

**Validation
of near-surface boundary layer processes
from
operational weather prediction runs**

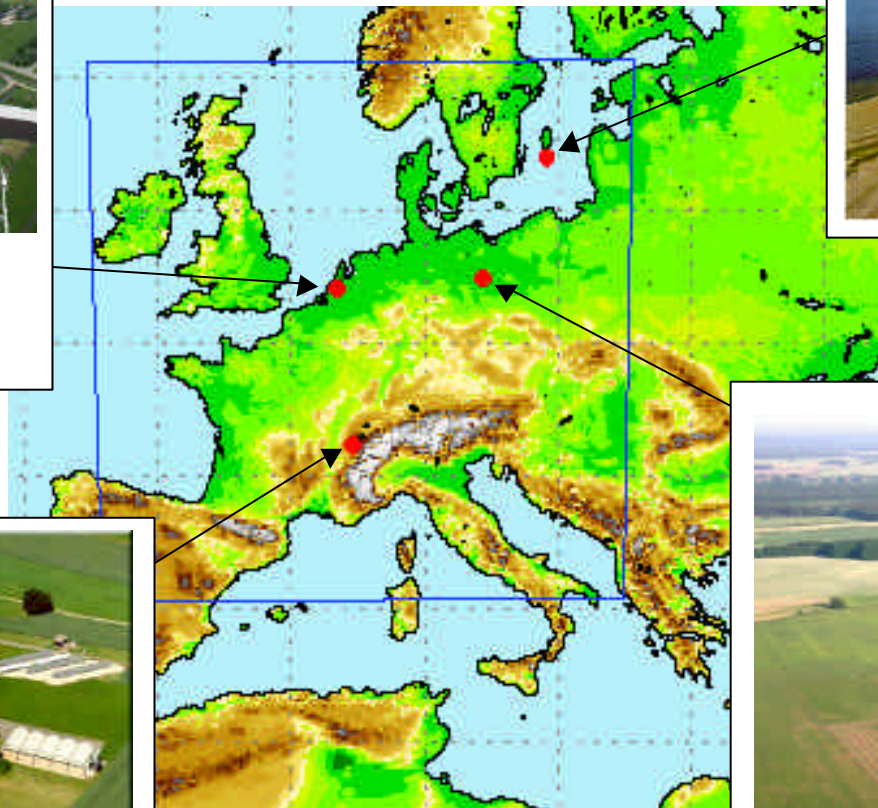
**Gerd Vogel, Ursula Schubert, Eva Sulz
DWD, FE14 Potsdam**

**COSMO meeting
Italy, September 2004**

Cabauw(KNMI)



Validation points within the model area of the Lokal-Modell (DWD)



Östergarnsholm (Univ. Uppsala)



Payerne (Meteoswiss)

