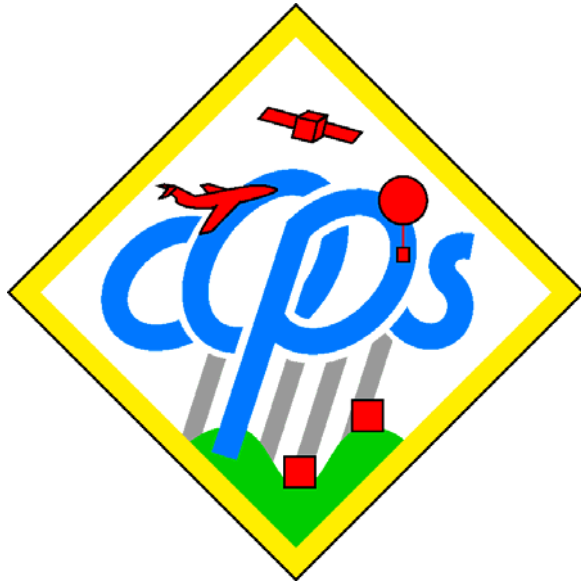


Evaluation of summertime convection forecasts against IASI observations



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*Laboratoire d'Aérodynamique, University of
Toulouse and CNRS, France*

Convective and Orographically-induced Precipitation Study

June-July-August 2007

Extension of radar coverage

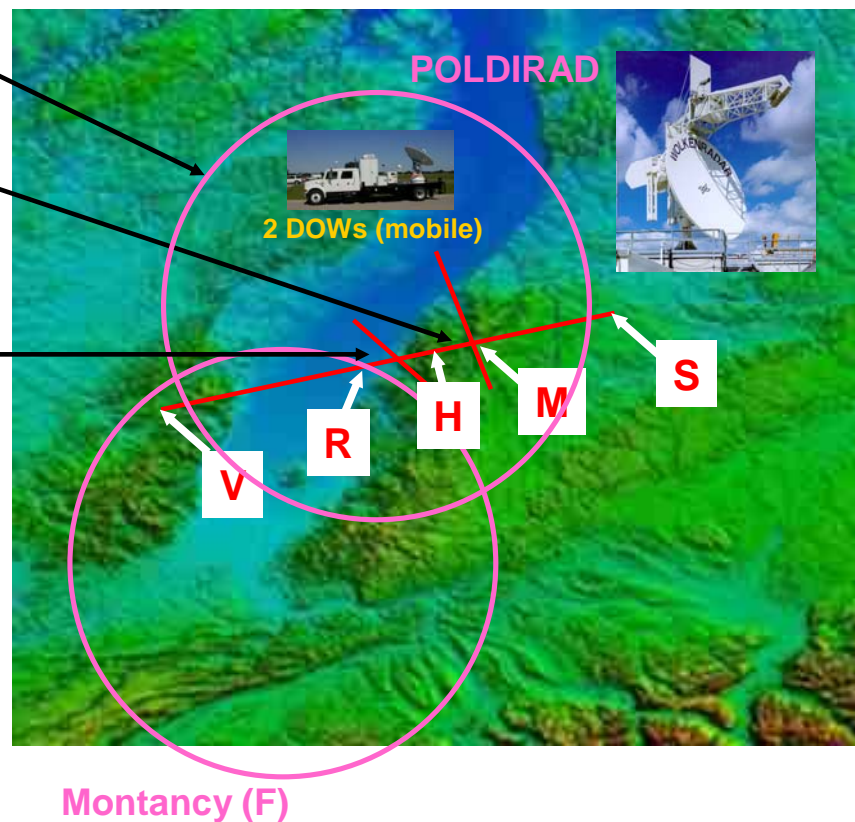
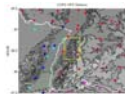
Transect with supersites,
observations along valleys

Densification of networks

Mobile teams

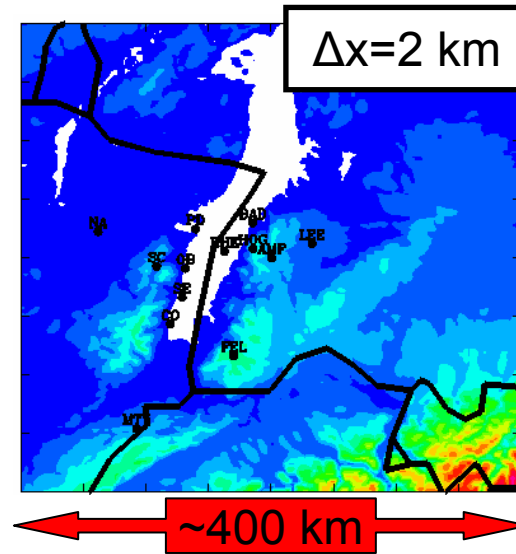
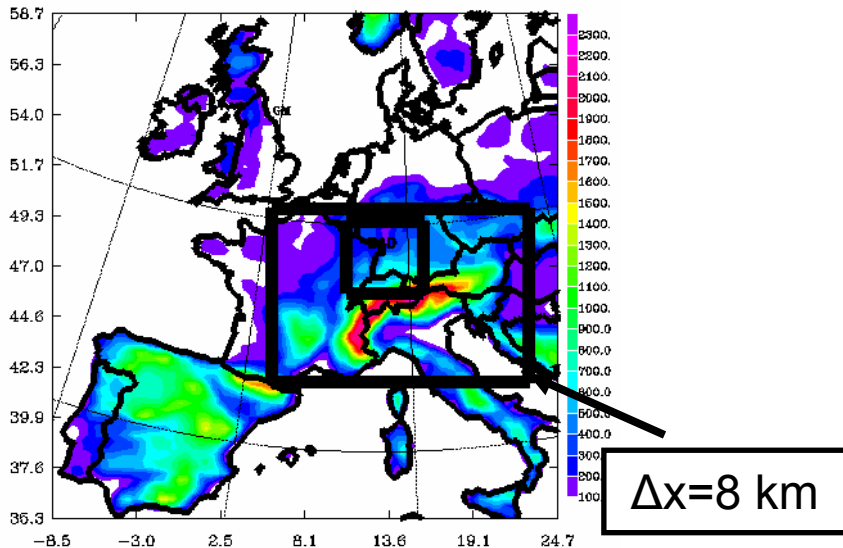
Regional observations between
supersites performed by
various airborne platforms

