

Inter-CSE Transferability Study (ICTS)

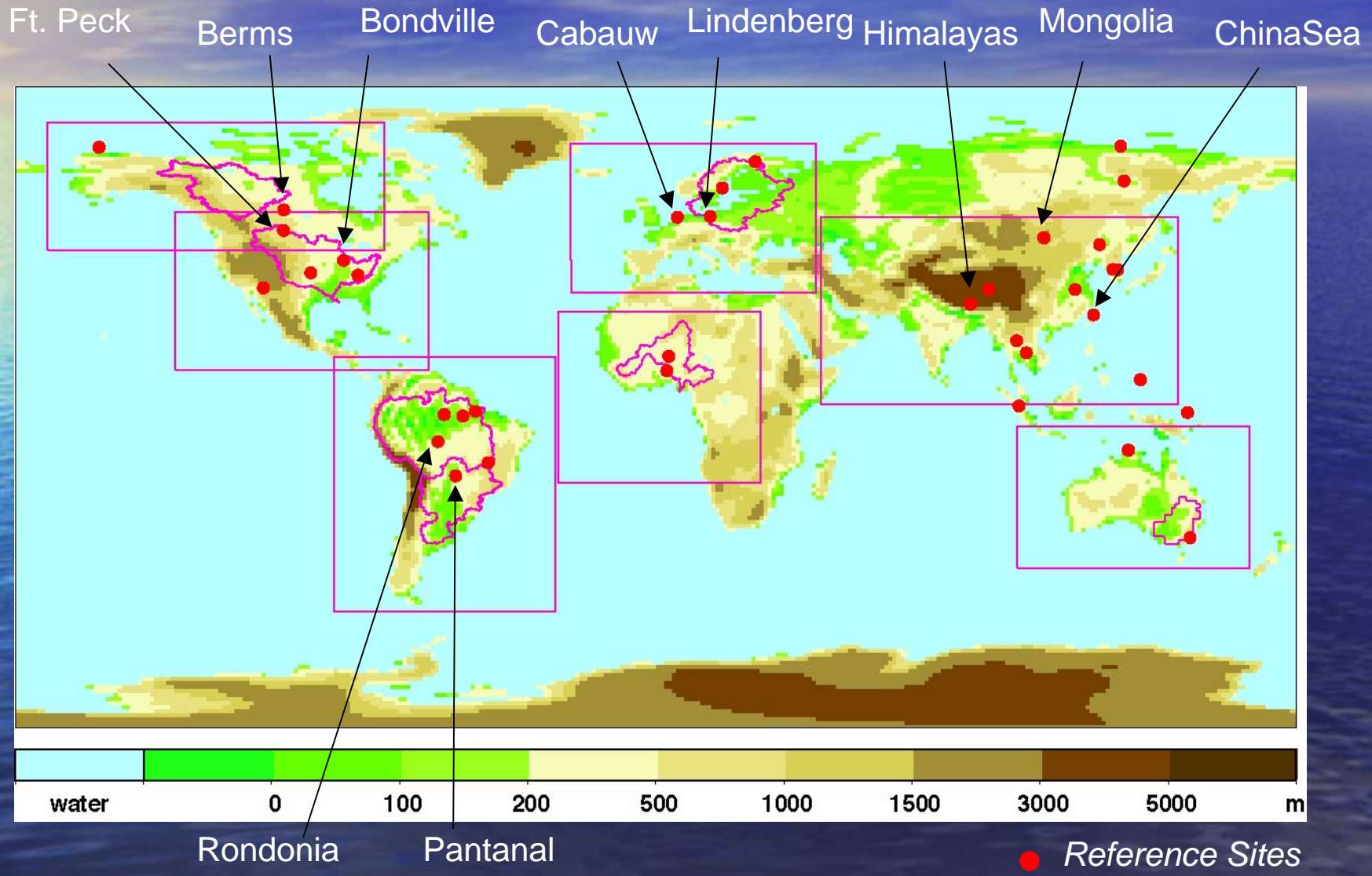
B. Rockel, J. Roads, I. Meinke, W. J. Gutowski