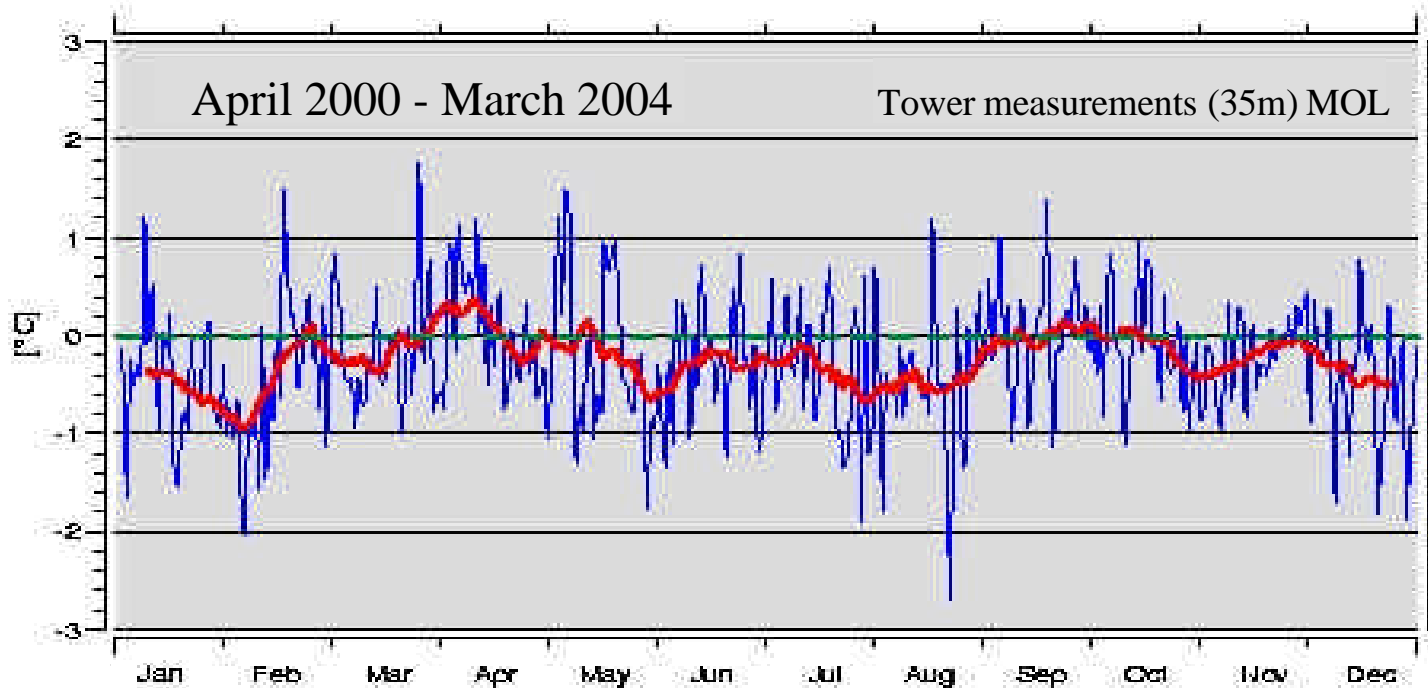


Lindenberg (DWD)



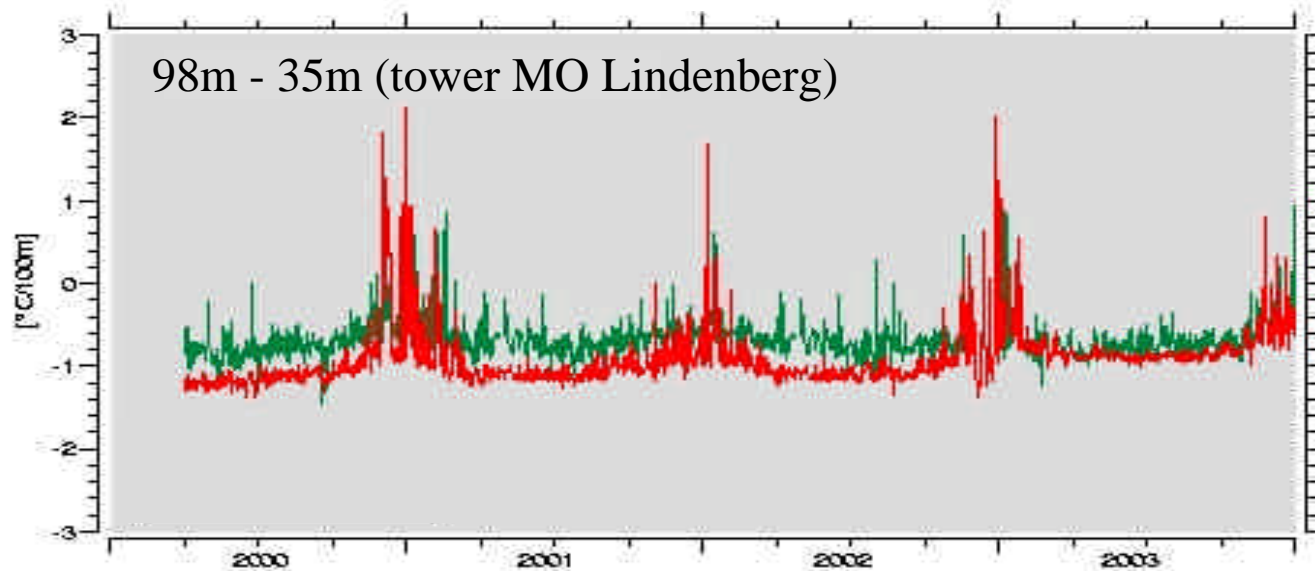
Mean bias values: -0.25°C (year) -0.38°C (April-September)