Large-scale and mesoscale
observations provided by
dedicated aircrafts

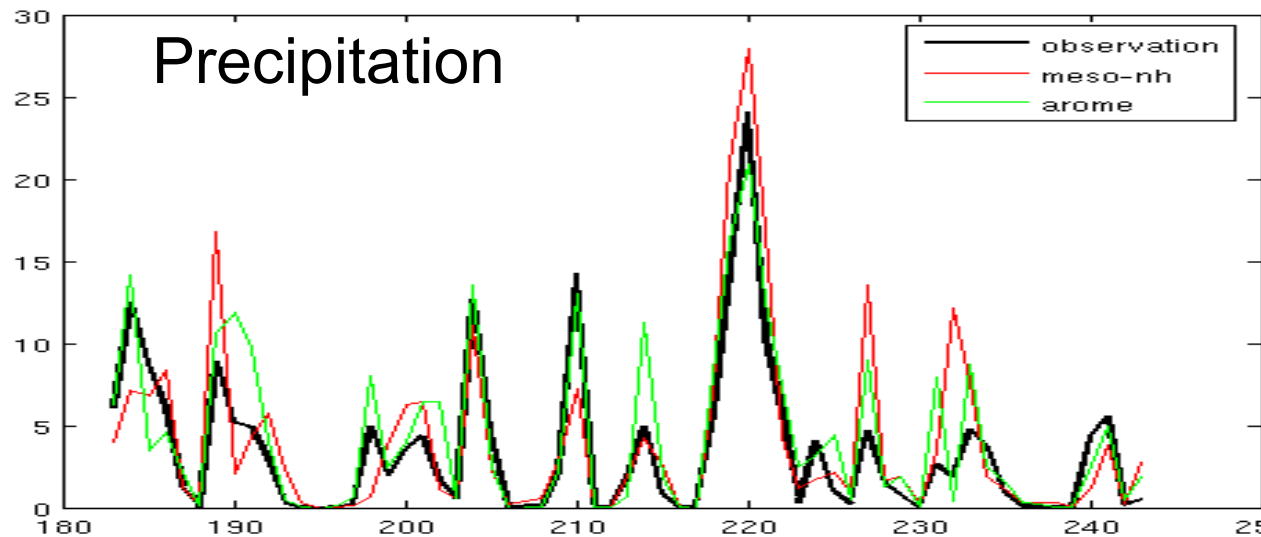


MESO-NH forecasts for COPS

30-h daily forecasts since 1st July 2007

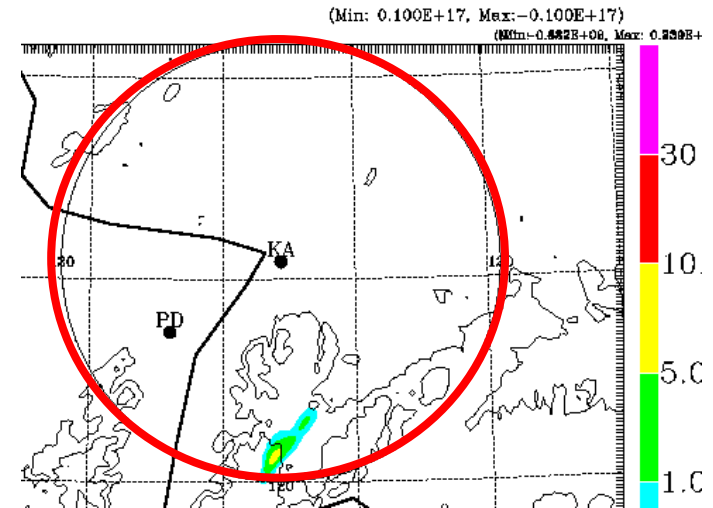
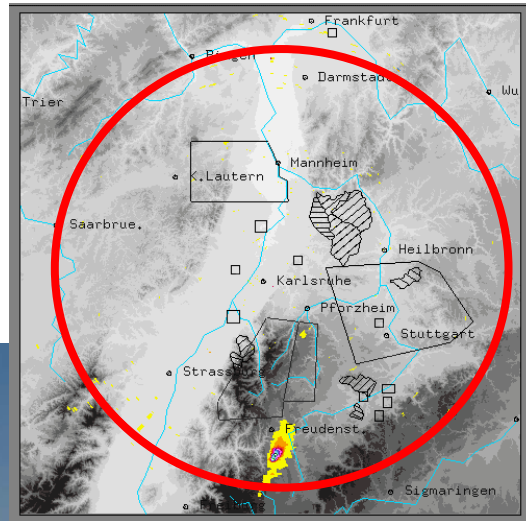


$\Delta x = 32$ km

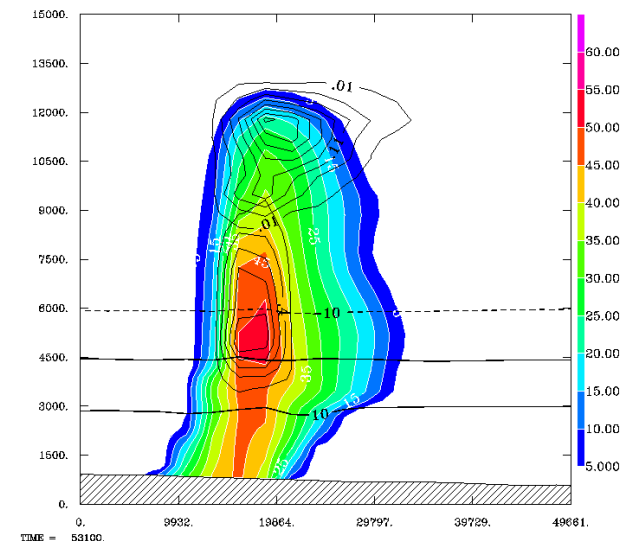
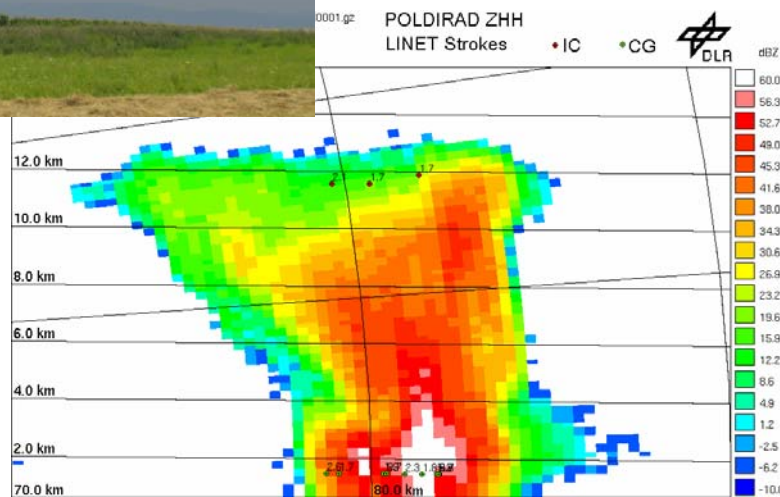