- Study the transferability of regional climate models over different CSE's (i.e. different climate regimes)
- Apply CEOP (Satellite, Reference sites, global analysis and model data) and other available observational data sets to validate the energy and water cycle in regional climate models
- Assess the influence of different driving global re-analysis

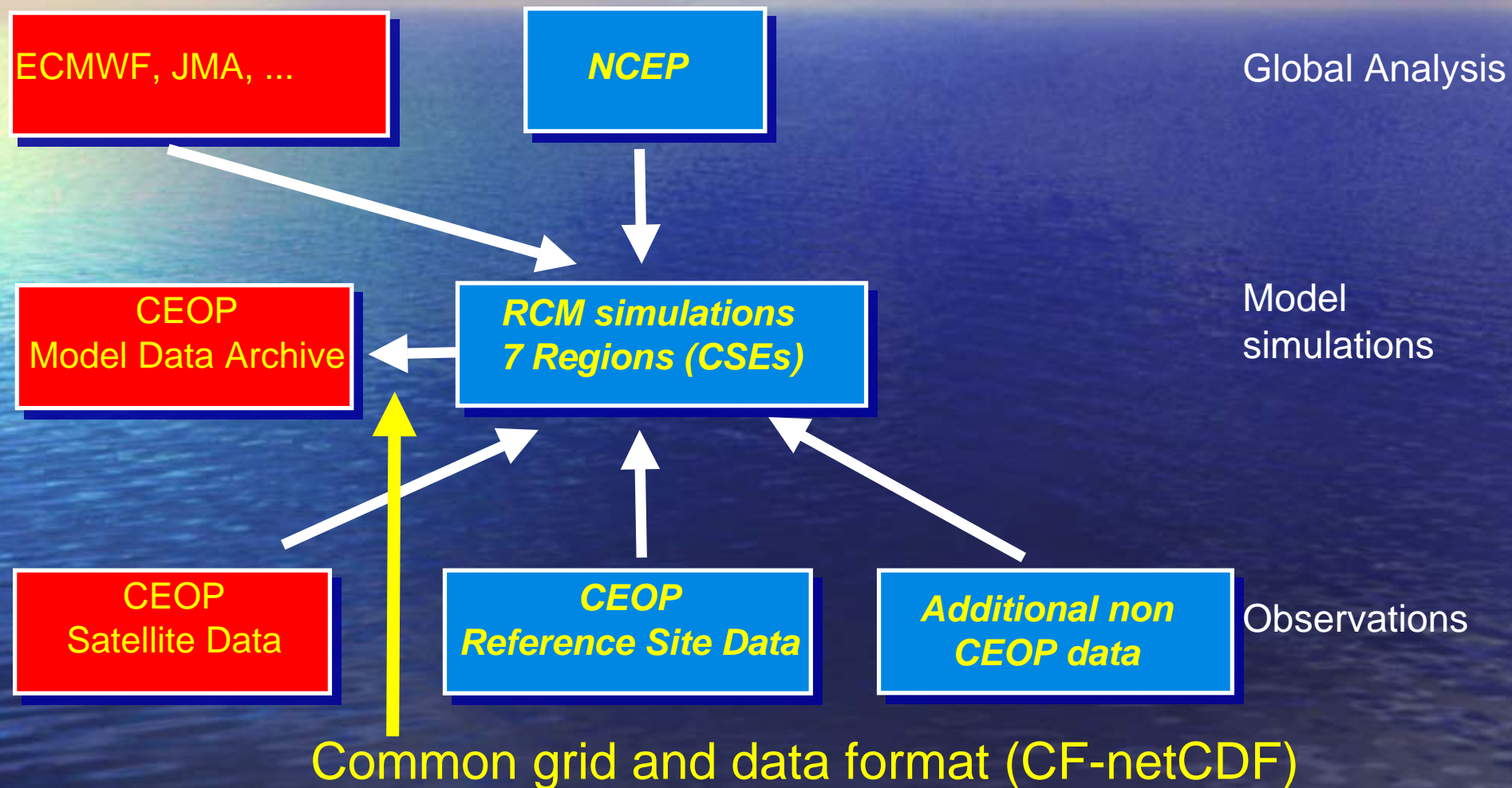
Why transferability studies?