Daily temperature bias (model - measurement, 10 - 15 UTC)



Vertical temperature gradient (10-15 UTC)
based on tower measurements at Lindenberg

— LM
— measurement



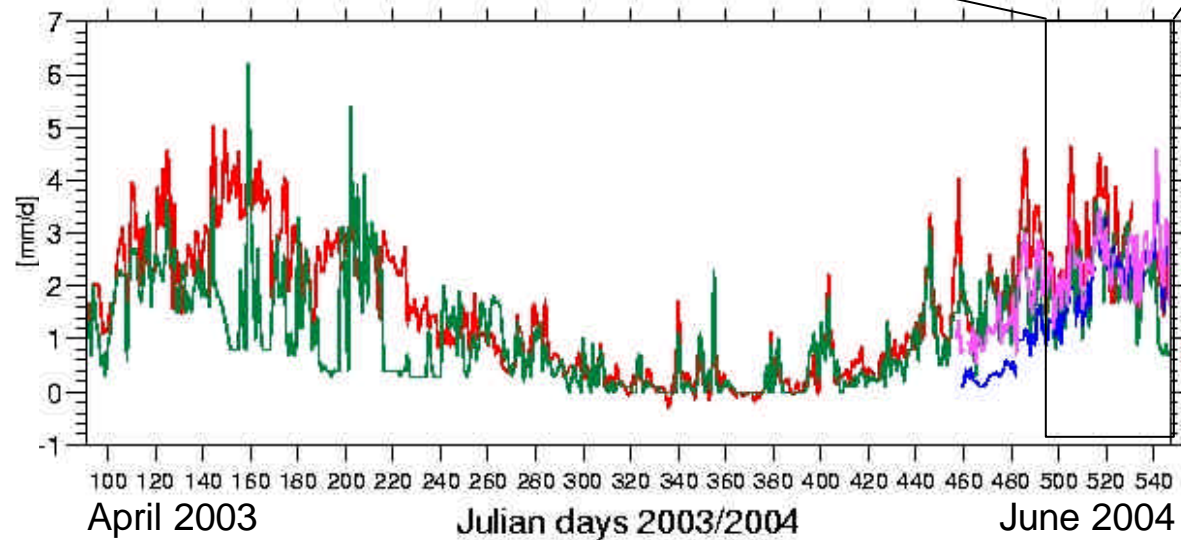
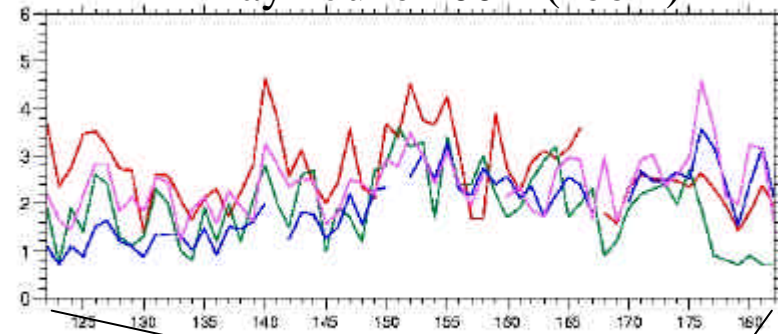
The AMBAV data were kindly provided by staff members (F.-J. Löpmeier, H. Braden, T. Vogt and M. Klein) of the agrometeorological research division of DWD in Braunschweig