The storm of 15 July 2007

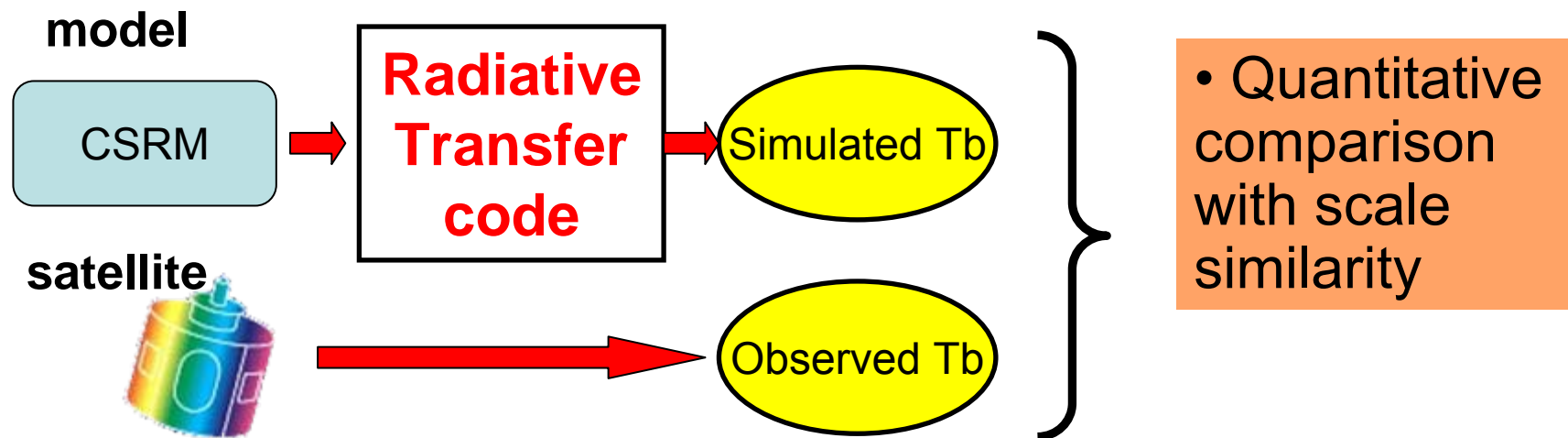
Observations



Meso-NH forecast

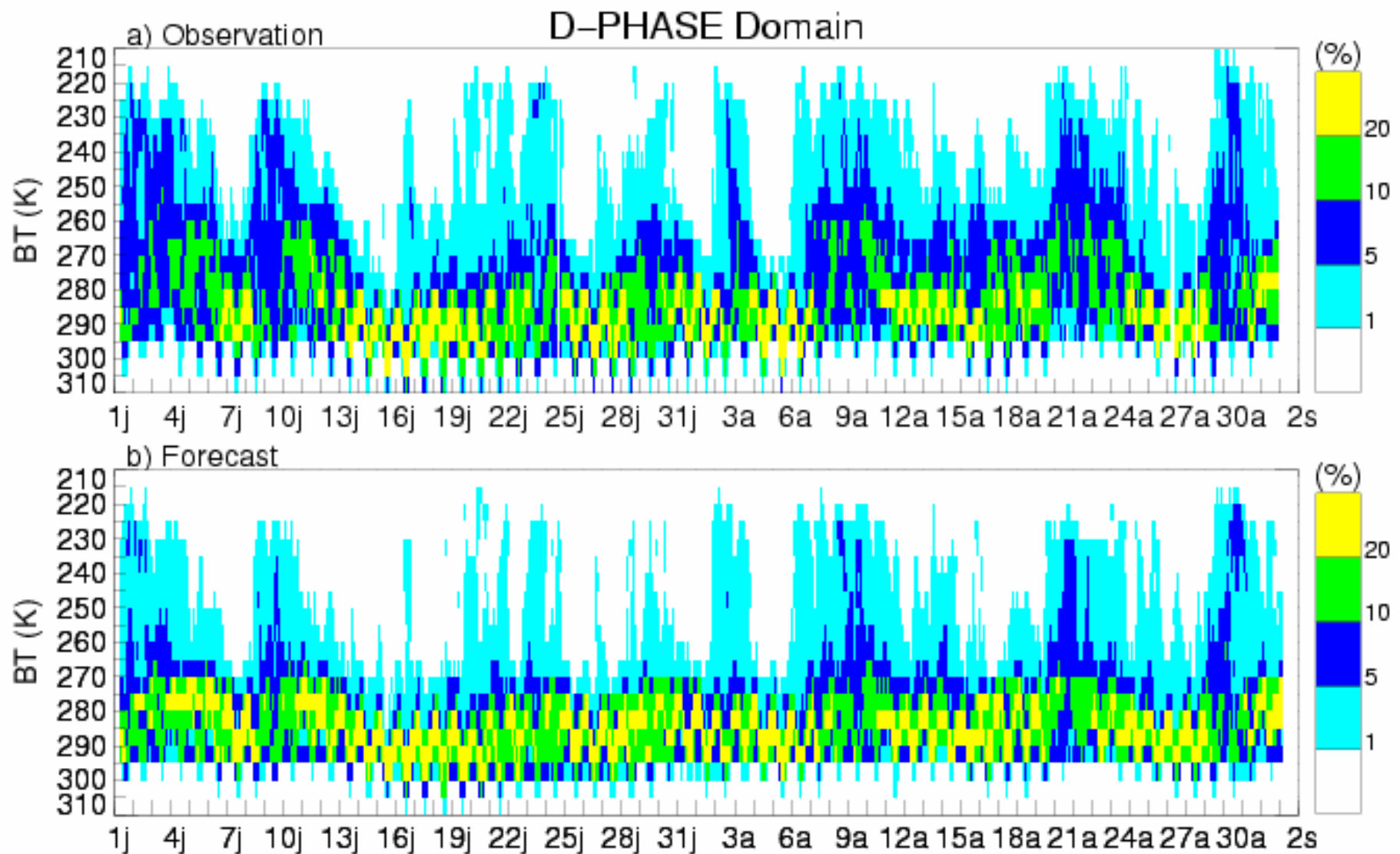


Our approach: model to observation

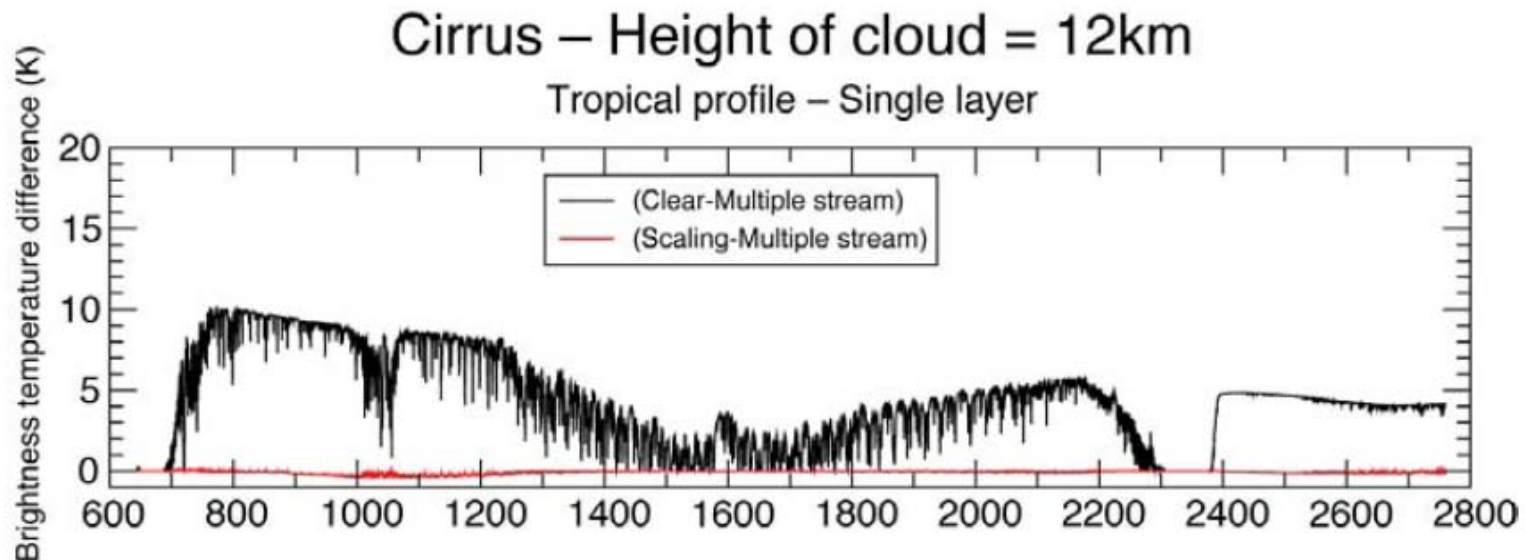
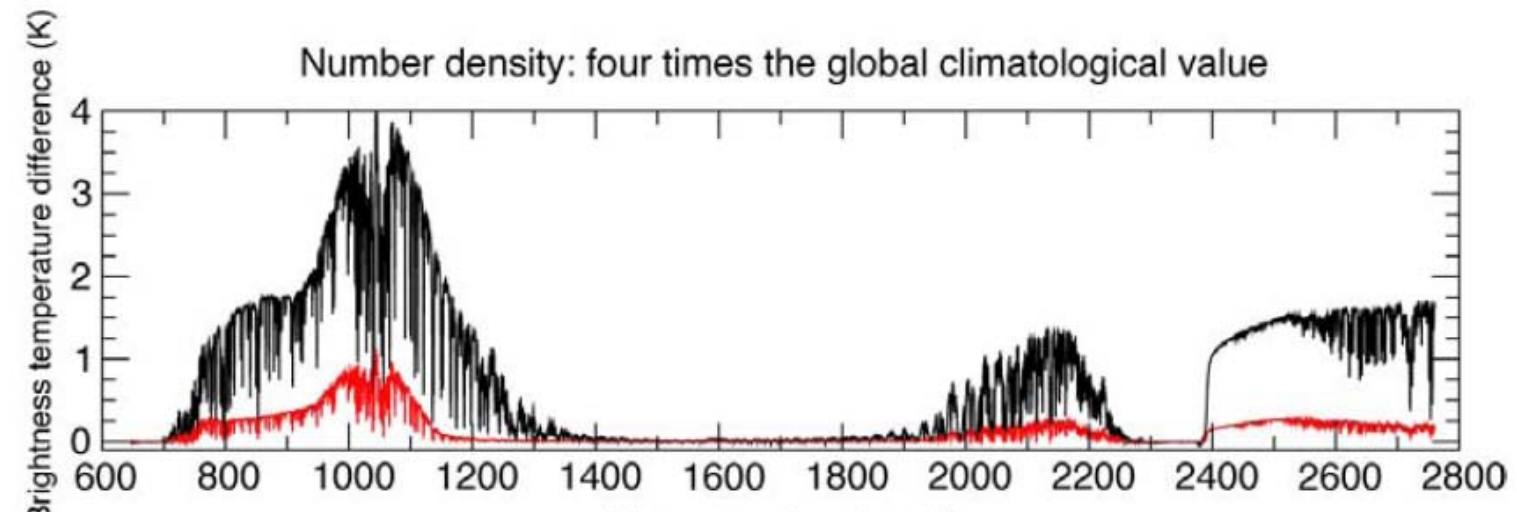


