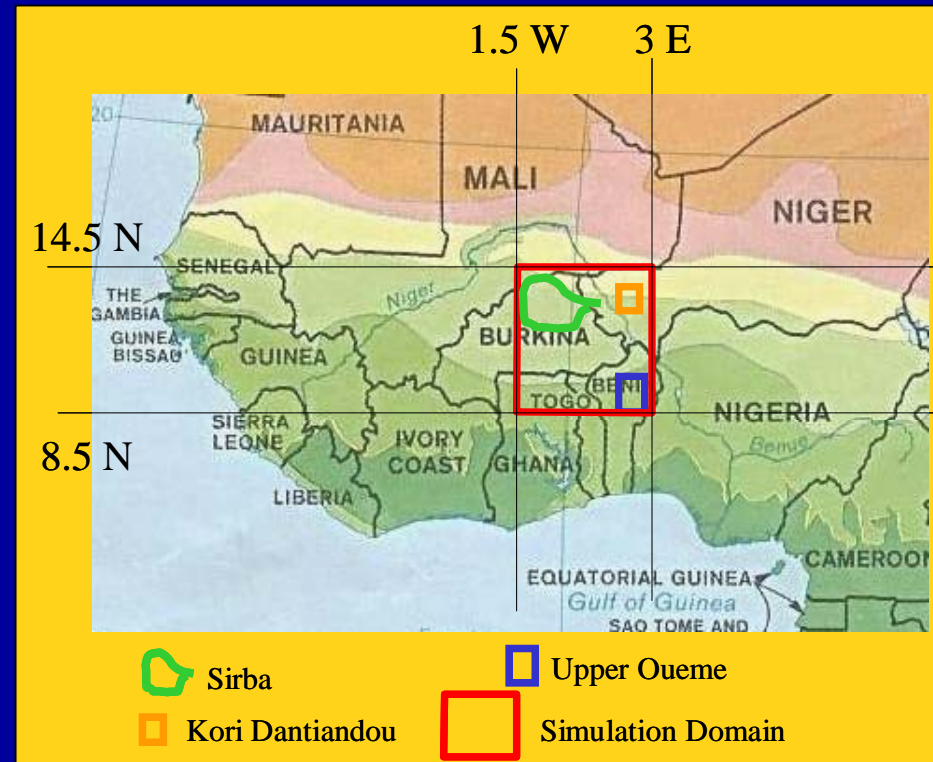
Preferred scale for atmosphere and surface integration

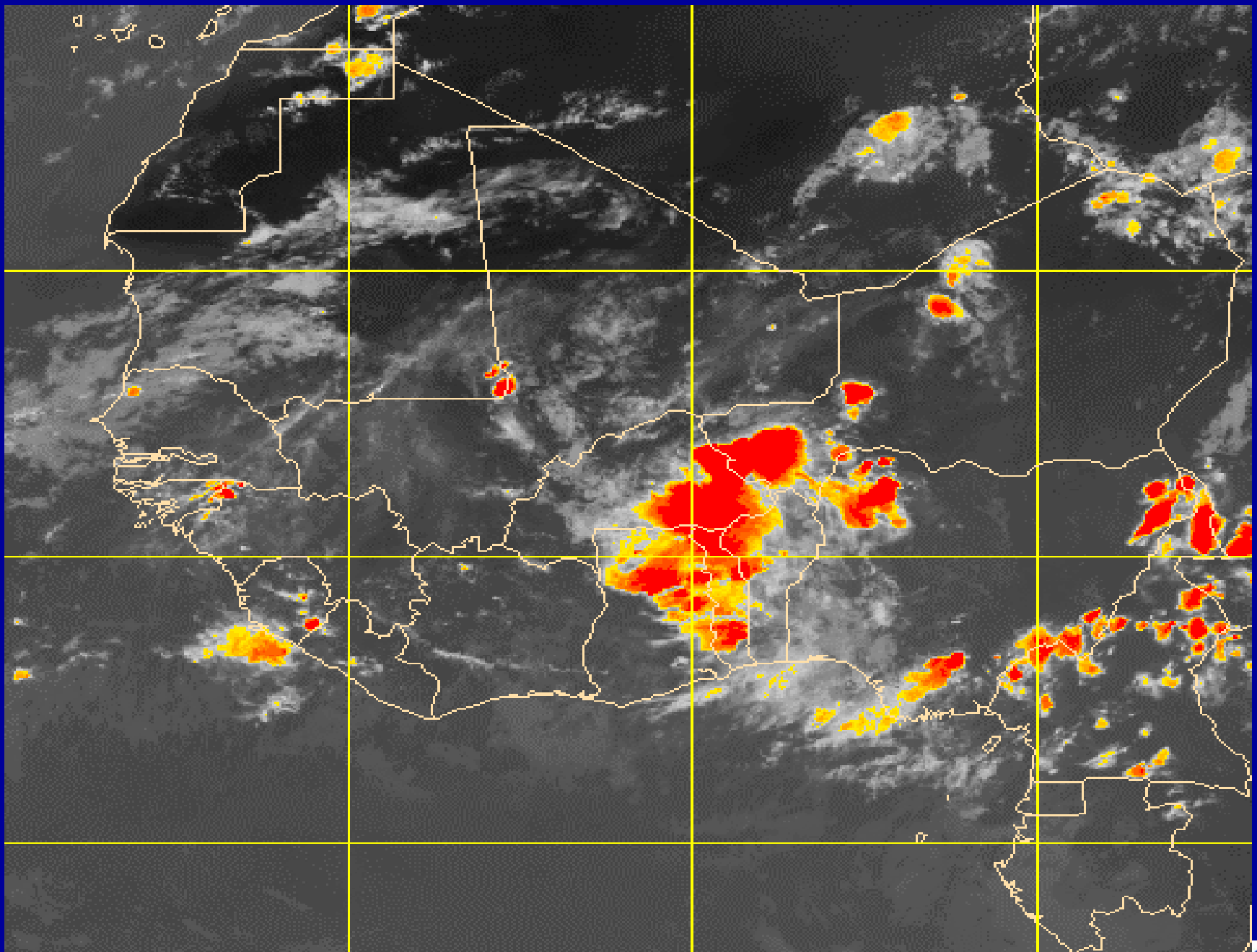
Scales complies with both hydrologic and atmospheric model capabilities; Scale of MCS & many surface-atmosphere interactions

