1. CEOP Reference Sites characteristics

2. CEOP Hydrology Reference Sites

3. CEOP Phase II Reference Sites

Preliminary Conclusions in Irvine, March 2004:

In particular for MOLTS – Site Data comparison purposes:

- Mind heterogeneity of various sensible characteristics (soil type, land use, vegetation type, elevation....)

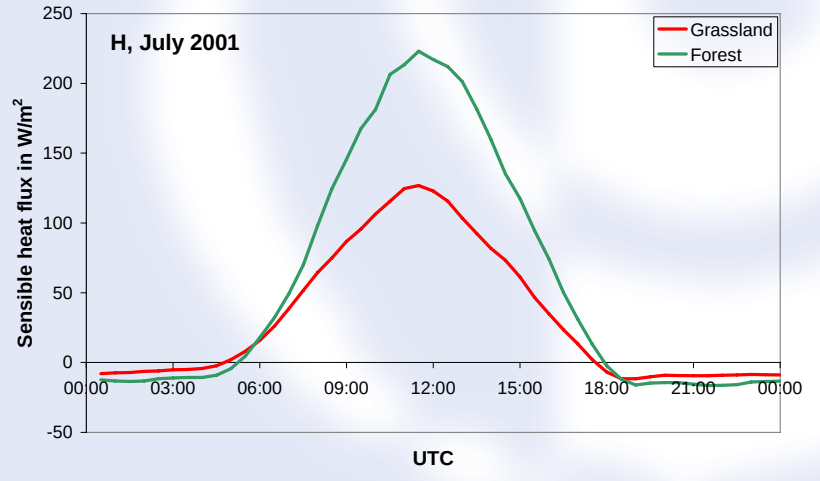
- Verify model vs. site characteristics: **Establish inventory of model gridpoint characteristics at MOLTS locations (Tokyo 2005: ok) and complete reference site metadata inventory (to be finalized)**

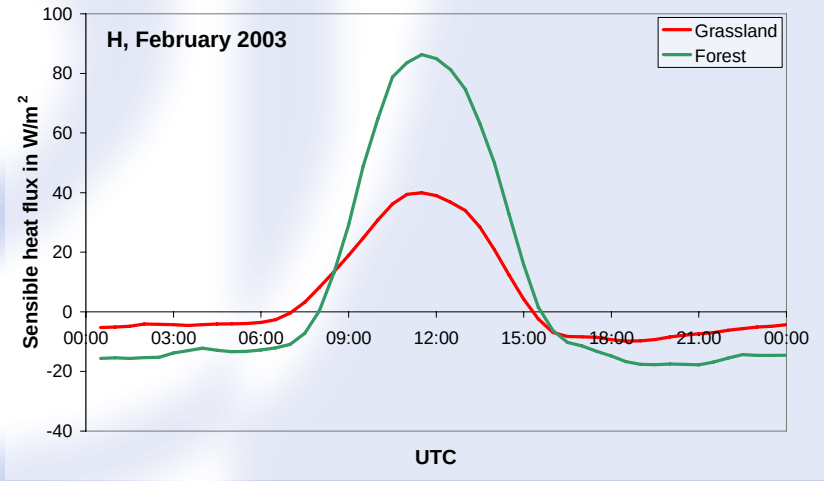
- Specific for Lindenberg:
Which model characteristics at MOLTS site co-ordinates:
Forest or Grassland ? **Include both data sets into CEOP !**

Present CEOP data from Lindenberg represent grassland / agriculture

Differences forest - grassland (IV): Sensible heat flux

... up to 100 %





Two Ad-hoc Examples:

CEOP Reference Site: **North South China Sea/Southern Japan**

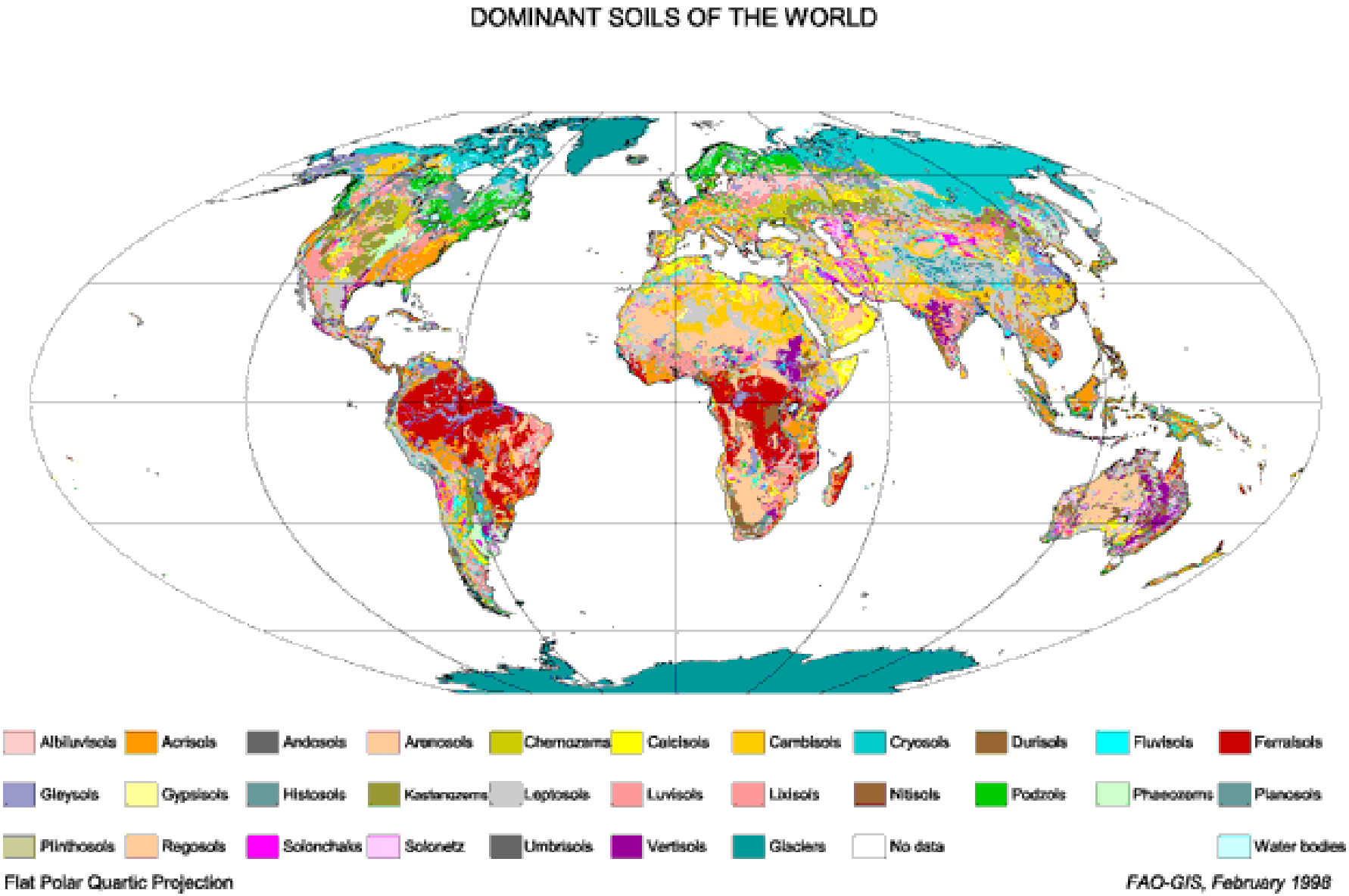
Model	Characteristics
ECPC:	Ocean
ERA40/ECMWF:	41% irrigated forest, 59 % mixed forest/woodlands