- ❖ IR: RTTOV (parameterization)
 - ❖ MW: ATM (int. size dist.)
 - ❖ Active: Pinty et al. (int. size dist.)
- ❖ High clouds (Tb 10.8 μm)
 - ❖ Precipitation (150, 90, 37 GHz)
 - ❖ Cirrus/dust (ΔTb 8.7, 10.8, 12 μm)
 - ❖ Overshoots (ΔTb 6.2, 10.8 μm)
 - ❖ 3D clouds/precip. (lidar/radar)

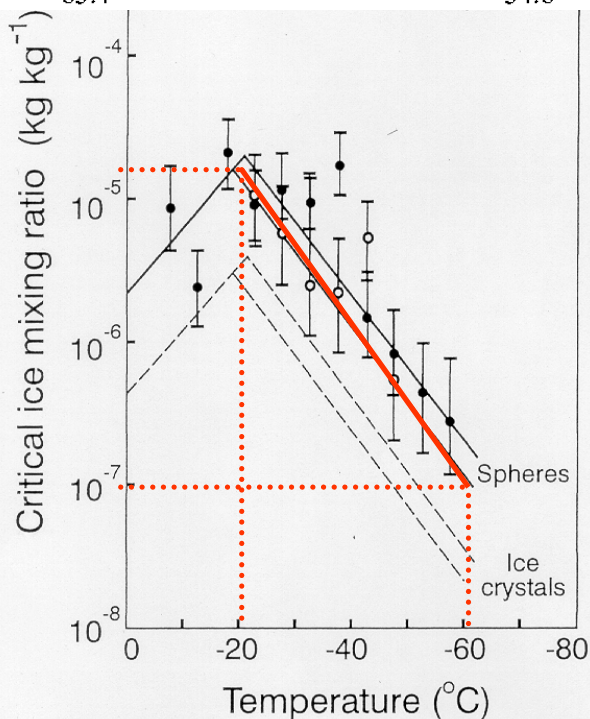
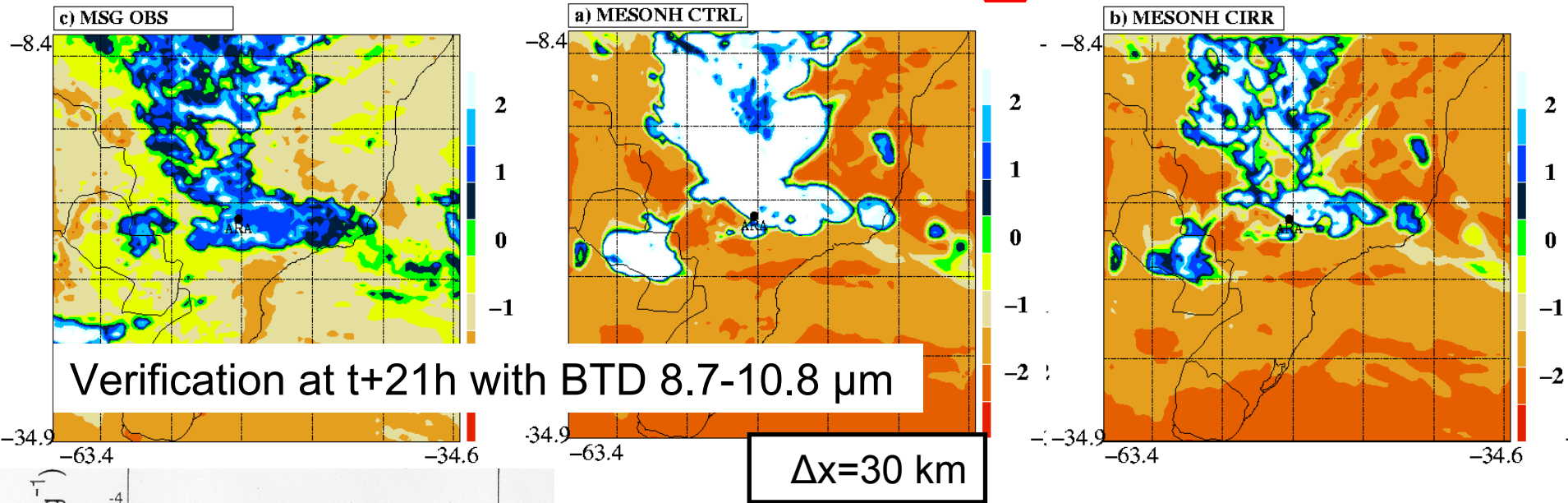
MESO-NH against MSG at 10.8 μm



