

GOMOS Temperature and Density

ACVT GBMCD subgroup

Rapporteur: Georg Hansen
Norwegian Institute for Air Research (NILU),
Dept. in the Polar Environmental Centre, Tromsø

Contributing PI's:

K.-H. Fricke & U. Blum

Institute of Physics, Bonn University, Germany

H. Schets

Royal Meteorological Institute of Belgium

G. Hansen & K. Stebel

Norwegian Institute for Air Research @ the
Polar Environmental Centre

GOMOS data validated:

- "Dataset generated with the prototype processor GOPR version 6.0a, equivalent to GOMOS IPF 5.00 (under development)"
- Only high-resolution data (temperatures and densities), no low-resolution data available
- Time period covered: August 2002 - February 2003
- In total 101 GOMOS profiles, 76 of which after 1 January, 2003

High Resolution Temperature Profile (H RTP)

Caution: The results are currently not considered as valid. This product is currently thoroughly examined in the frame of a dedicated activity. The activity will most probably lead to recommend updates of the processing chain.

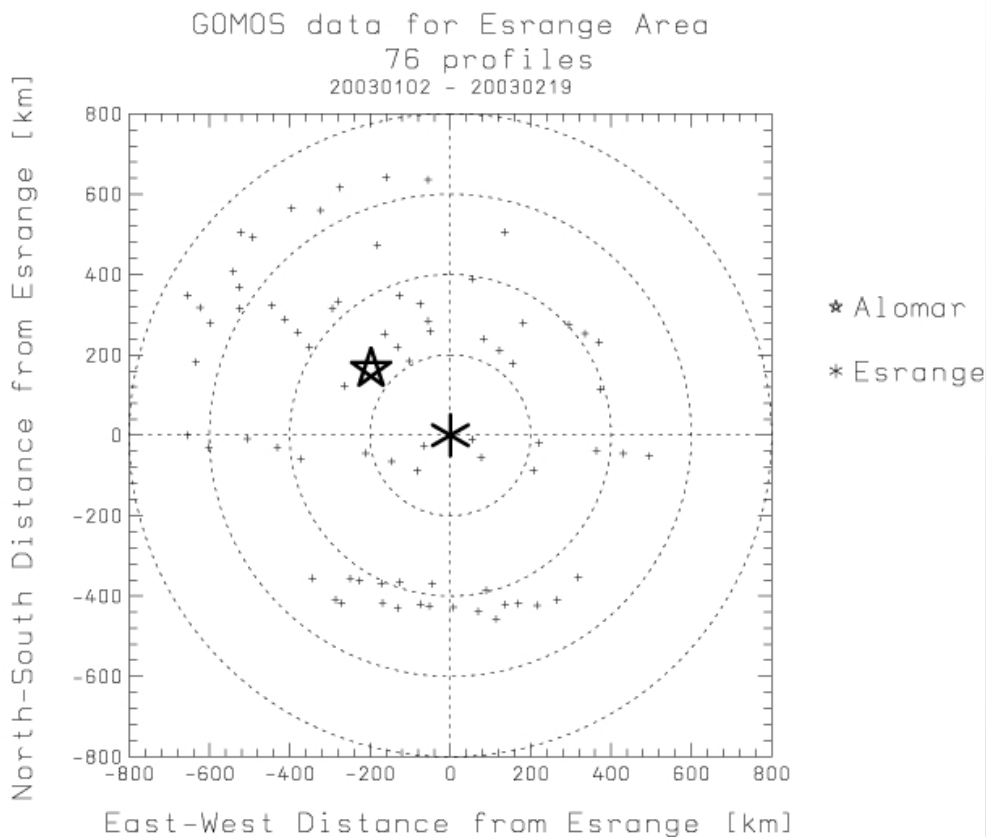
Repeated values are signature of exception handling in the algorithm (will be improved in the future).

Error bars for H RTP are largely overestimated.

