

# Land surface modelling session:

## Merging efforts on surface processes, remote sensing, modeling and data base, on focusing on African Land Data Assimilation (ALDAS)

(wp 4.1, 4.3, 4.4)

Tools & methods relevant for integrated Wps:

- Wp 1.2 (water cycle),
- Wp 1.3 (land-atmosphere feedbacks),
- Wp 2.3 (land surface processes).

Outcomes of land surface models (Wednesday 21 Sept 2005 session),  
P de Rosnay with AMMA-EUwp4.1.1.c and API wp 4.1.2 participants.

## Addressed questions:

A lot of Models are used. They focus on different processes and work at different temporal and spatial scales, on different domains and sites.

How can we take advantage of the large range of models involved in processes studies to address scientific objectives of wp 1.2, 1.3, 2.3 ?

How can the multi-scale data base be used to run various types of land models ?

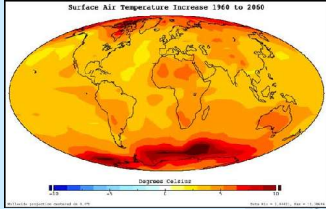
Can we extend the inter-comparison project to a larger range of models representing different processes, at various scales (temporal, spatial) ?

And how to perform it ?

Are there enough local information to run different types of integrated and specific models on different sites ?



# Diversity of models, domain of applicability and coupling



GCMs  
 ARPEGE  
 LMDZ  
 ECMWF  
 Met Off  
 CCM3  
  
 MM5  
  
 RCM  
 MAR

ISBA  
 ORCHIDEE  
 TESSEL  
 JULES  
 IBIS  
 SETHYS  
 Noah LSM ?

VIS, PIR, MW

VIS, TIR

MW

Meso to basin to local:

STEP

ABC Treegrass, TGPIX

GR4j, POWER, REW,  
 Top Model

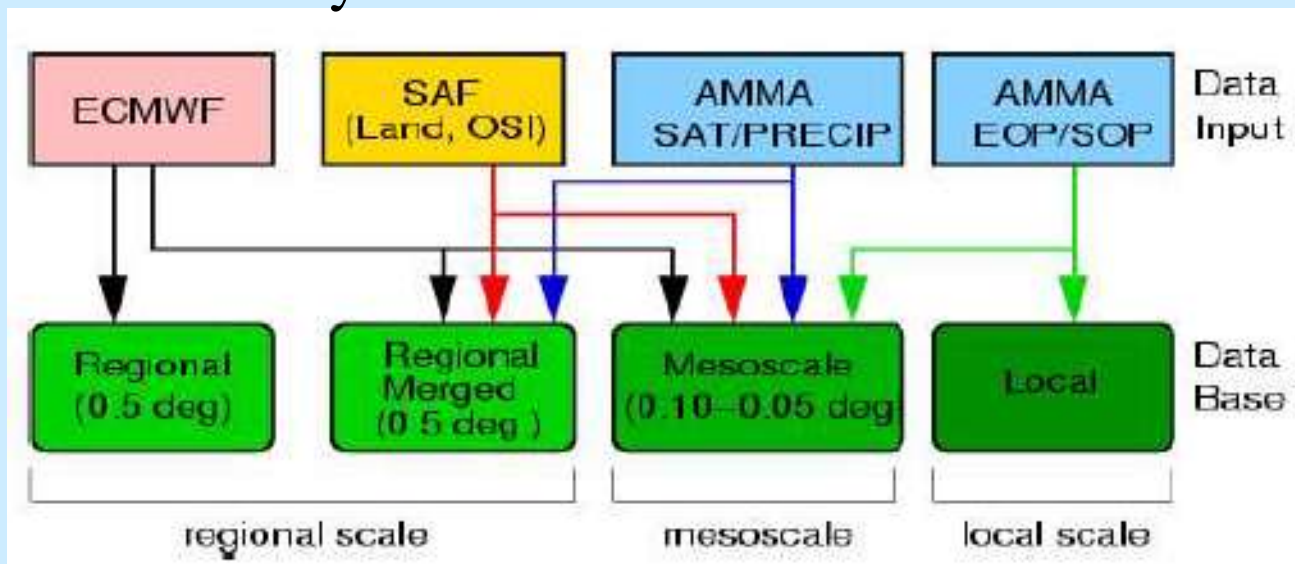
Global, Regional to meso and local



# Multiscales Land Surface Forcing Data base (A. Boone)

Appropriate input data to run LSM. Two types of input:

- **Parameter data:** Properties of the land surface that change on timesteps of a day or longer, e.g., soil, land cover, topography
- **Forcing data:** Atmospheric inputs to the land surface models, including precipitation, radiation, and surface winds, temperature, pressure and humidity.



Various sources for each of the spatial scale of the database



# ELDAS: Soil moisture analysis system

## Optimal Interpolation:

- Used in the operational ECMWF-forecast since 1999 (Douville et al., 2000)
- Fixed statistically derived forecast errors

**ELDAS to be adapted to Africa**

**-> ALDAS in 2006**

## ELDAS Extended Kalman Filter:

- **Assimilation of 2m- T and RH, and mw-Tb, when available**
- **Evolution of forecast error**
- **Forcing by observed precipitation (and SW radiation), when available**
- **The system has been extensively validated\***
- **Prototype of operational configuration ready for testing during 2006**



# Intercomparison Project

ALMIP-1 (to be conducted in 2006):

- Based on experience/knowledge acquired with previous intercomparison experiments (PILPS, Rhône AGG...)
- Use of Integrated LSM and SVAT models
- Focus on ability to represent spatial/temporal vegetation phenology
- Local to meso to regional scale fluxes
- Period: 2003 (spin-up), 2004

Participants to ALMIP-1: LSM (ORCHIDEE, ISBA, TESSEL, JULES, IBIS, Noah, SETHYS)



