CEOP Model Output Inter-comparison

Preliminary study – EOP1 data

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Outline

- Preliminary study method
- General findings – tentative
- Specific issues

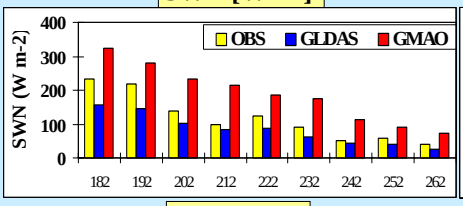
Preliminary study – EOP1

- 21 CEOP reference sites were investigated: comparison of ***in-situ*** data and MOLTS by **NASA-GMAO** and **NASA-GLDAS** models
- 10-days **averages** and 10-days **mean diurnal variations**
- Investigation focused on **surface variables:**
  - Radiation, heat fluxes, water vapor, rainfall, air temperature
  - Soil moisture

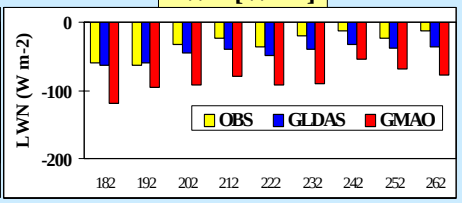
General findings - tentative: 10-days averages

- **SWN** and **LWN radiation** – more or less overestimated
- **Net radiation** – good estimation, except for Alaska site

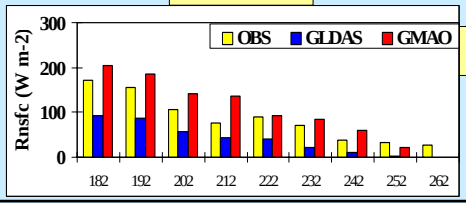
SWN [Wm^{-2}]



LWN [Wm^{-2}]



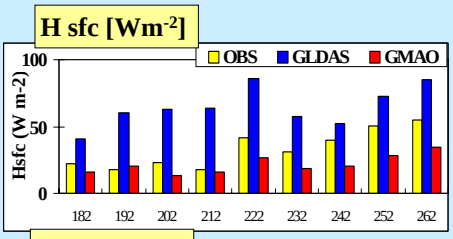
RN [Wm^{-2}]

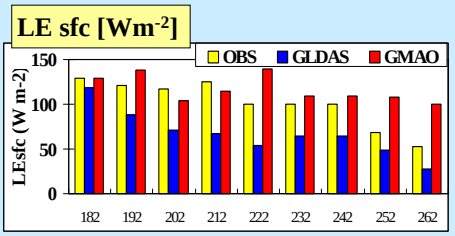


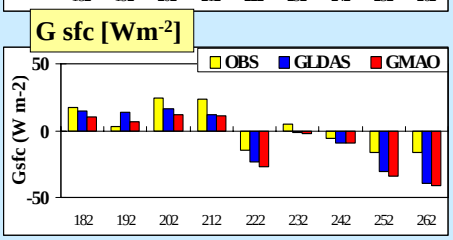
ARM - Alaska – Barrow

General findings - tentative: 10-days averages

- **Heat fluxes:** underestimated **H** & overestimated **LE** and vice versa, while **G** is reasonable → incorrect partition between **H** and **LE**



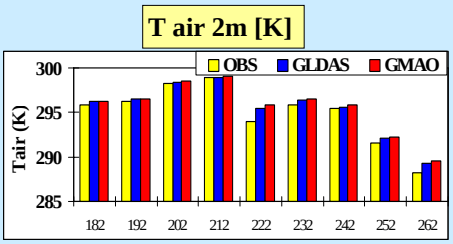




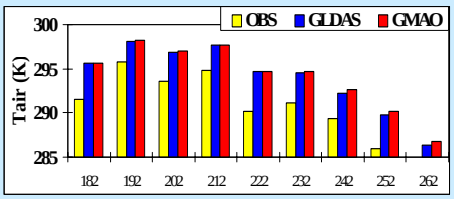
GAPP – Bondville

General findings - tentative: 10-days averages

- **Air temperature** is estimated very well except for Mongolia and Alaska



GAPP – Bondville

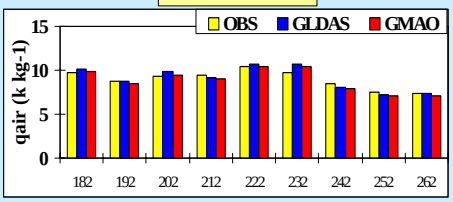


CAMP - Mongolia

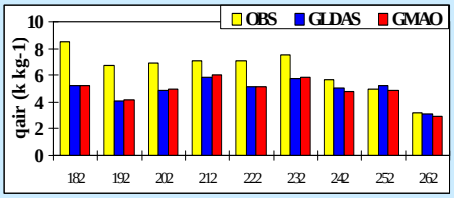
General findings - tentative: 10-days averages