Sites/instruments included in the validation:

- ALOMAR, Norway (69.29° N, 16.02° E):
Norwegian ozone lidar
- Esrange, Kiruna, Sweden (67.88° , 21.06°):
University of Bonn Rayleigh lidar
- Uccle, Belgium (50.80° N, 4.35° E): radiosondes/
ozonesondes

Validation data set:

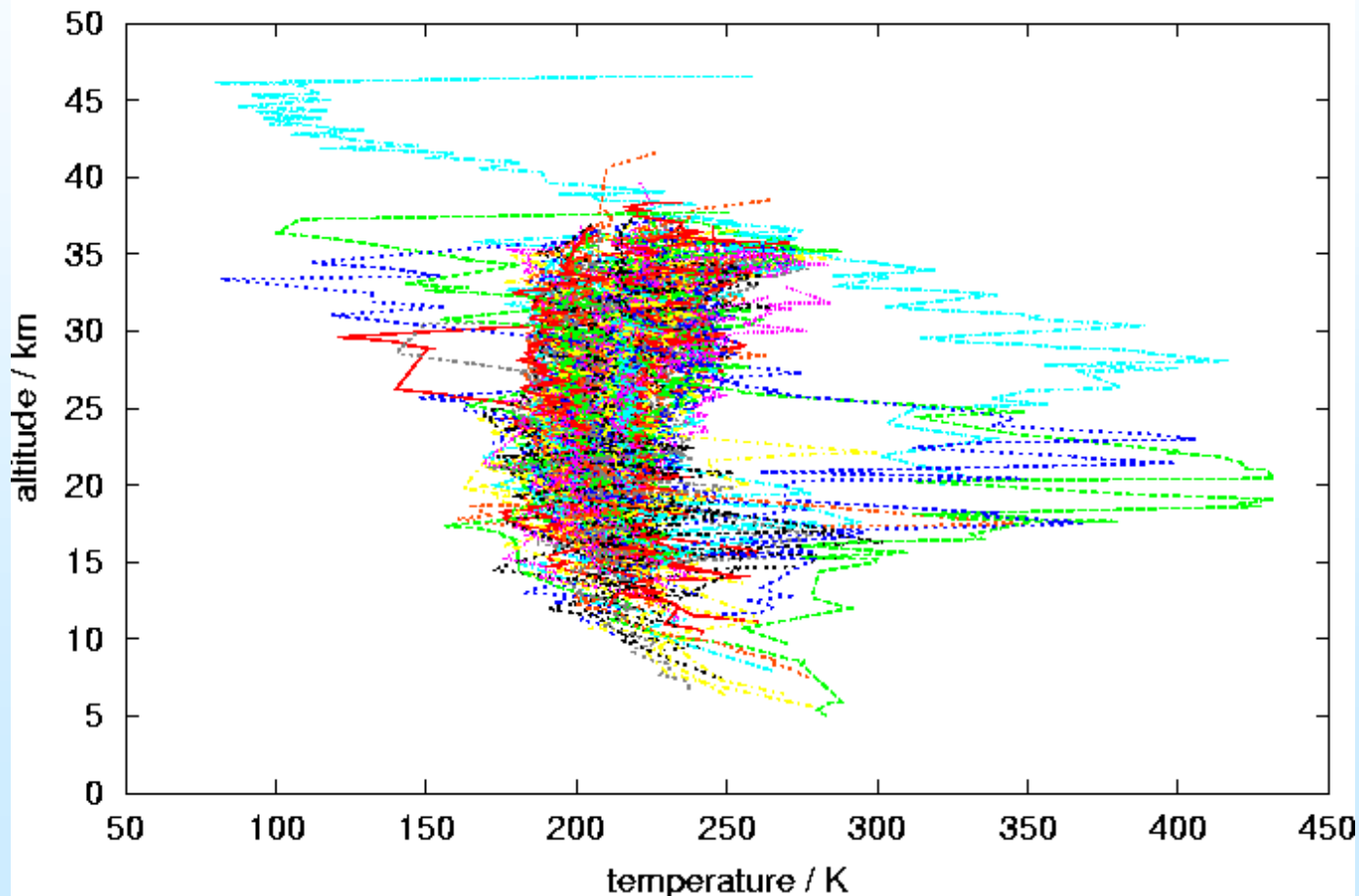


- In total 76 GOMOS profiles from 030102 to 030219
- 25 coincidences when allowing 1000 km distance, 21 coincidences when allowing 500 km