- Different dynamical and physical processes in different regions of the globe.
- Various regional models have been developed, each for a specific domain.
- Regional simulation of water- & energy budget is sensitive to representation of regional physical processes.
- Comparison to CEOP data should help to improve regional and eventually global model predictions.
- **Act regionally, think globally!**

Model areas (transformed)



Long term simulations July 1999 - Dec 2004



Regional climate models involved so far

- CLM (Climate version of the “Lokalmodel”) / GKSS, BALTEX
 - non-hydrostatic, grid-point atmospheric model
- RSM (Regional Spectral Model) / ECPC, GAPP
 - hydrostatic, spectral atmospheric regional model
- RegCM3 (Regional Climate Model) / ISU, GAPP
 - hydrostatic, grid-point atmospheric model
- **Additional contributions, especially those from other CSEs, would be most welcome!**

Model runs and validation data

Regional simulation:

Horizontal resolution: ~50 km

Forcing: NCEP, planned: ECMWF, JMA

Simulation period: July 1999 to December 2004

First 2 years are for spin up, esp. equilibration of the soil moisture.

Model set up (physics / numeric) are the same over all domains.

Validation data:

CEOP reference site and satellite data

GPCC data (Global Precipitation Climatological Centre)

ISCCP data (International Satellite Cloud Climatology Project)

CEOP 1 RefSites (not all listed)

Site	PS	T	TD	RELHUM	QV	VABS	VDIR	U	V	TOT_PREC	W_S	SHFL	LHFL	SOBD	SOBU	THBD	THBU	NETRAD	T_SKIN	
Cabauw	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Red
Lindenberg	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green	Yellow	Green	Yellow	Green	Red
China Sea	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Himalaya	Green	Green	Yellow	Green	Red	Green	Green	Green	Green	Green	Red	Red	Red	Green	Red	Red	Red	Red	Red	Red
Mongolia	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red	Green	Green	Red
Bondville	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Yellow	Yellow	Green	Yellow	Green	Green	Green	Green	Yellow
Ft. Peck	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Yellow	Green	Green	Yellow	Yellow	Yellow	Green	Green	Red
Pantanal	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green	Red	Red	Green	Green	Red
Rondonia	Yellow	Green	Yellow	Yellow	Yellow	Green	Green	Green	Green	Green	Red	Yellow	Yellow	Green	Green	Green	Green	Green	Green	Yellow
Berms	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red	Green	Green	Green	Green	Green	Green	Green	Green	Red