*water input
into the
atmosphere*



**Evapo-
transpiration
(grass)**

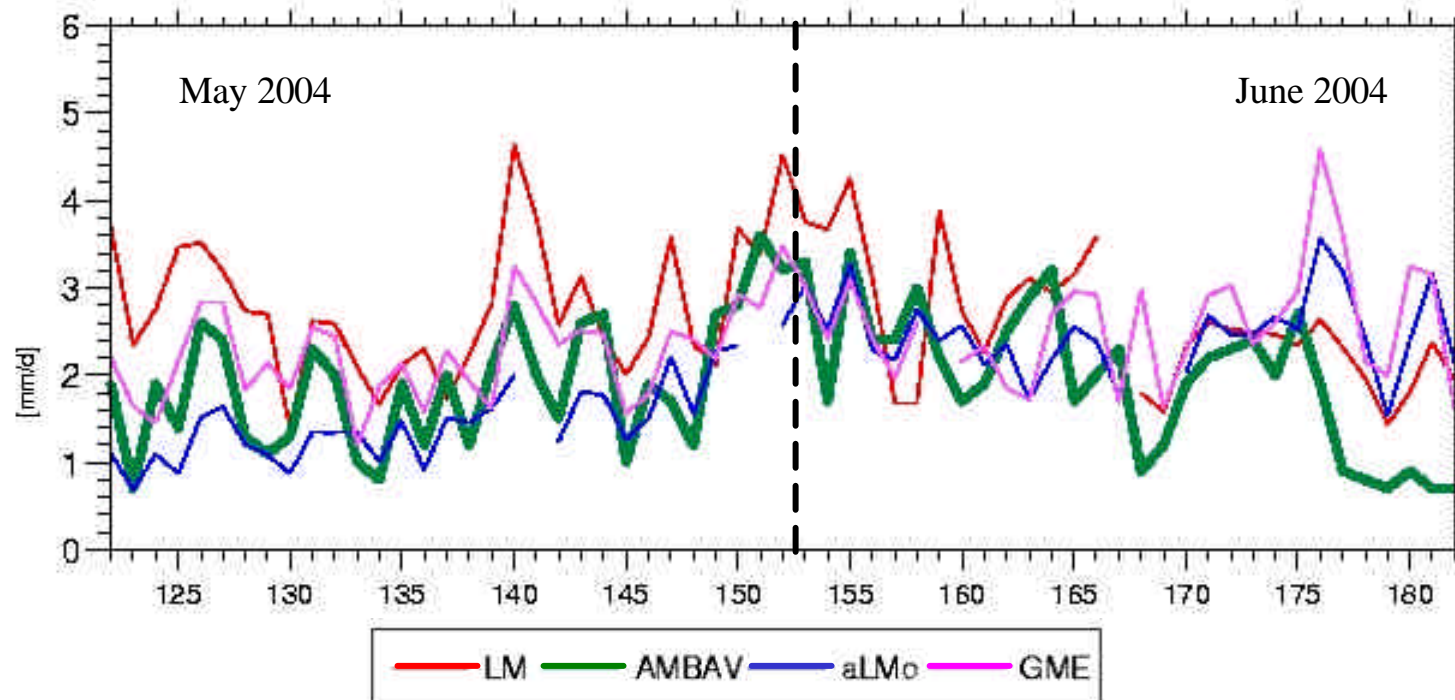
May - June 2004 (zoom)



— LM — AMBAV — aLMo — GME

Evapotranspiration
May - June 2004
(Lindenberg site)