CEOP Reference Site: **Lindenberg**

Observations: **Grassland**

JMA model: **Broadleaf trees with ground cover**

http://www.isric.nl



Proposed Sample

Vegetation,

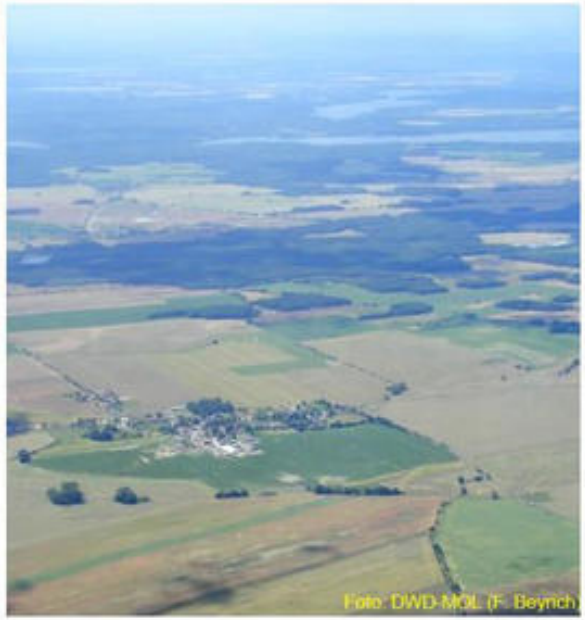
Land Use, and

Soil Types

Descriptions from

Lindenberg Reference Site

VEGETATION AND LAND USE: The land use is dominated by forest and agricultural fields (40 - 45 % each), lakes cover 6- 7 %, villages and traffic about 5 %. Both, the orography and the mixture of surface types are rather typical for large parts of northern Central Europe south of the Baltic Sea. For the agricultural fields, triticale (a hybrid between wheat = triticum and rye = secale) is the dominating vegetation, significant parts of the farmland are also covered by grass, rape and maize.



SOIL TYPES: The soil type distribution is dominated by sandy soils. In the forested parts west of Lindenberg, the sand reaches a depth of several meters. At the GM Falkenberg, sandy soils (pale soil - Eutric Podzoluvisol, brown soil - Cambic Arenosol) cover a layer of loam, which can be typically found at a depth of between 50 cm and 80 cm, locally even below.

Table 1 - Physical parameters of the soil at GM Falkenberg

layer no.	horizon	upper boundary [cm]	lower boundary [cm]	clay / poor clay [M%]	sand [M%]	dry density [g/cm³]	pore volume [%]	field capacity [V%]	wilting point [V%]	hydraulic conductivity [cm/d]	soil heat capacity [*10⁶ J/(K*m³)]
1	Ap	0	30	26	74	1.6	37	16	4	110	1.32
2	Al	30	60	26	74	1.7	36	18	3	80	
3	Bt	60	120	40	60	1.7	34	24	11	20	

REFERENCE SITE CHARACTERISTICS

Steps (to be done as soon as possible):

1. Use Lindenberg site description as a prototype and add ISRIC soils information in cooperation with the Lindenberg site manager.
2. Circulate this prototype to the CEOP modelling centers for comment(s).
3. Distribute this example to the Reference Sites to request the needed information.

CEOP HYDROLOGY REFERENCE SITES

Steps (to be done as soon as possible):

<u>From 8 candidate sites, start with easiest 4 sites:</u>

Nagu River (China) – This is already a CEOP Reference Site and all that is needed is to add the streamflow and any ancillary precipitation data in the basin.

Walnut Gulch (US) – Data already exists in SALSA project database. Request for data to be made.

Zwalm River (Belgium) – Request for the data to be made.

SGP (US) – This data is already a CEOP Reference Site and the data already exists at JOSS (including streamflow). Data only needs to be re-organized.

CEOP PHASE II REFERENCE SITES

Steps (to be done as soon as possible):

1. Each CSE to survey sites to determine which sites have the potential to be operating during Phase II.
2. From subset list of available sites, a scientific evaluation is needed to determine which are needed as a minimum to fulfill CEOP II objectives (as well as the necessary parameters)
3. Request to CEOP SSC to draft letter (for WCRP) encouraging continuation of measurements from 2005 through 2010. This letter to be sent from WCRP to each site.
4. Add new sites (or parameters) as needed (e.g. LaPlata or “ocean“ sites)