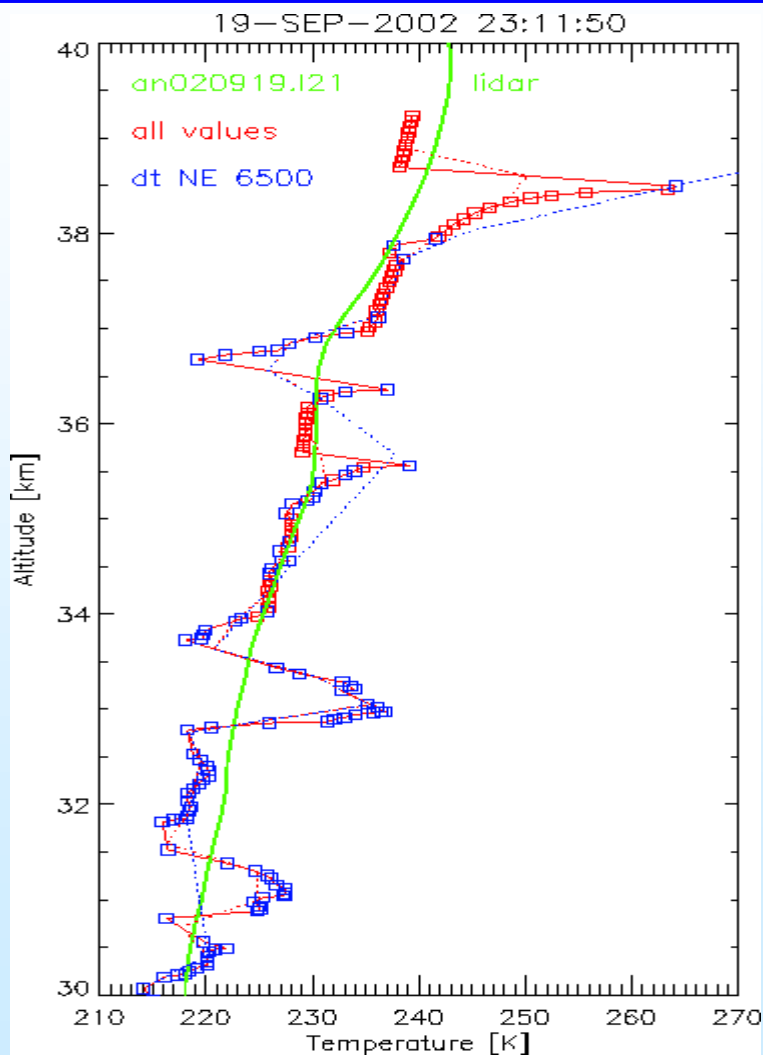
22-04-04 12:37:21 / gomlocat.x subr locpl1/khf

Results from AOID 222 (Univ. Of Bonn/Kiruna):