- **Water vapor** – very good prediction except for CAMP Mongolia site

q air 2m [K]



BALTEX Lindenberg

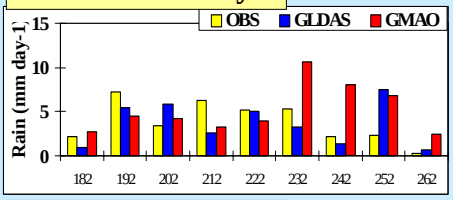


CAMP - Mongolia

General findings - tentative: 10-days averages

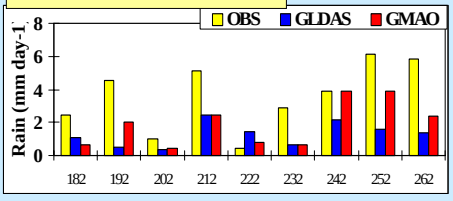
- **Precipitation** is predicted relatively well at MAGS sites, Alaska, TWP and Himalayas; underestimated at BALTEX sites; and overestimated at LBA sites

CAMP - Himalayas

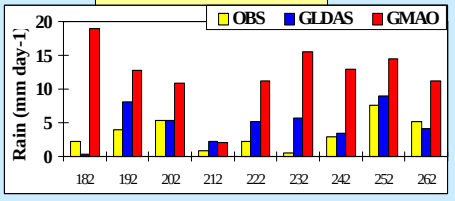


Precipitation [mm day^{-1}]

BALTEX Cabauw



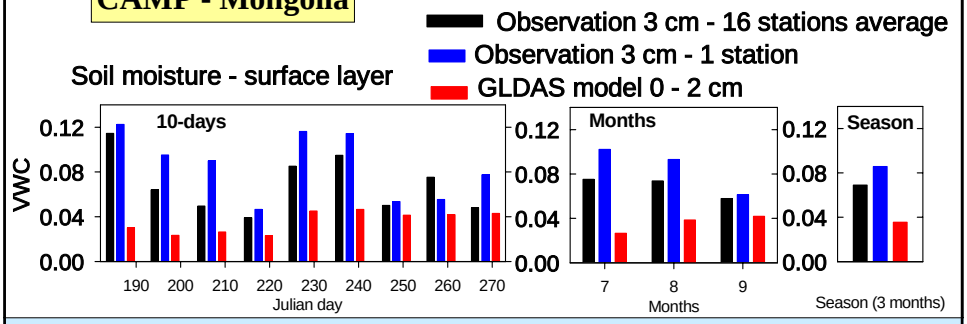
LBA – Manaus



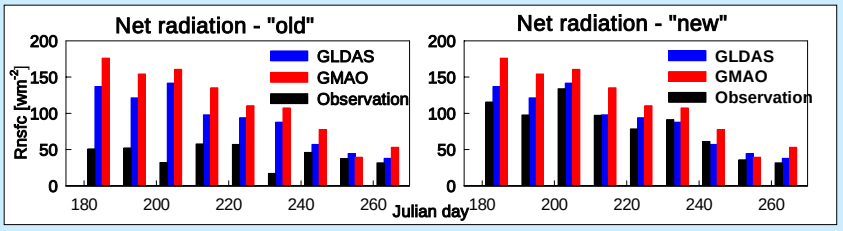
General findings - tentative: 10-days averages

- **Soil moisture** – usually underestimated by GLDAS model (no data from GMAO)