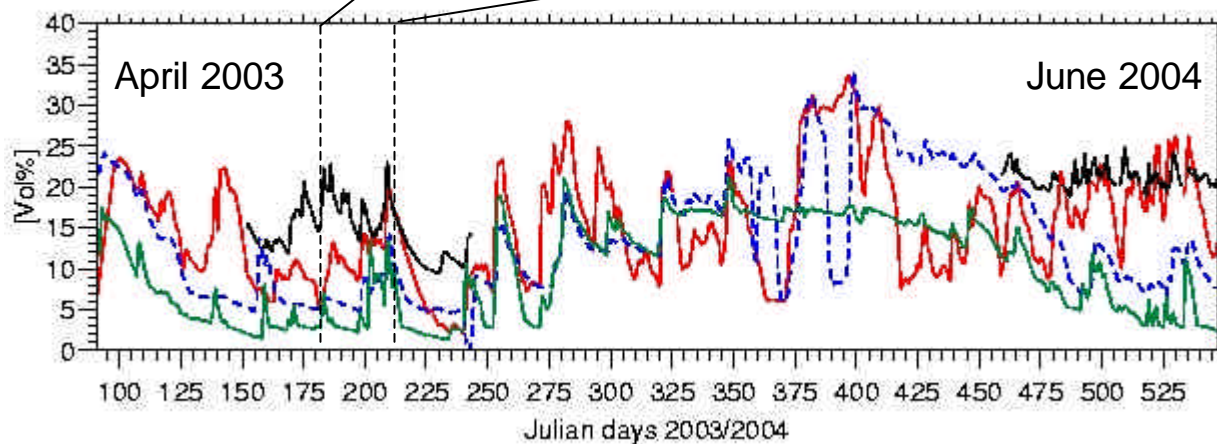
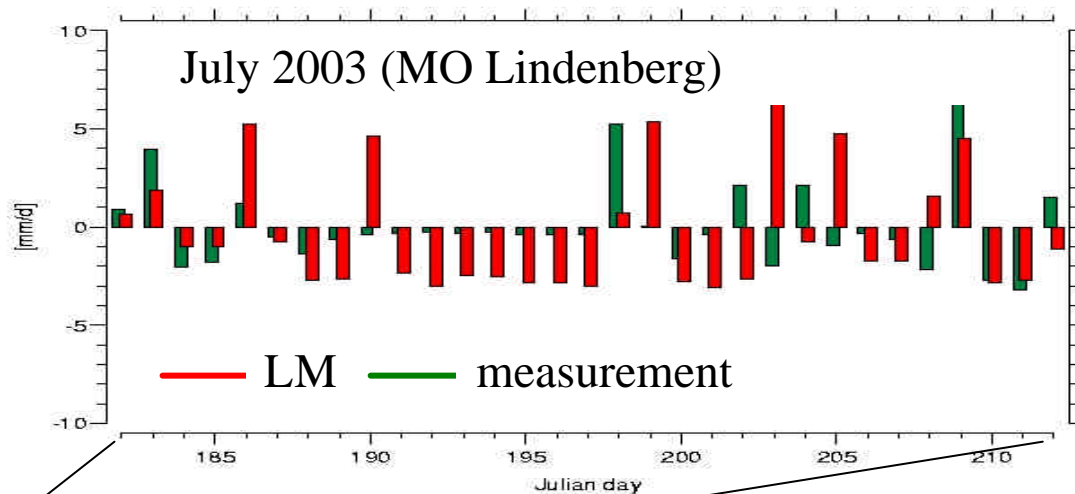
[mm/month]	May	June
AMBAV	53.20	51.40
LM	79.39	68.05
GME	63.95	68.65
aLMo	42.64	65.19