Gomos High resolution Temperature Data



Most GOMOS profiles "reasonable", but some obviously selected on wrong basis

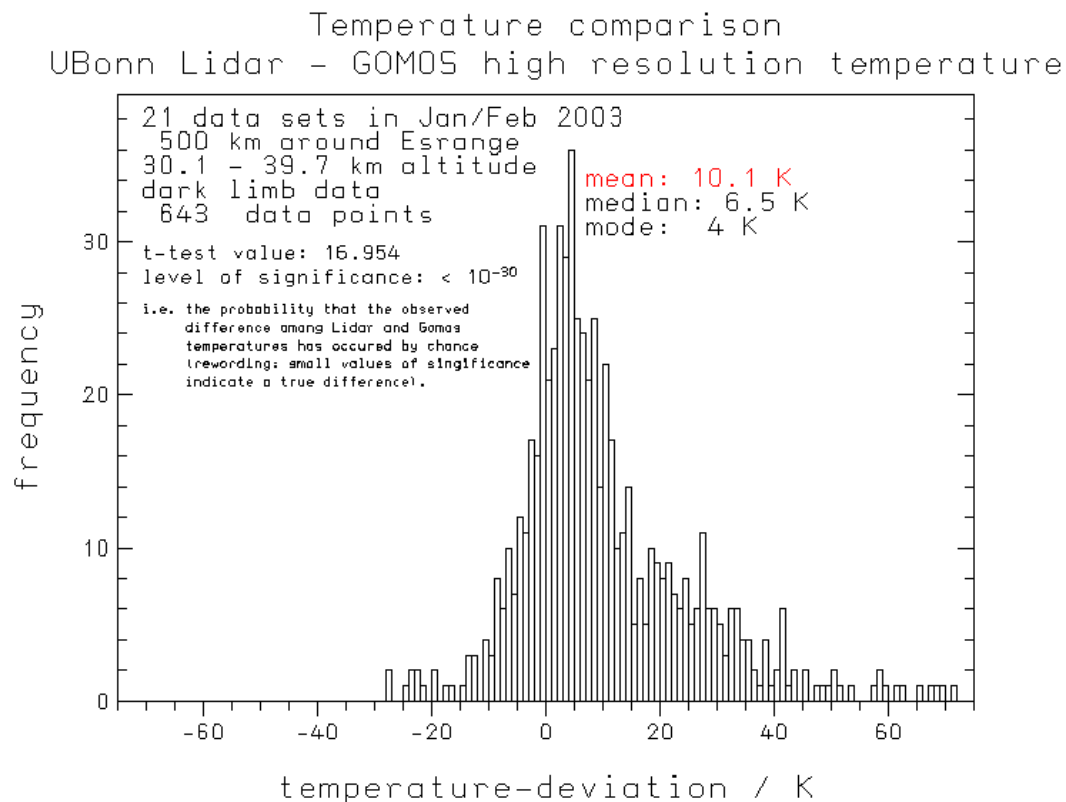
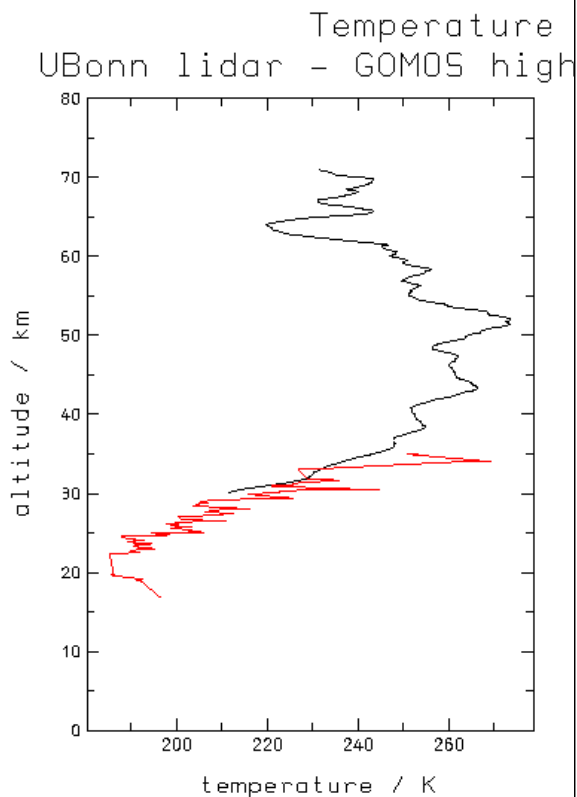


Selection/quality-labelling of GOMOS data

Single profile check:

In the upper part of GOMOS
profile obviously many good (?)
values flagged with error label