Spectral signature of dust & cirrus



A MSG-based tuning for cirrus

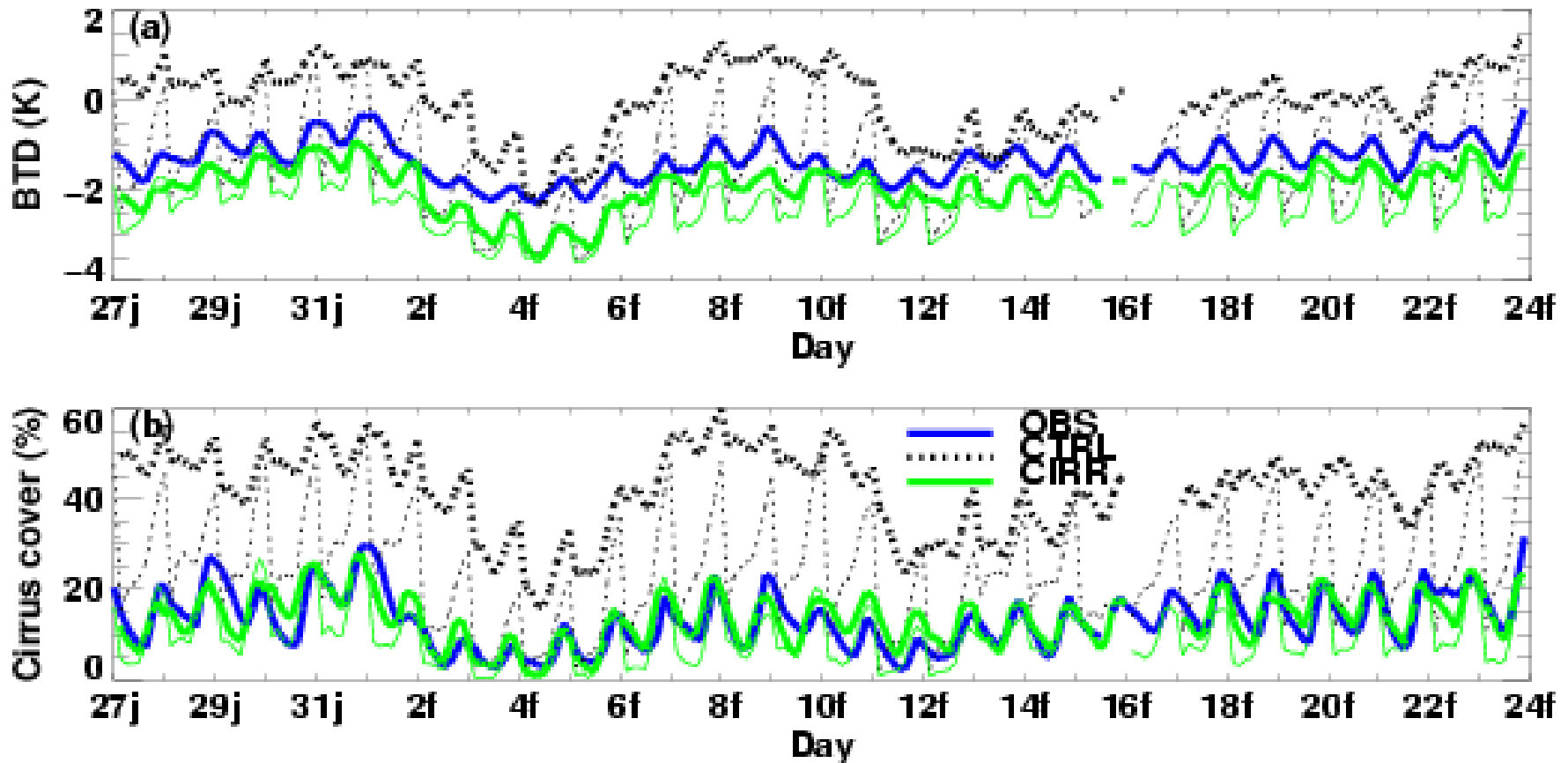


Autoconversion= $f(T)$
(Ryan 2000)

Adaptation to Meso-NH

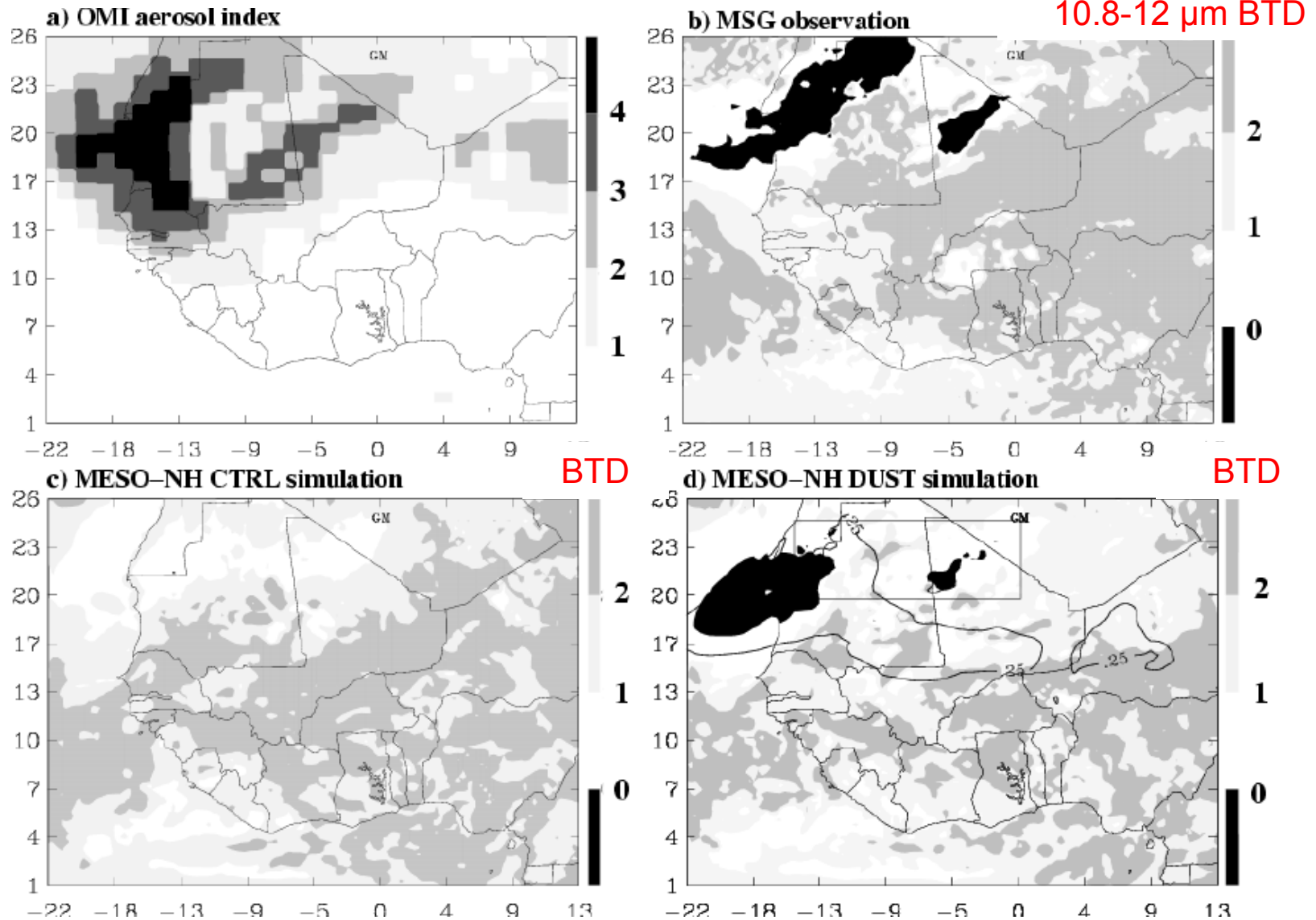
$$r_i^* = \min\left(2 \times 10^{-5}, 10^{0,06 \times (T - 273,16) - 3,5}\right)$$