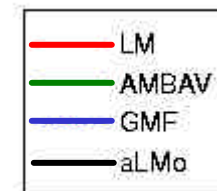
Boundary layer processes

effects of precipitation and evapotranspiration on soil moisture

precipitation - evapotranspiration

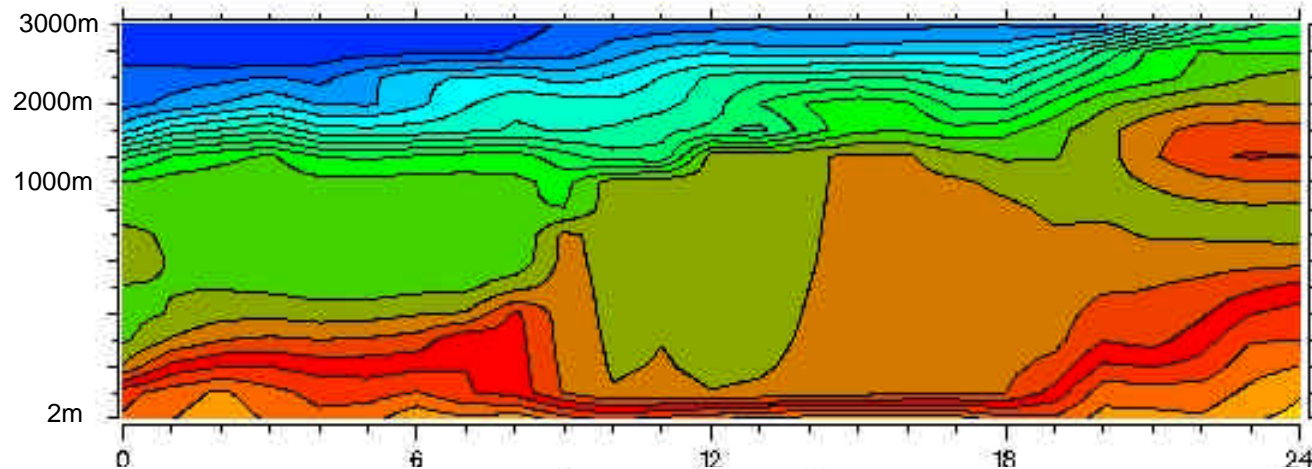


Soil moisture (0-10 cm)

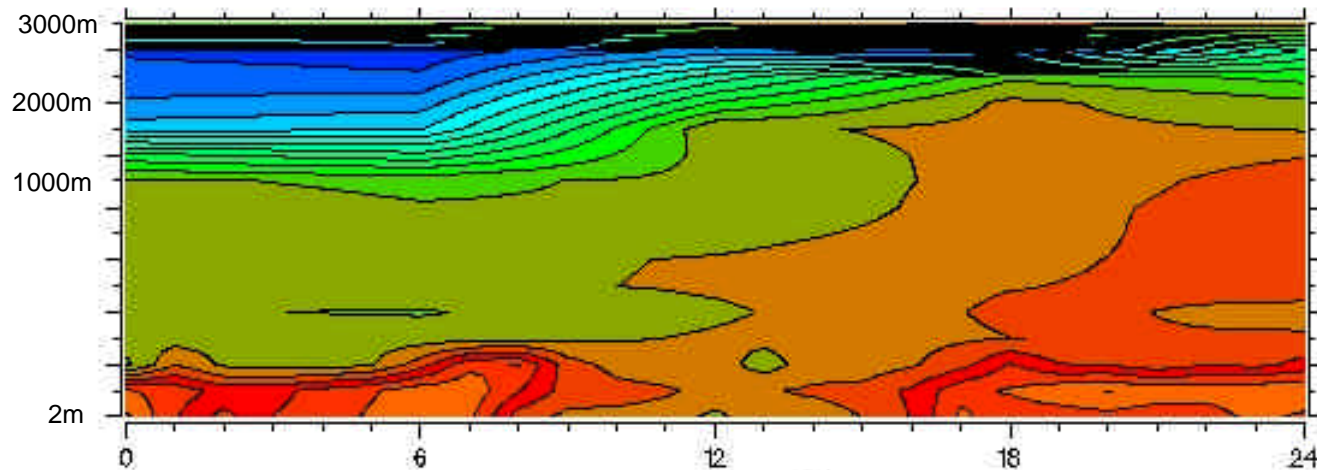




Operational LM run 07 June 2003, 00 UTC

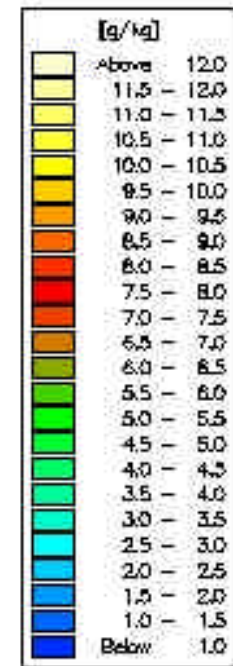


Composite profiles



hours [UTC]

Specific
humidity



Conclusions

- By now, a versatile data pool is available, established from measurements of the Lindenberg Observatory and operational model predictions. This has opened a new way for a great variety of boundary layer validations. The planned inclusion of further measurement sites will enable us considerably to extend these studies.
- In view of a more systematic validation it would be of great interest to produce hourly near-surface profiles of temperature, wind and humidity on the basis of monthly means. Furthermore, we want to focus our validation activities also to soil moisture processes as a key factor in near-surface boundary layer modelling.
- In order to find out specific shortcomings in boundary layer processes some sensitivity studies should be made with LMK, in which a wider range of model errors is excluded. Thus, in model integrations soil moisture, precipitation and radiation balance values should be replaced at selected points by corresponding measurement data (oversimplified LLM philosophy).