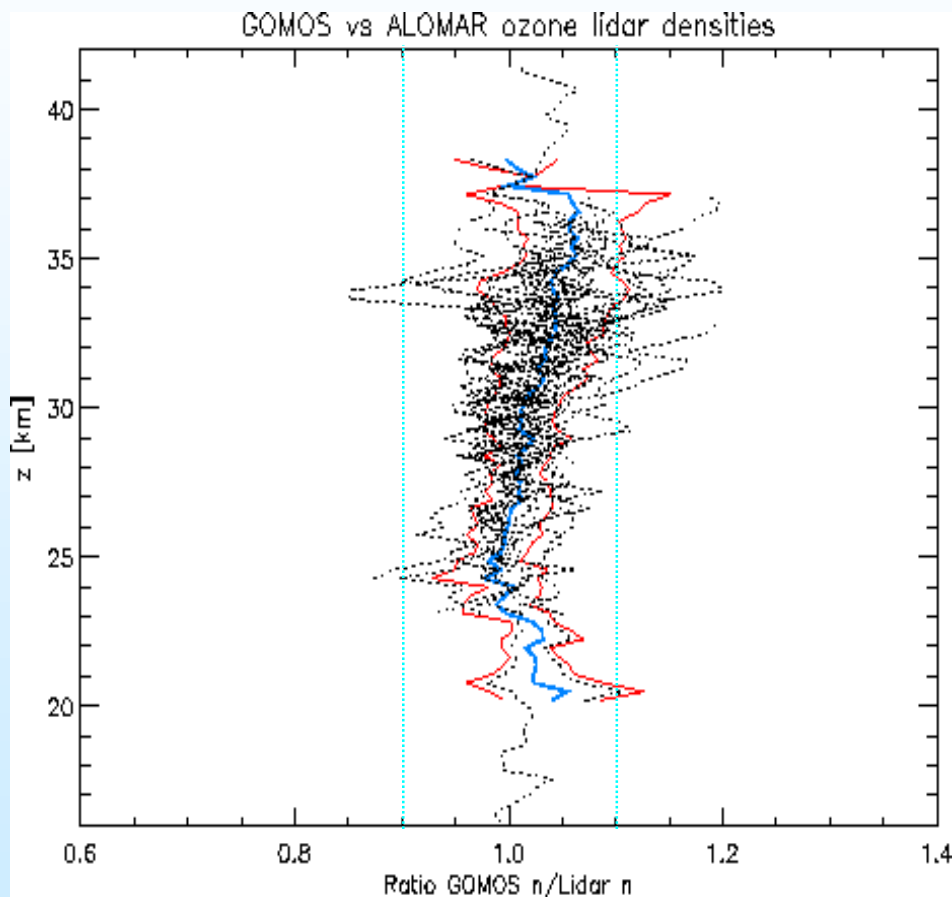
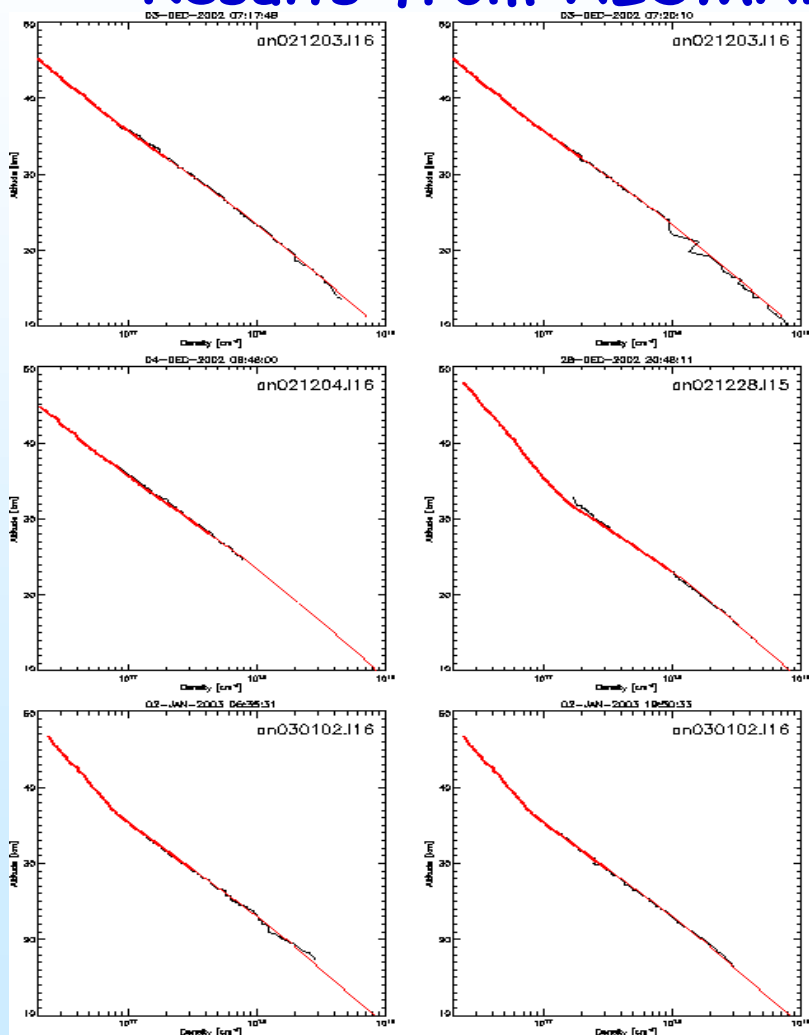
Results from AOID 222 (Univ. Of Bonn/Kiruna):