Main AMMA activity in coming year (before EOP/SOP)

First case study in combining:

- *Hydrology & Atmosphere
- *Field observations EOP
- *Satellite observations AMMASAT
- *Modeling





Case study: Preliminary setup

Period: ~28Aug-1Sept 05

Domain: 1.5°W-3°E x 8.5°N-14.5°N

MCS traveled over 3 supers sites (upper Ouémé, Niamey-region, Sirba)

AOC “Dry run forecast “: Available runs from operational met models & their analysis

Data available from the field (hydrological & atmosphere), Soil moisture analysis, etc

Models:

Atmosphere: Forecast models from “dry run” (10 to ?? km resolution); Research models (1-4km resolution) : WRF, Meso-NH/AROME, BOLAM/MOLOCH, MAR (tbc), others

Hydrology: Top-Model, GR4J, rwf-abc (tbc), Geostreamflow (?), POWER, others.

Tasks

To gather all available atmospheric data: O. Bock

To gather atmospheric data from AMMASAT (cloud top, tracking, water vapor, ...): “F. Fierli”

To gather all surface (including radar) & hydrological data: S. Galle, L. Descroix, et al

To gather all available information on moisture at mesoscale (ALMAS, Satellite,): “A. Boone”

To set up the case study: C. Peugeot & JL Redelsperger



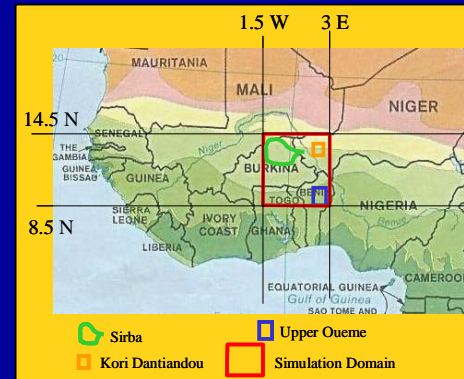
Preferred scale for atmosphere and surface integration

Scales complies with both hydrologic and atmospheric model capabilities; Scale of MCS & many surface-atmosphere interactions

Main AMMA activity in coming year (before EOP/SOP)

First case study in combining:

- *Hydrology & Atmosphere
- *Field observations EOP
- *Satellite observations AMMASAT
- *Modeling



The case study is yet international and is open. Any people wanted to participate can contact case leaders

Leaders of mesoscale activity: C. Peugeot & JL Redelsperger

To coordinate the case study (incl. document to be distributed)

To make links with “dry run” group, GCM, WG3, WG5

To involve more people to participate

Preferred scale for intense hydrology observations (Super sites)

Super-sites of AMMA field experiment = high resolution “laboratories” to identify dominant surface processes

AMMA activities in coming year :

- **To perform accurate hydrological budgets on super-sites**
- **To test and develop parametrizations to be then used at the mesoscale and applied to water budget assessment.**

Leaders: B. Cappelaere, L. Descroix, S. Galle, L. Seguis.

Actions : Improve coordination between sites (e.g. : methodology for vegetation studies, develop local scale hydrological studies on Gourma site, share models and knowledge – also LOP/EOP issues)

Better integrate the other local sites in the strategy (e.g. site monitored by AMMA-Burkina)



Methods of upscaling & downscaling used to transfer information between scales

Critical for impact studies

Upscaling: is addressed through the 3 previous activities

Downscaling: Small participation of people working on

Activities exist in Africa, EU, UK, US

Activities in AMMA

Need to coordinate activities on downscaling at international level in regard to the importance & the complexity (strong & clear request from WG4)

Leader(s): ? Africa, IRI, UK, EU

ISSC needs to work on in the next coming months



Recommendations to AMMASAT (who agreed):

***Strong need to get estimation of error bars on products (e.g. precip)**

***To develop an activity on case studies**

Coordinating group:

A. Gaye (Africa), JL Redelsperger (France), F. Fierli (EU), Somebody from USA????

C. Peugeot, N. Hall, F. Guichard, C. Depraetere (activities leaders)

Coordination of 4 activities

Email list will be established

A web page will be developed

To develop and promote WG2 in AMMA-Africa

To ensure links with WG1, WG3, WG4, WG5

To report and promote WG2 activities to GEWEX

To promote AMMA sessions in conferences/meetings (e.g. GEWEX) with ISSC