Green = available

Yellow = partly available

Red = not available

PS = surface pressure

T = 2m temperature

TD = 2m dew point

RELHUM = 2m relative humidity

QV = 2m specific humidity

VABS = 10m absolute wind speed

VDIR = 10m wind direction

U = 10m u-component of wind

V = 10m v-component of wind

TOT_PREC = total precipitation

W_S = water equivalent of snow

SHFL = sensible heat flux

LHFL = latent heat flux

SOBD = surface solar radiation downward

SOBU = surface solar radiation upward

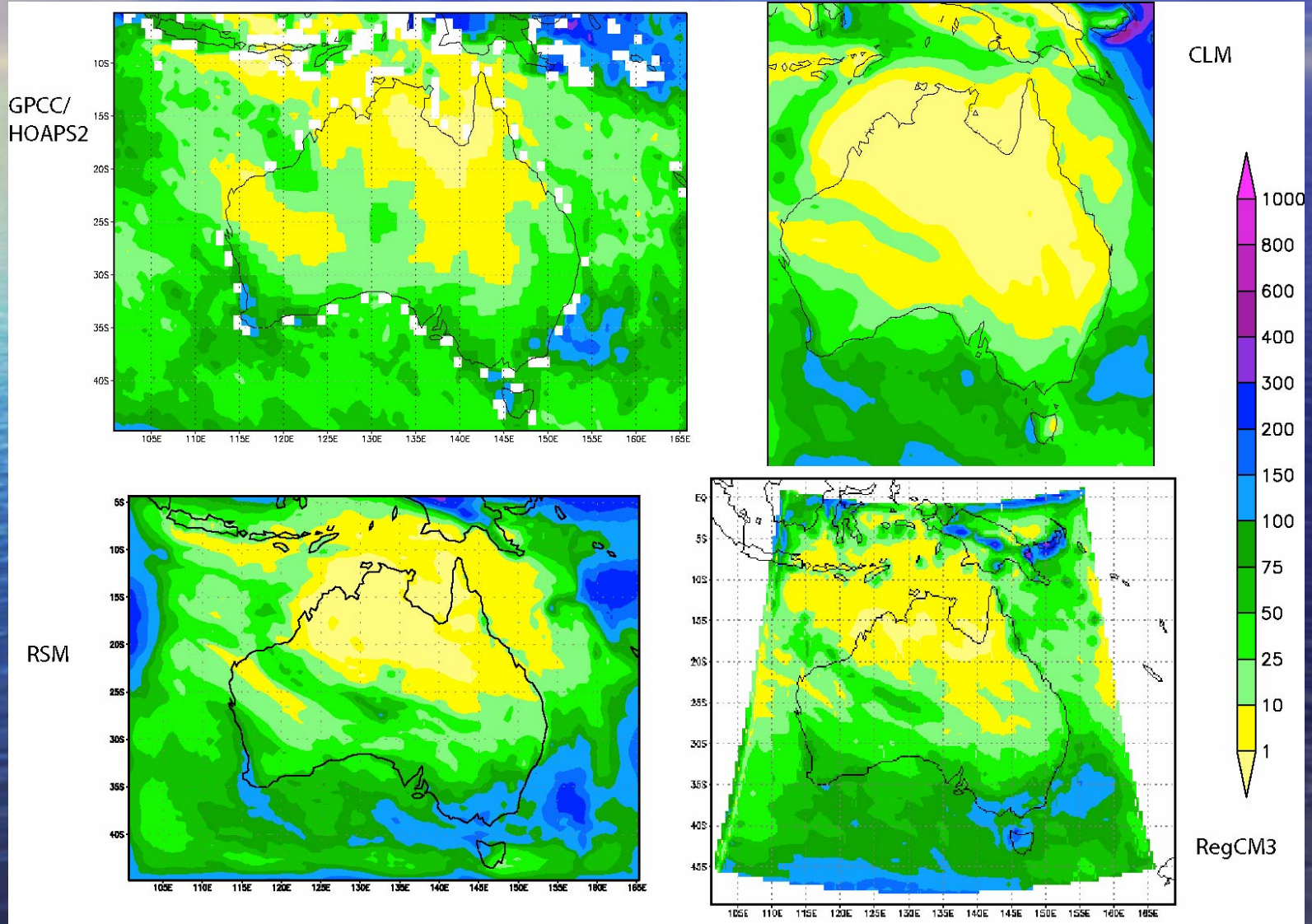
THBD = surface terrestrial radiation downward