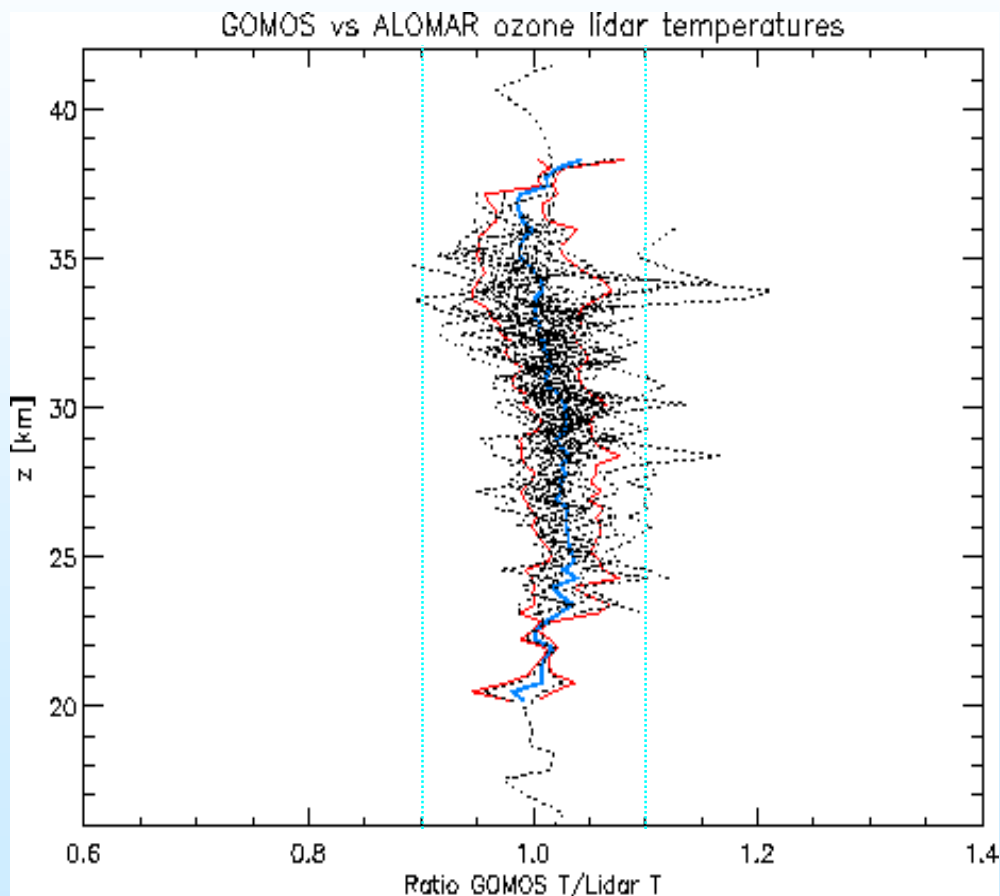
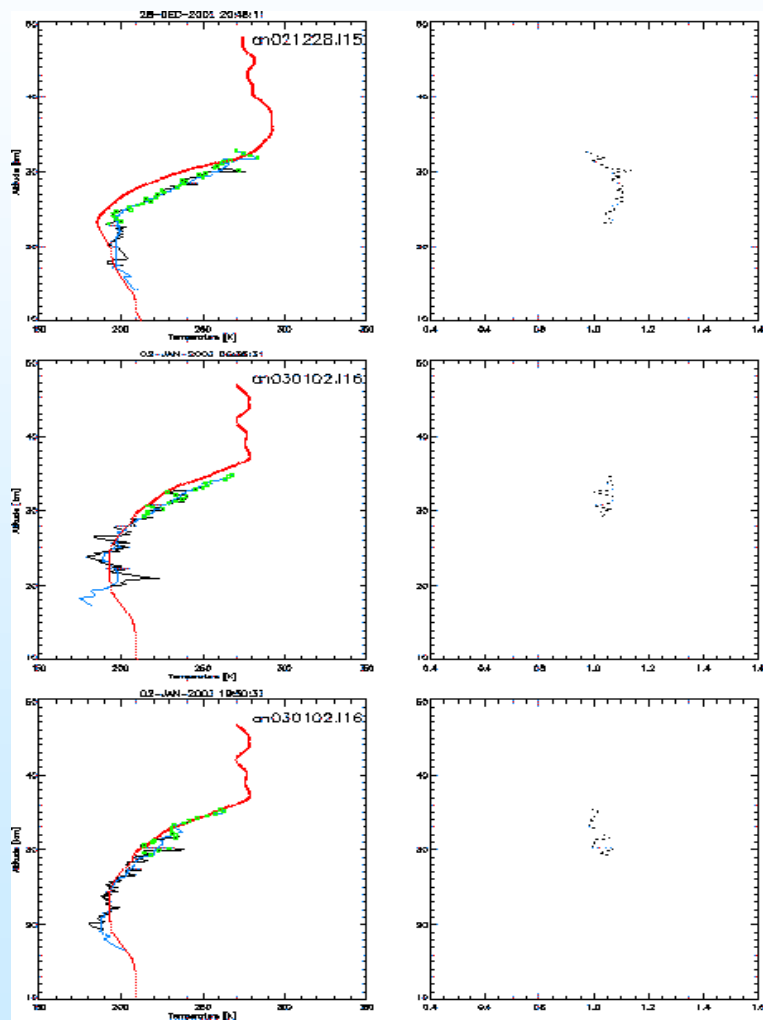
Results from ALOMAR ozone lidar:

- In total 101 GOMOS overpasses at less than 1000 km distance from ALOMAR in period 020819 to 030219
- 36 coincidences with ALOMAR ozone lidar measurements, allowing distances up to 1000 km and time offsets of up to 12 hours
- ALOMAR ozone lidar:
 - not NDSC-certified for T, n;
 - non-coaxial configuration until April 2003
 - empirical cut-off and replacement with ECMWF profiles (ranging from 10 to 40 km)

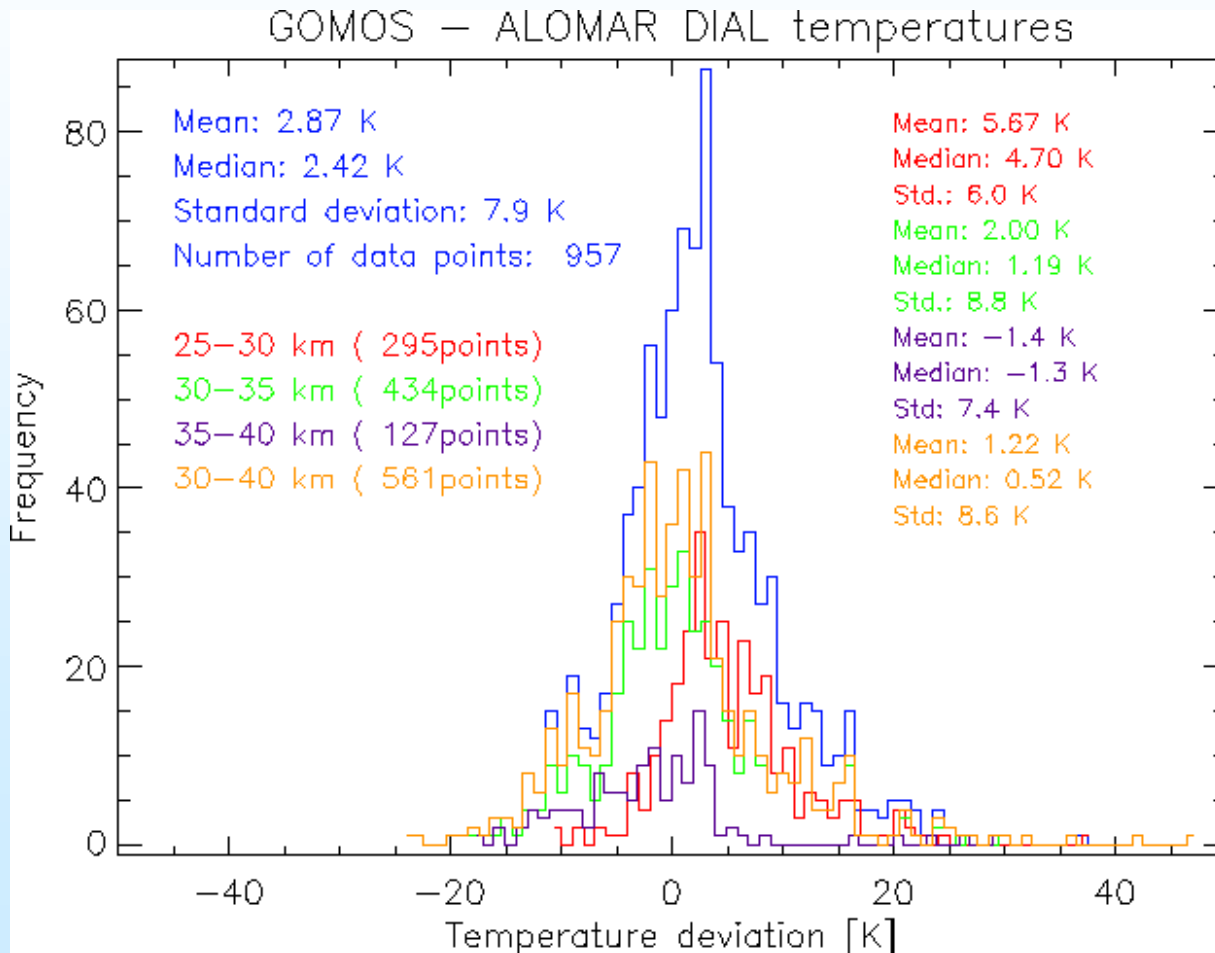
Results from ALOMAR ozone lidar: (1) Density