CAMP - Mongolia



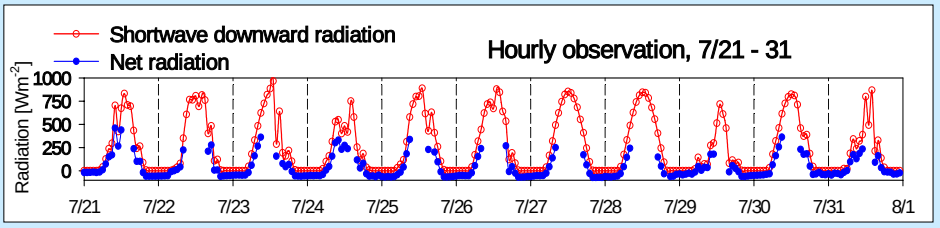
BALTEX - Lindenberg

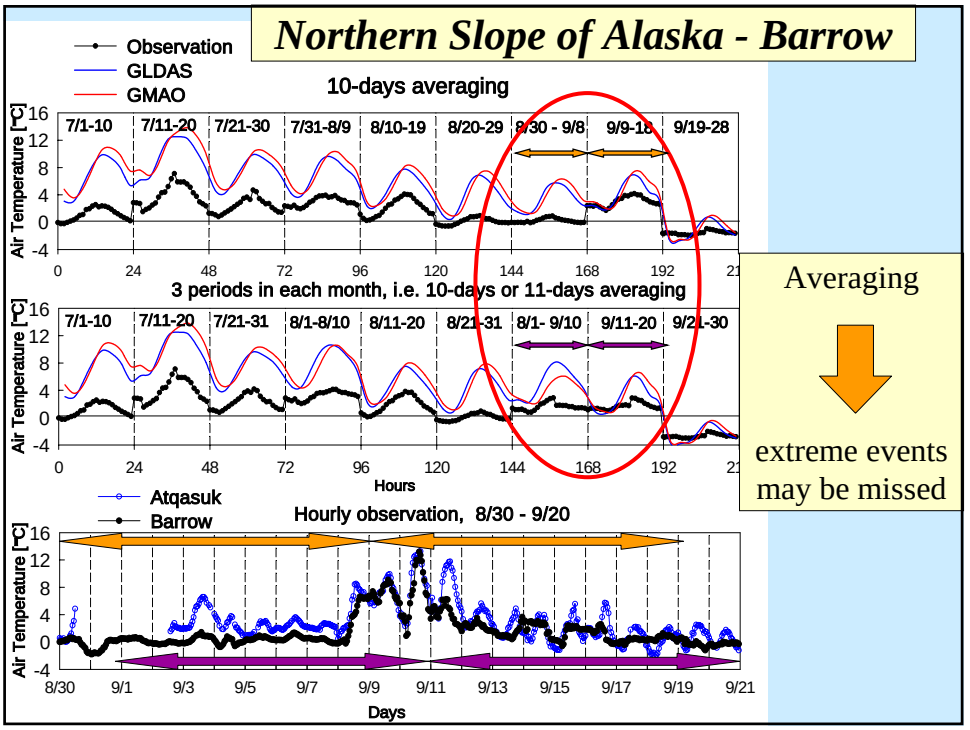


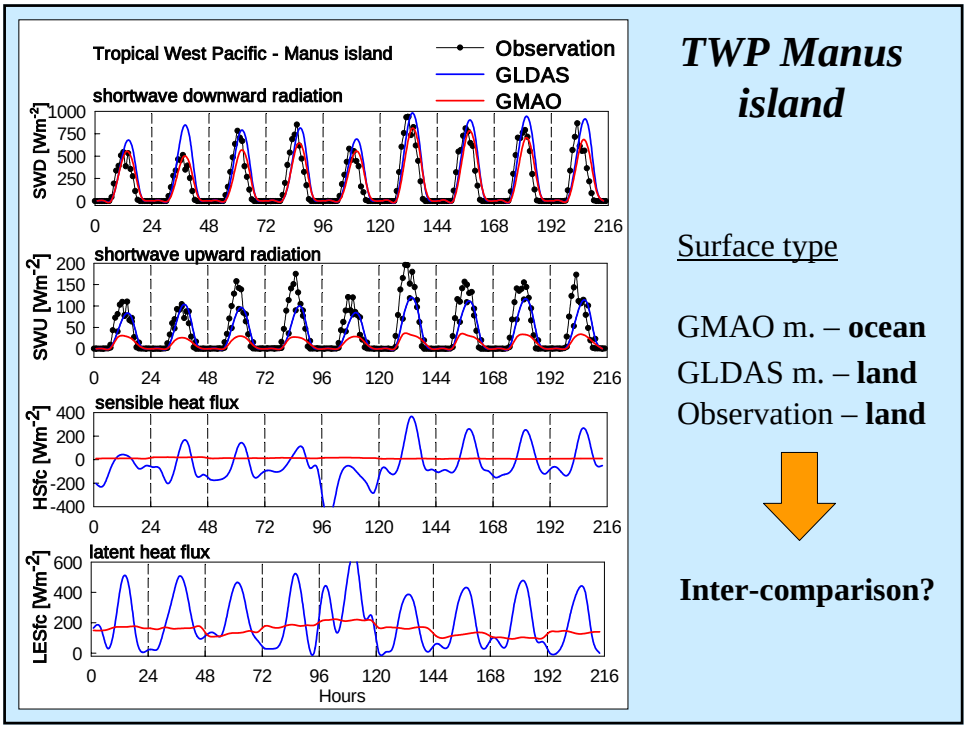
LWU observation is missing during stronger sunshine