THBU = surface terrestrial radiation upward

NETRAD = surface net radiation

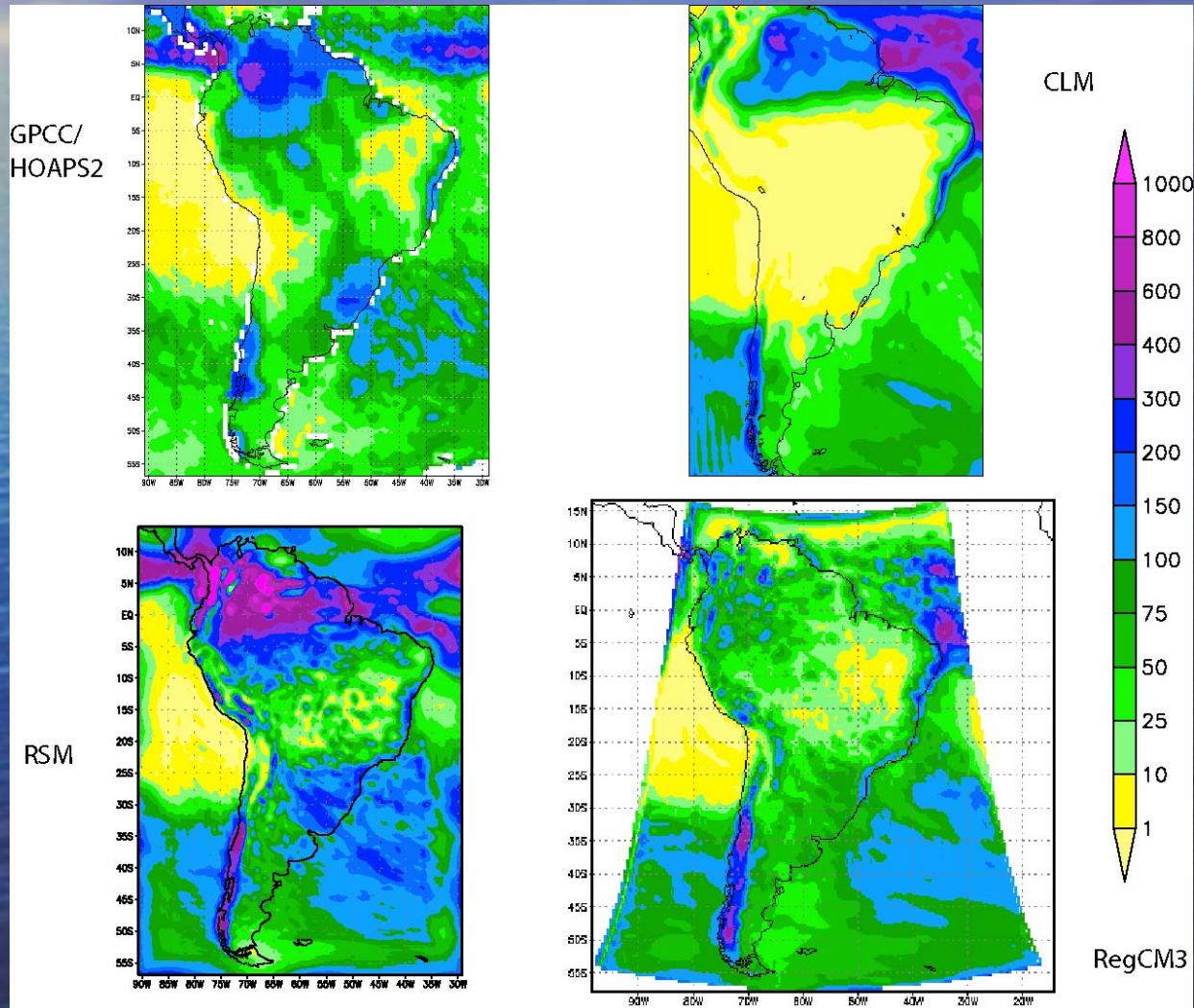
T_SKIN = surface skin temperature

Observation vs. Model data (3) **MDB** (Jul-Sep 2001)