Results from ALOMAR ozone lidar: (2) Temperature

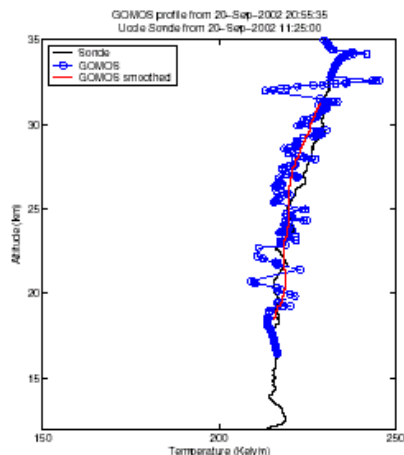
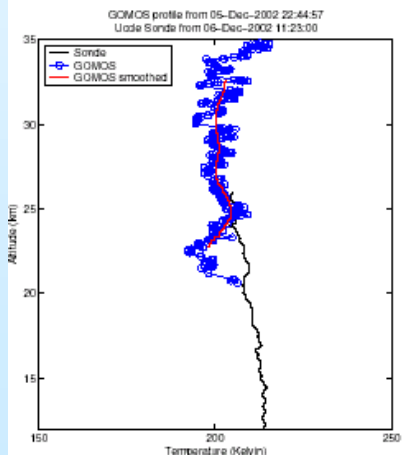
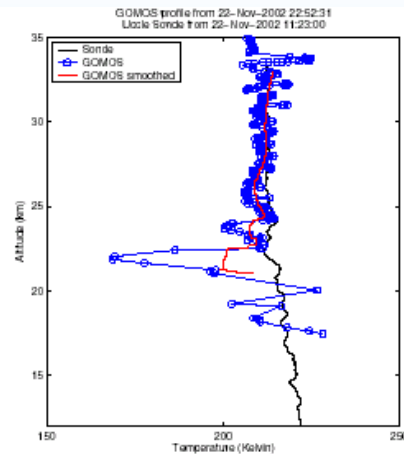
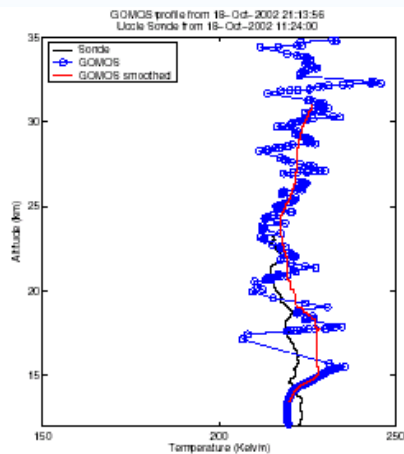
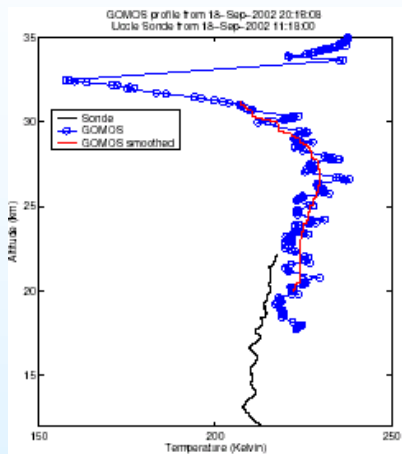


Results from ALOMAR ozone lidar: (2) Temperature



Comparison to Kiruna results:
 better agreement in case of ALOMAR in overlapping altitude range, both with respect to bias and standard deviation

Results Uccle:



Only 5 single profiles from late 2002 for comparison: too little to make a meaningful comparison

Conclusions - specific

- Precision of GOMOS T (high-resolution):
"Noisiness" of individual profiles; at best ± 3 K below 30 km, decreasing gradually above (± 10 K at 38 km)
- Accuracy of GOMOS T (high resolution):
systematic errors (biases) in the order of +5 - 10 K, (2 - 4%) altitude-dependent (largest in altitude range 25 - 32 km, decreasing above)
- GOMOS density (only one site for comparison):
bias increasing from 0 at 25 ± 2 km to 10% at 35 ± 2 km

Conclusions - general

- Data quality flagging procedure of GOMOS operational data needs to be improved - remove all "bad"/physically meaningless data; do not flag "good" data as invalid
- ESA should take steps to guarantee a responsible/sufficient validation network - not given for the species dealt with in this case: most negative replies because of lack of funding (incl. rapporteur)