**ALMIP** AMMA Land Surface Model  
Intercomparison Project

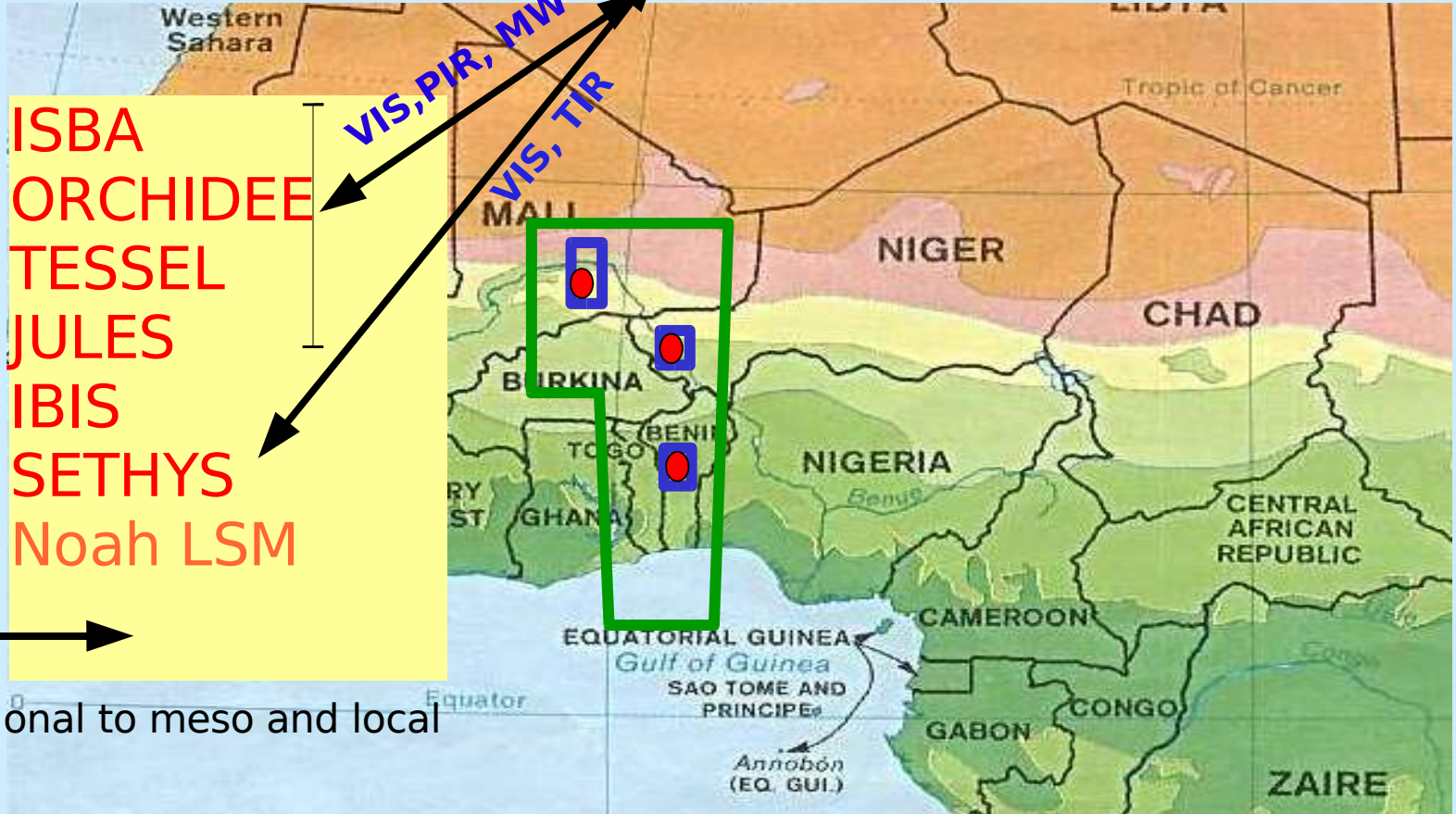
# ALMIP-1 (2006)



FORCING  
DB:  
P, Tair,  
SW, LW,  
Wind,  
Pr, Qair  
soil prop.

ISBA  
ORCHIDEE  
TESSEL  
JULES  
IBIS  
SETHYS  
Noah LSM

VIS, PIR, MW  
VIS, TIR



Global, Regional to meso and local



**ALMIP** AMMA Land Surface Model  
Intercomparison Project

# ALMIP-2 (2007)



FORCING  
DB:  
P, Tair,  
SW, LW,  
Wind,  
Pr, Qair  
soil prop.