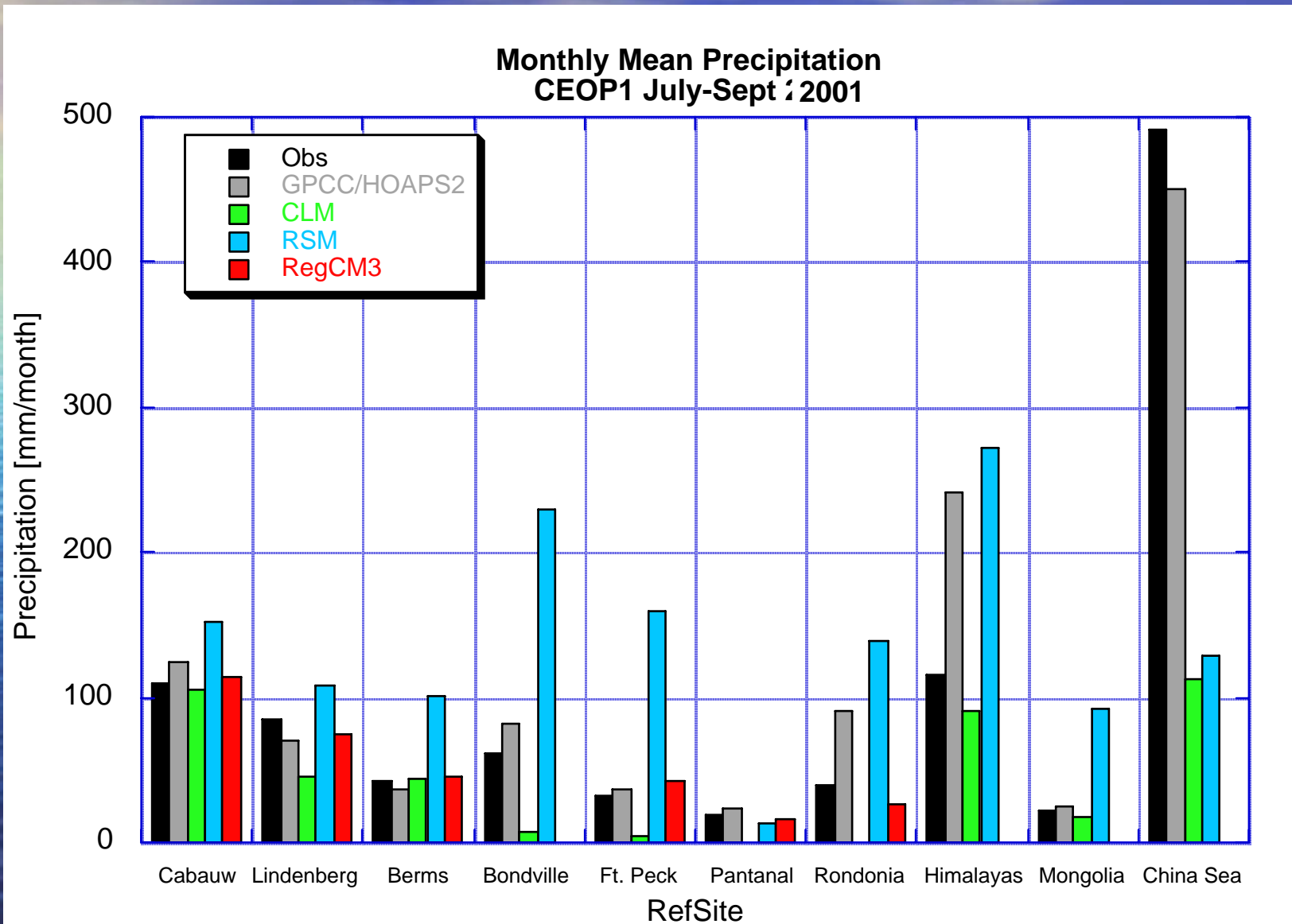


Observation vs. Model data (3)

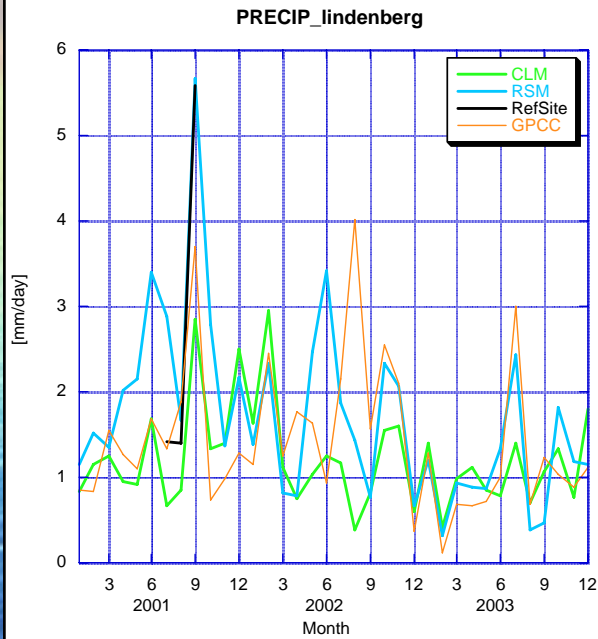
LBA/LPB (Jul-Sep 2001)