→ High values of **net radiation** are missing

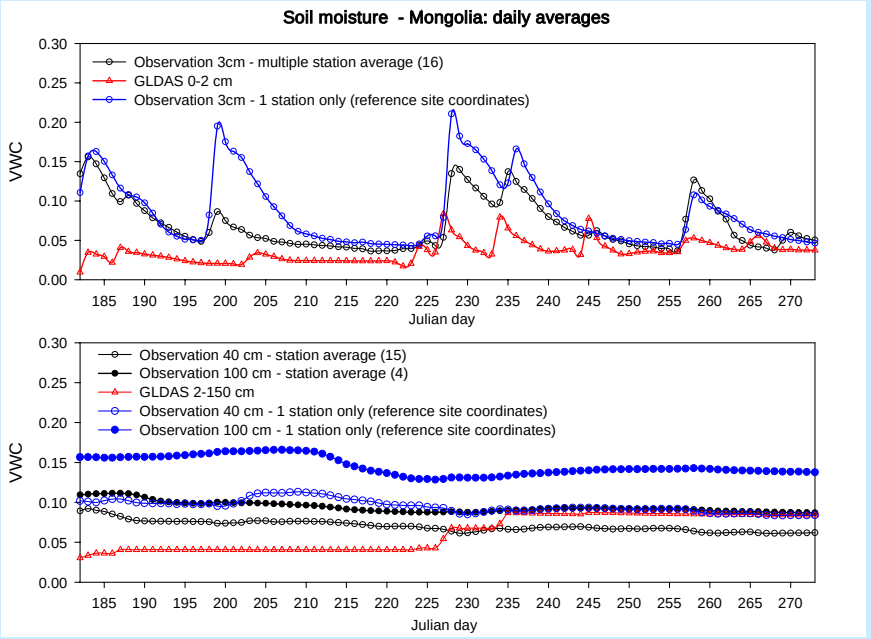
→ **Underestimated mean values** of **Rnet** by normal processing



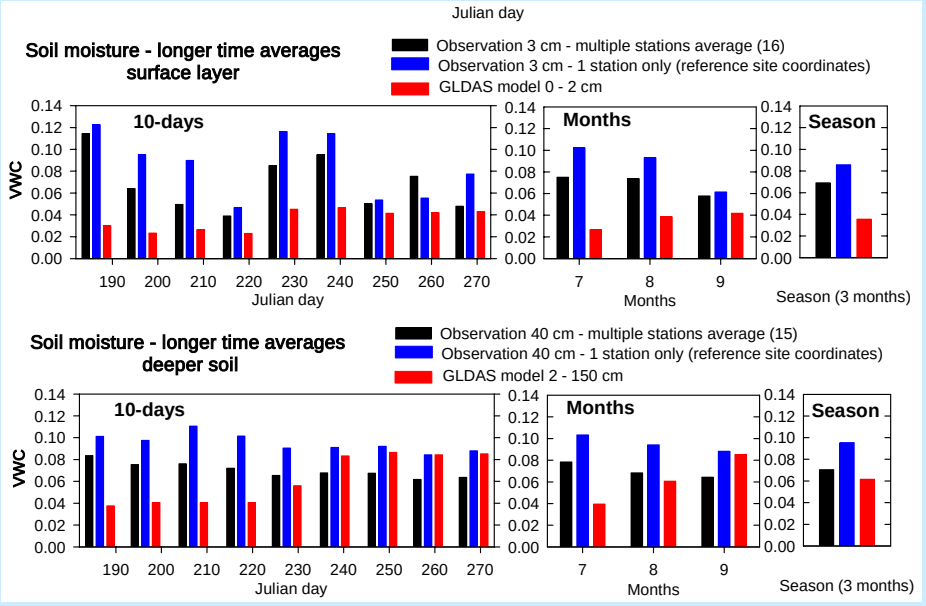

Northern Slope of Alaska - Barrow
Observation
GLDAS
GMAO
10-days averaging
7/1-10
7/11-20
7/21-30
7/31-8/9
8/10-19
8/20-29
8/30 - 9/8
9/9-18
9/19-28
Air Temperature [°C]
3 periods in each month, i.e. 10-days or 11-days averaging
7/1-10
7/11-20
7/21-31
8/1-8/10
8/11-20
8/21-31
8/1- 9/10
9/11-20
9/21-30
Hours
Atqasuk
Barrow
Hourly observation, 8/30 - 9/20
8/30
9/1
9/3
9/5
9/7
9/9
9/11
9/13
9/15
9/17
9/19
9/21
Days
Averaging
extreme events may be missed


Tropical West Pacific - Manus island
Observation
GLDAS
GMAO
shortwave downward radiation
SWD [Wm-2]
shortwave upward radiation
SWU [Wm-2]
sensible heat flux
HSfc [Wm-2]
latent heat flux
LESfc [Wm-2]
Hours
TWP Manus island
Surface type
GMAO m. – ocean
GLDAS m. – land
Observation – land
Inter-comparison?

Mongolia soil moisture



Mongolia soil moisture



General findings – tentative:
10-days mean diurnal variations

- Observed diurnal variations of **air temperature** are bigger than predicted ones at some sites

GAPP – Fort Peck