30 days of statistical assessment



Cirrus cover defined with $\text{BTDR} > 1\text{K}$

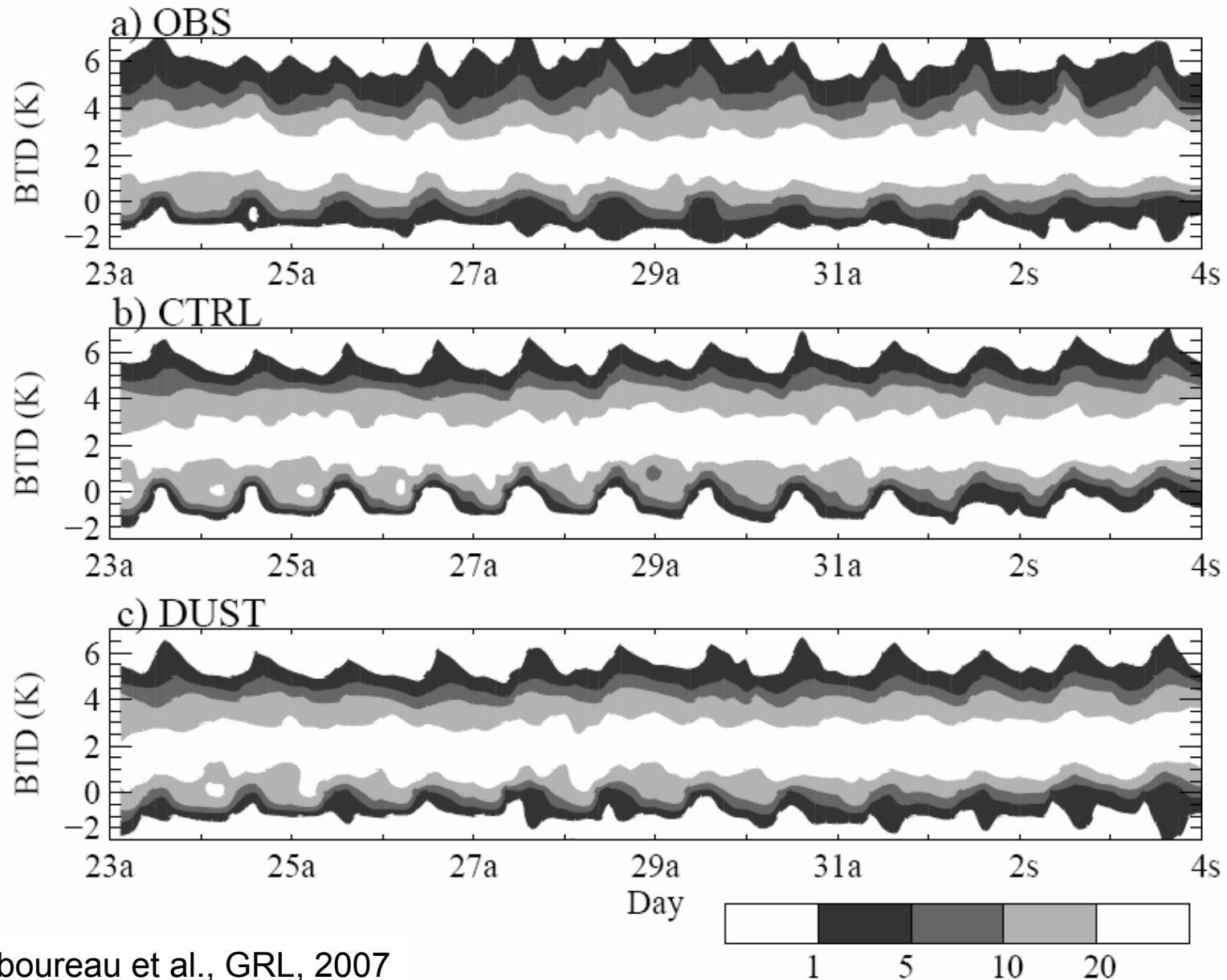
Remote sensing of dust & cirrus



12UTC 26 August 2005 (+45h)