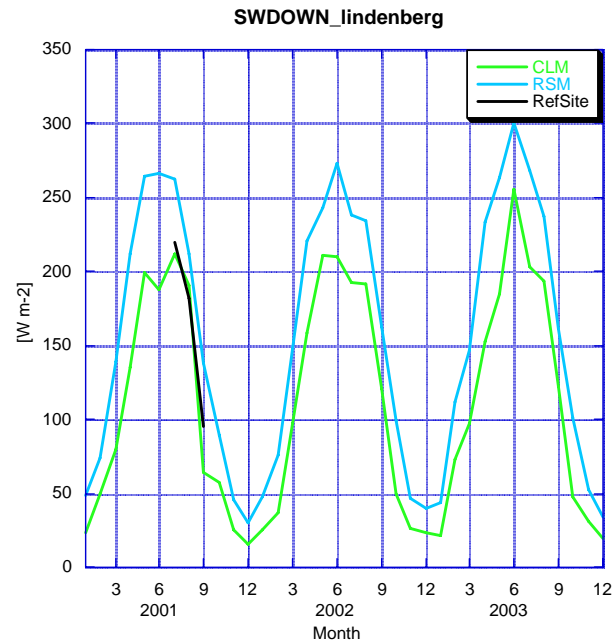
Observations vs. Model (1)



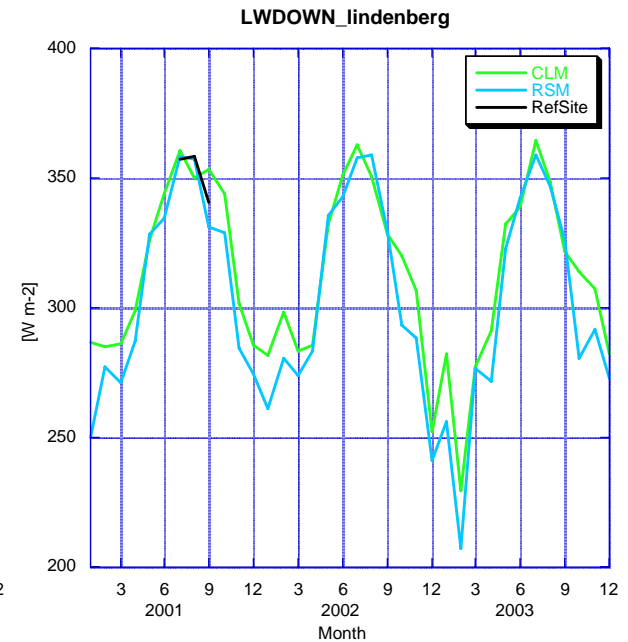
Lindenberg (CEOP1)



