



Current Status and Activities at the Meteorological Observatory Lindenberg: A Reference Site Contribution from DWD to BALTEX and CEOP

Frank Beyrich

Meteorologisches Observatorium Lindenberg (Richard-Assmann-Observatorium)

Deutscher Wetterdienst (DWD), 15848 Tauche - OT Lindenberg (Germany)

frank.beyrich@dwd.de

The Meteorological Observatory Lindenberg (Richard-Assmann-Observatory) of DWD

The Landscape

- covered by the forest glaciers during the last ice age
- slightly undulating terrain
- at up to 100 m over or of about 10 km
- mixture of forest, farmland, lakes, and villages



The Measurement Programme

- synoptic weather station Q4 for eye observations
- hour full PTU radiosoundings per day (at 00, 06, 12, 18 UTC; MOL site)
- a special boundary layer field site with micrometeorological and lower measurements up to 100 m (204 Falkenberg)
- energy balance station at a forest site (red circle)
- regional precipitation and radiation network (blue circles, red rings)
- active / passive ground-based remote sensing systems: wind profiler radar / RASS, microwave radiometer profiler, cloud radar, ceilometer, water vapour Raman lidar, FTIR spectrometer, sun photometer (MOL site)
- BSRN station including measurements of broadband and spectral radiation, aerosol-optical depth, UV radiation, total ozone content (MOL site)
- scintillometers (red line) (sites see below)

The Climate

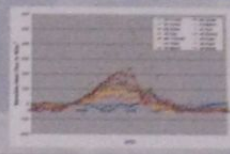
- moderate mid-latitude climate conditions
- transition from marine to continental influence



Contributions from Field Experiments to Atmospheric and Climate Research

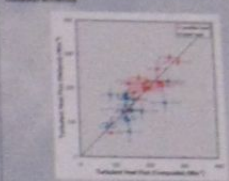
The LITFAAS-2000 Experiment

(Lindenberg Inhomogeneous Terrain - Fluxes between the Atmosphere and the Surface: a long-term Study). Measure variability of surface fluxes and the approximation of different flux averaging strategies - significant differences between the energy fluxes over different surfaces



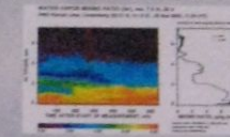
The LITFAAS-2005 Experiment

Aggregated surface fluxes from eddy-covariance measurements (flux composite) in mesoscale agreement with surface fluxes derived from all-sky measurements



The LAUNCH-2005 Experiment

(Lindenberg campaign for Assessment of Humidity and Cloud Profiling systems and its Impact on High-resolution modelling). Operational capabilities of integrated profiling techniques for the vertical sounding of wind, temperature, humidity and cloud parameters and their impact on numerical modelling results using advanced data assimilation techniques.



The LUAMI-2006 Campaign

(Lindenberg Upper Air Methods Intercomparison). upper air sensors and measurement techniques • in-situ and remote sensing methods • organised in agreement with WMO/COMOPAQ Upper Air • scheduled for the period Feb 25 to Mar 17, 2006 • Participation invited: Deadline Jun 29, 2007 • to assess modern active and passive ground-based remote sensing techniques in view of their operational network and high-performance reference capabilities • to improve the quality of world-wide standard radiosoundings with respect to water vapour and temperature measurements, in particular in the upper troposphere / lower stratosphere • to provide a reference data set of vertical profiles representing atmospheric conditions over Central Europe in late winter

Contributions from MOL-RAO to CEOP Phase I

The Activities

- participation in the preparation of the CEOP Reference Sites Data Release Guidelines
- participation in the preparation of the CEOP Reference Sites Data Set Procedures Report
- coordination organisation during the 2nd CEOP implementation and planning meeting
- timely delivery of data from Falkenberg and Forest stations over EOP-3 and EOP-4
- Lindenberg Reference Site Metadata information as a prototype for CEOP sites
- participation in the preparation of the CEOP Reference Sites Vegetation and Soil Questionnaire
- additional delivery of 2006 data to CEOP CDA (data for 2006 in preparation)

Data Availability

Improvements in sensor setup, maintenance and quality control resulted in reduction of „missing values“ in the CEOP data sets from 2003 through 2006.



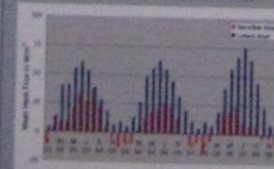
Site Differences

- Significant differences in the mean energy fluxes between the Falkenberg and Forest stations
- Considerably higher sensible heat fluxes (up to a factor of two) at the forest site



Interannual Variability

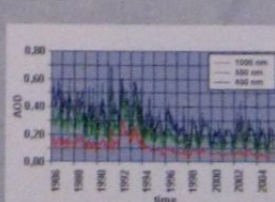
→ Considerable interannual variability in the mean sensible and latent heat fluxes over the period 2003 - 2006 (mean precipitation sum: May to September was 167 mm, 256 mm, and 201 mm, respectively)



Possible Extensions to CEOP Phase II

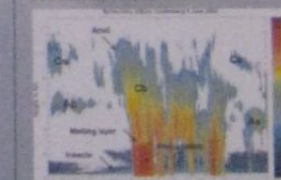
Aerosol

→ Measurements of spectral aerosol optical depth since 1986



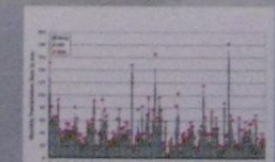
Cloud Parameters

→ Hourly cloud observations from the synoptic weather station, cloud heights from ceilometers and cloud integral and microphysical parameters from cloud radar measurements



Hydrology - Regional Distribution of Precipitation

→ Network of 12 precipitation sensors in the 20x20 km² area around MOL-RAO (additional precipitation information from a micro-rain radar and from weather radar observations)



Hydrology - Ground Water and Run-off

Measurements are performed regularly by the Federal Environmental Agency of the State of Brandenburg. Access to these data is currently being negotiated.