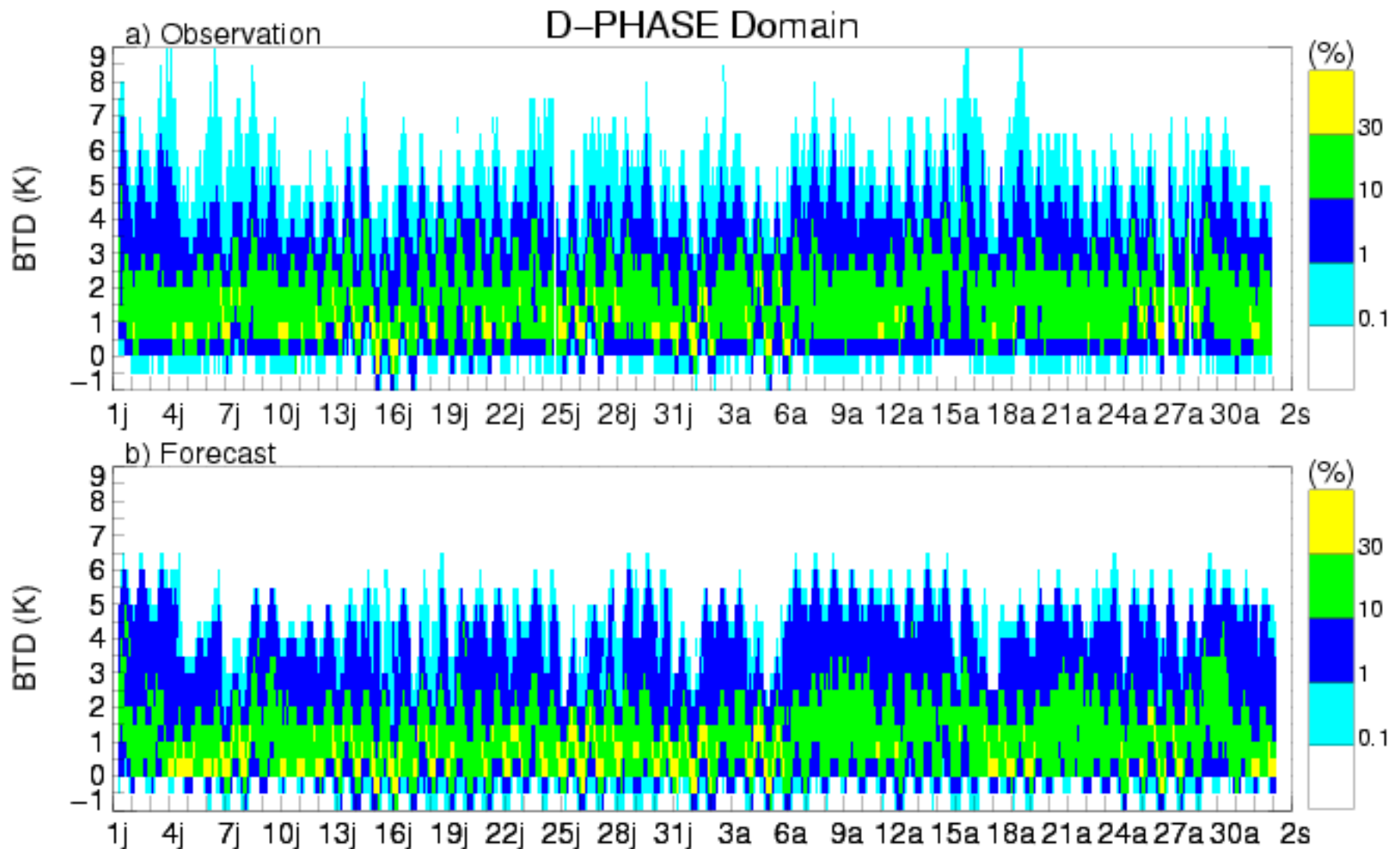
Chaboureau et al., GRL, 2007

Monitoring of dust & cirrus signal



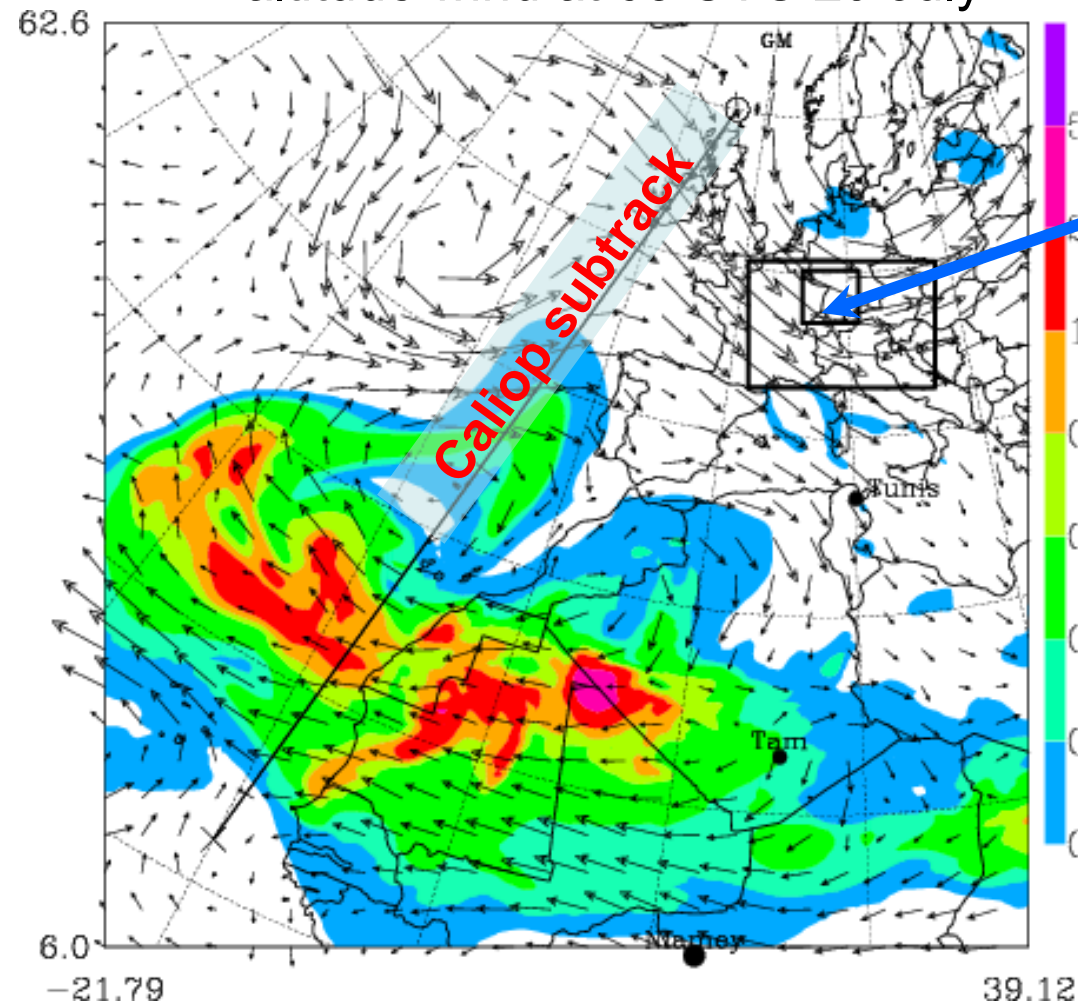
MESO-NH forecasts for COPS

10.8 μm – 12.0 μm BTD



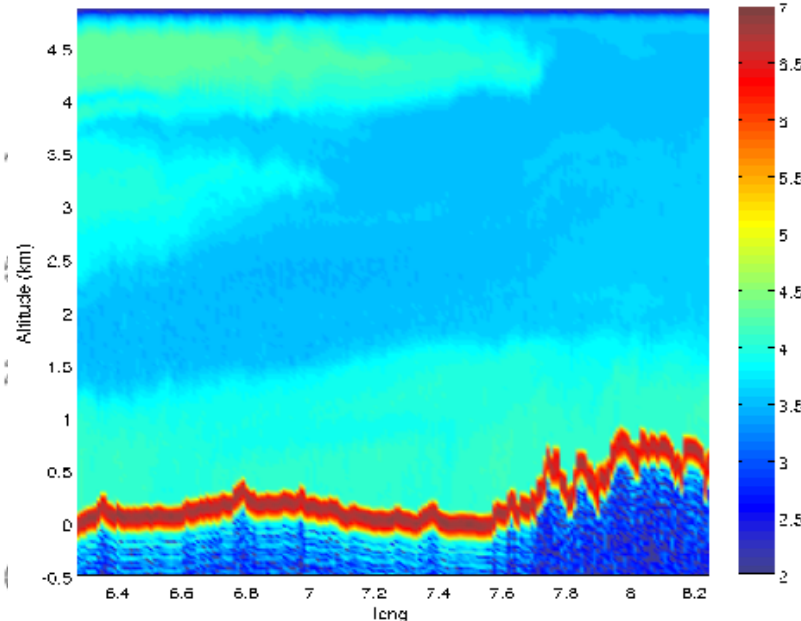
Case study: export of dust to COPS region

Acc. aerosol burden (g/m^2) and 5 km altitude wind at 03 UTC 29 July



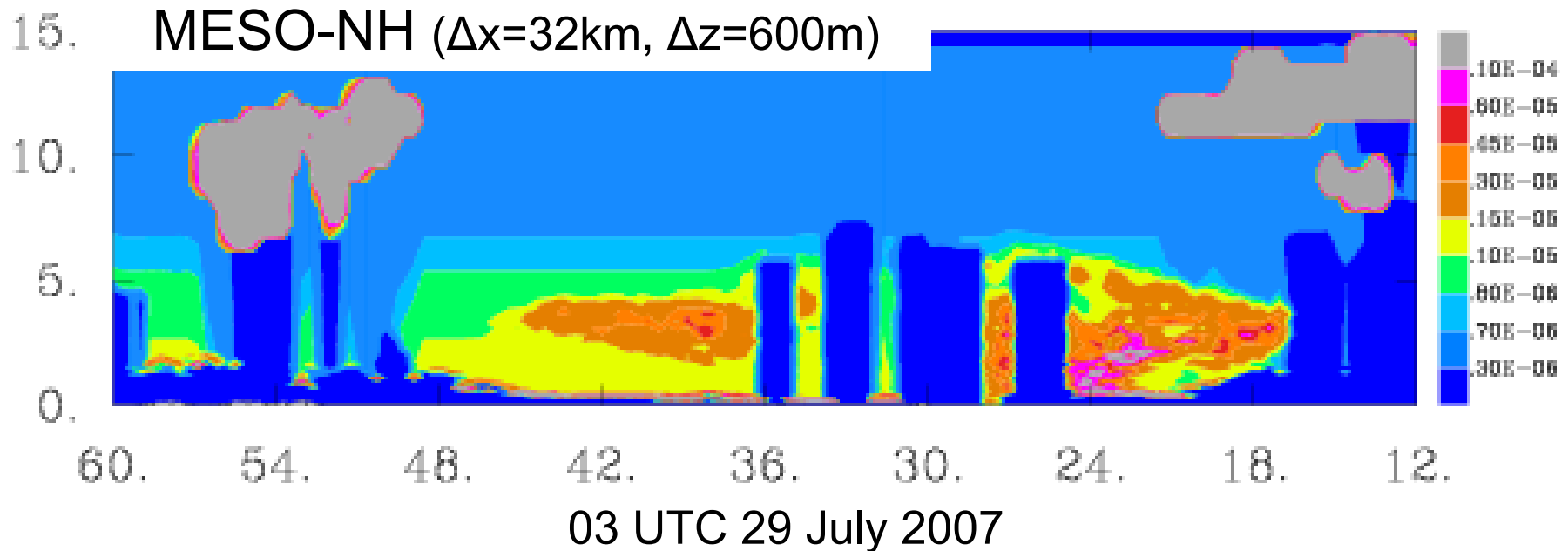
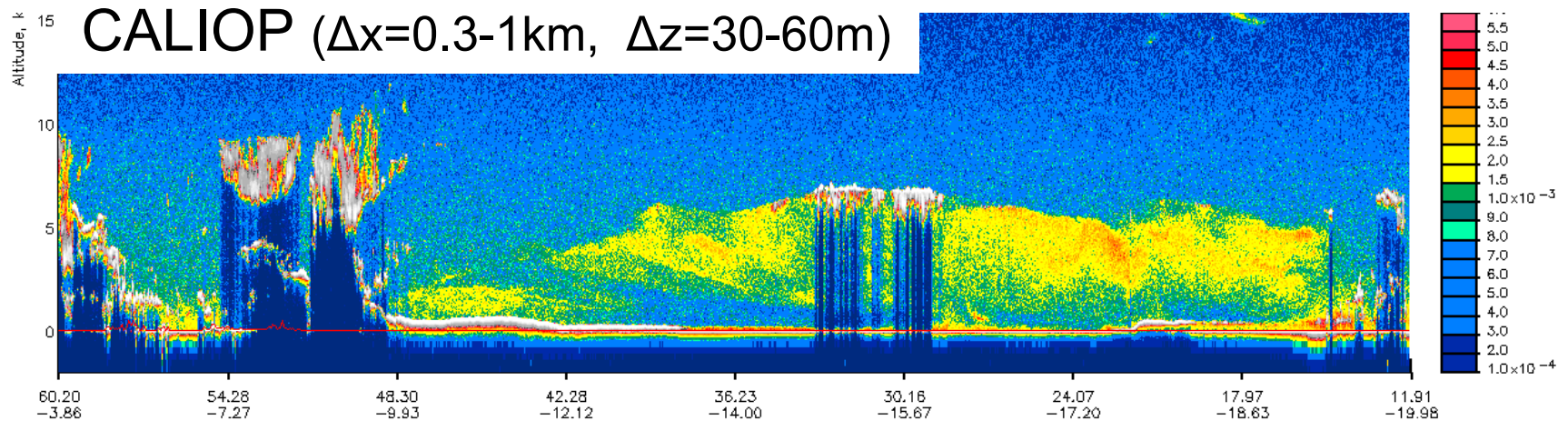
Dust observed by the CNRS lidar at 15 UTC 1st August