Precipitation



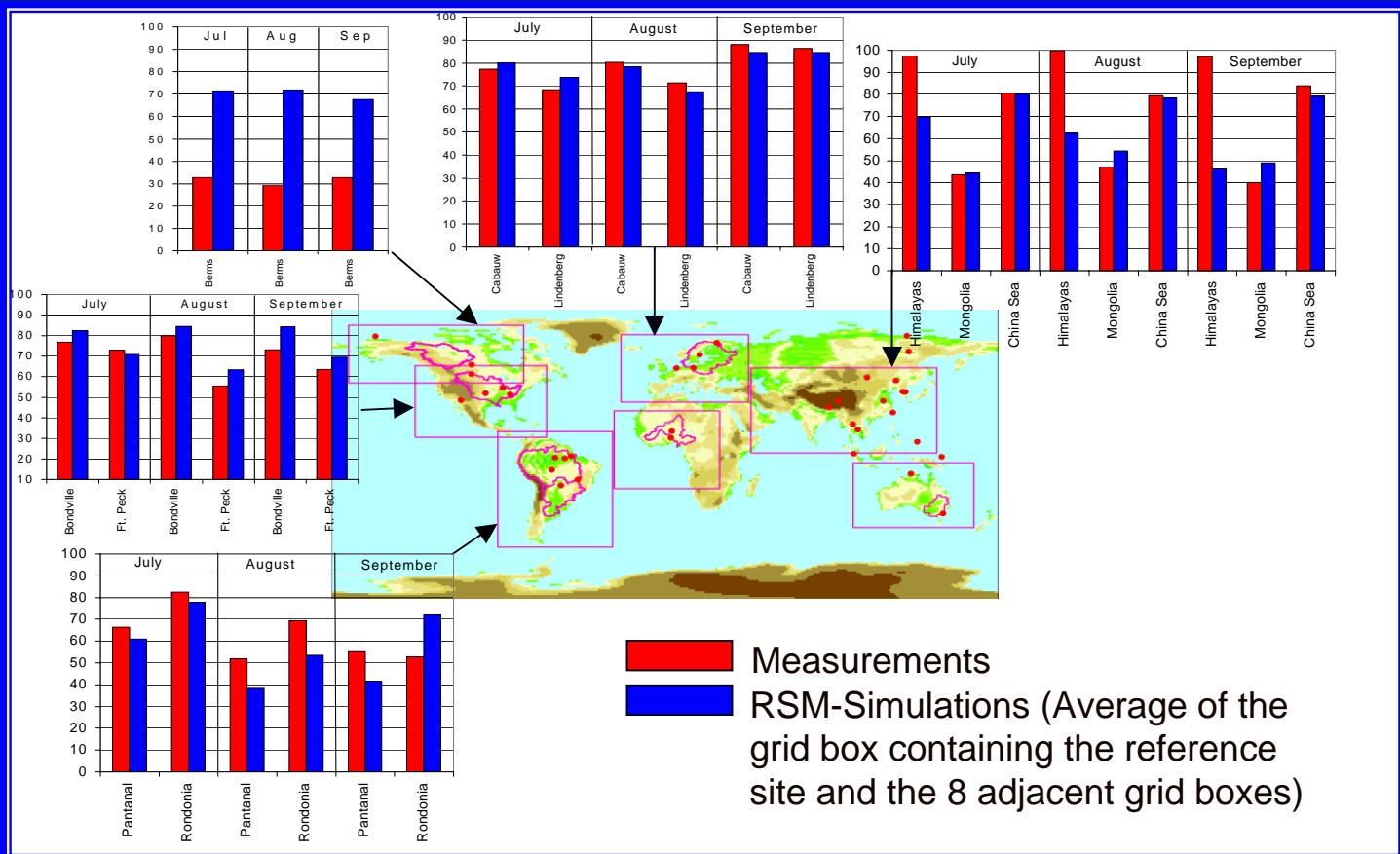
**Solar Downward Radiation
(surface)**



**Longwave Downward Radiation
(surface)**


Relative Humidity during CEOP I (%)


Comparisons of RSM simulations with CEOP reference sites measurements



- RSM – relative humidity shows good agreement with the CEOP reference site measurements, except Berms (MAGS) and Himalayas (GAME).
- RSM - relative humidity is more often underestimated than overestimated.

Outlook

- 
- Finish long term simulations July 1999 - December 2004 with NCEP Global Re-Analysis as boundary data.
 - Compare to CEOP reference site, satellite and other global data and global analysis models for two year period 2003/2004
 - Fix regional model biases?

- 
- Different global reanalyses as driving fields?
 - Again, the participation of additional RCMs, especially those from other CSEs, would be very much appreciated