ISBA  
ORCHIDEE  
TESSEL  
JULES  
IBIS  
SETHYS  
Noah LSM

VIS, PIR, MW

VIS, TIR

MW

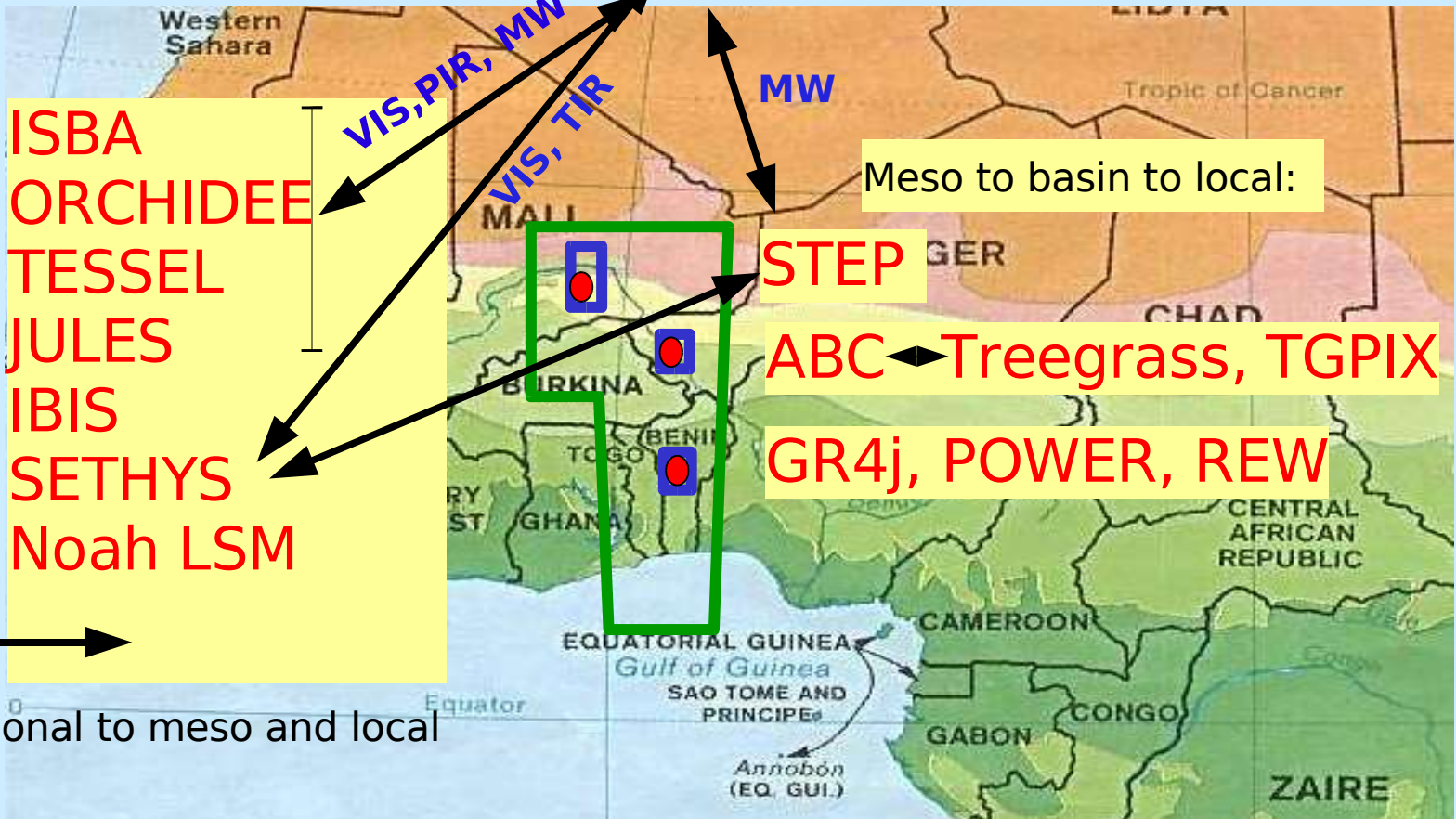
Meso to basin to local:

STEP

ABC Treegrass, TGPIX

GR4j, POWER, REW

Global, Regional to meso and local



**ALMIP** AMMA Land Surface Model Intercomparison Project

## Outcomes of Land surface modelling session:

- Multi scale forcing data base is critical for the land surface modelling activities:
  - Allows to run various types of models, at different scale, different sites.
  - Coherent with the whole wp 4.1 for GCM validation,
  - Forcing DB will be available in AMMA-DB for a large use in AMMA.
  
- On going ELDAS development at ECMWF
  
- Inter comparison project ALMIP-1 of integrated Land surface models
  
- Reflection concerning an innovative inter-comparison approach:  
ALMIP-2 experiment (2007) in which different approaches of surface modelling are involved (hydrological, vegetation, LSM, svat...).
  
- Requirement in coherent specific parameters measurements on the different sites to allow models comparison (link wp4.2.3).