Signal of voie 1 B200703011500.c

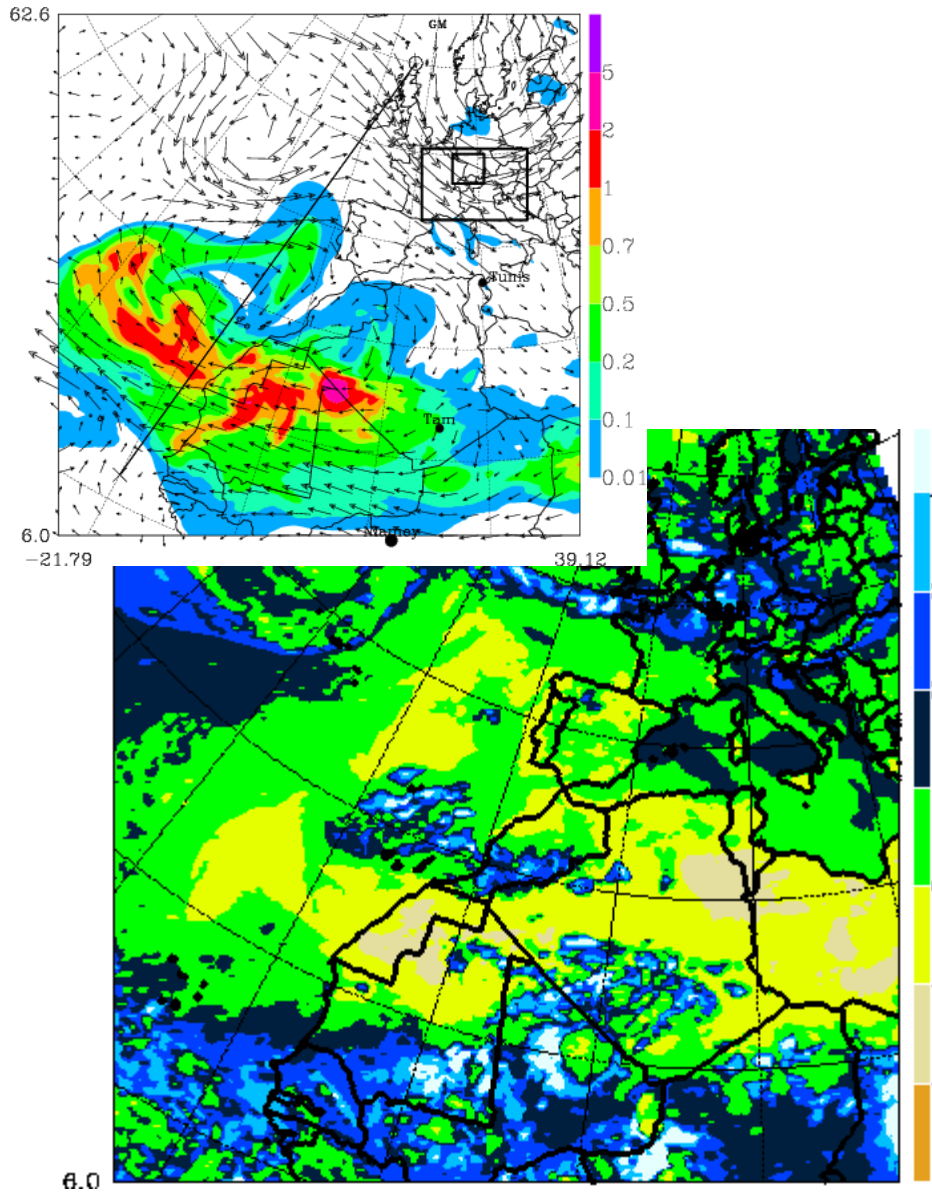


N

Export of dust over N. Atlantic

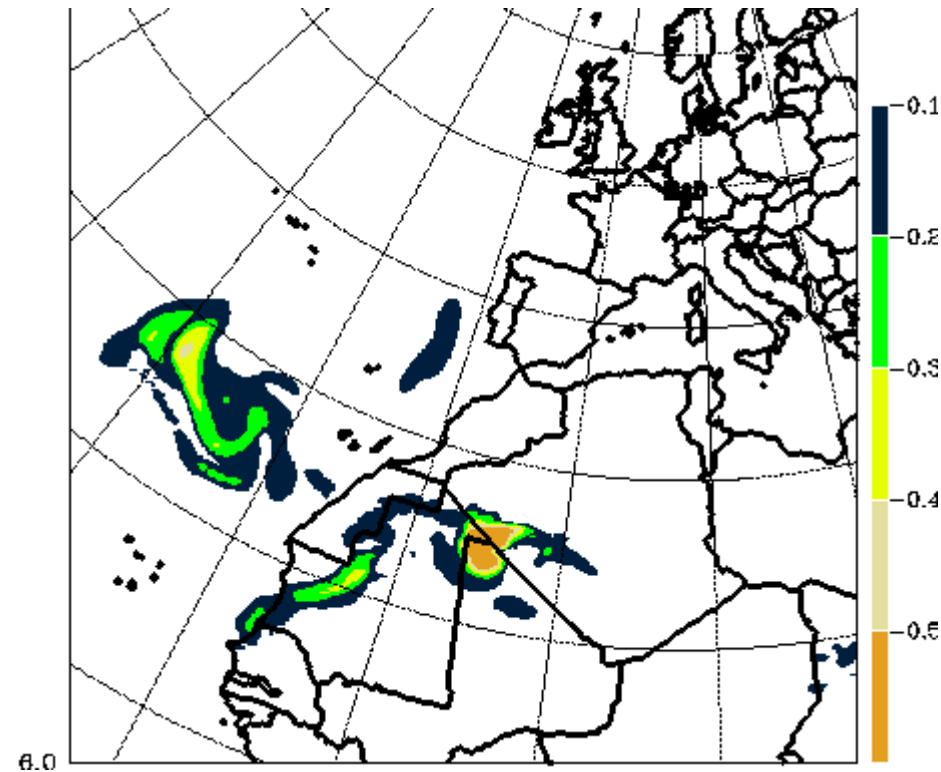


Export of dust over N. Atlantic



MSG 10.8 – 12.0 μm BTD

Dust impact on IASI BTD



Preliminary results with RTTOV-9 β

Conclusions

High value of satellite observation for evaluation

- objective tuning of empirical parameter (ice)
- verification of hydrometeor contents & conc.
- use of long series for statistical assessment

Work in progress

- verification of forecasts for COPS with MetOp (IASI, AMSU, MHS) and A-Train obs.