

Processing of GRAS raw sampling data

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GRAS RS data

Reconstructed RS data from Sept 30 and Oct 2007 made available by EUMETSAT [Christian Marquardt et al]; Internal and external NBs also made available; internal NBs from netCDF file used in this study

OCC code (similar to GRAS SAF ROPP_PP software) has been tuned together with Michael Gorbunov for being able to process GRAS RS data

Data gaps: <0.8 sec filled with smooth model

GRAS data do not penetrate as deep into the shadow zone as COSMIC data so low altitude biases are different

Overall results are similar to OCC processing of COSMIC data

OCC processing and options

State of the art Fourier integral operator code (CT2) ensures high accuracy (GO used above 25 km)

SO: optimal linear combination based on initialization to ECMWF or 2-parameter fitted MSIS climatology

Quality control based on L2-signal and SO-solution: $Q = Q_{L2} + Q_{SO}$

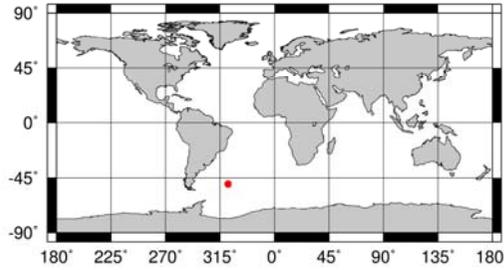
Cutoff of $u(t)$: all data used (i.e. no SLTA cutoff)

Radio-holographic (RH) filtering: phase: no; CT-amplitude: yes

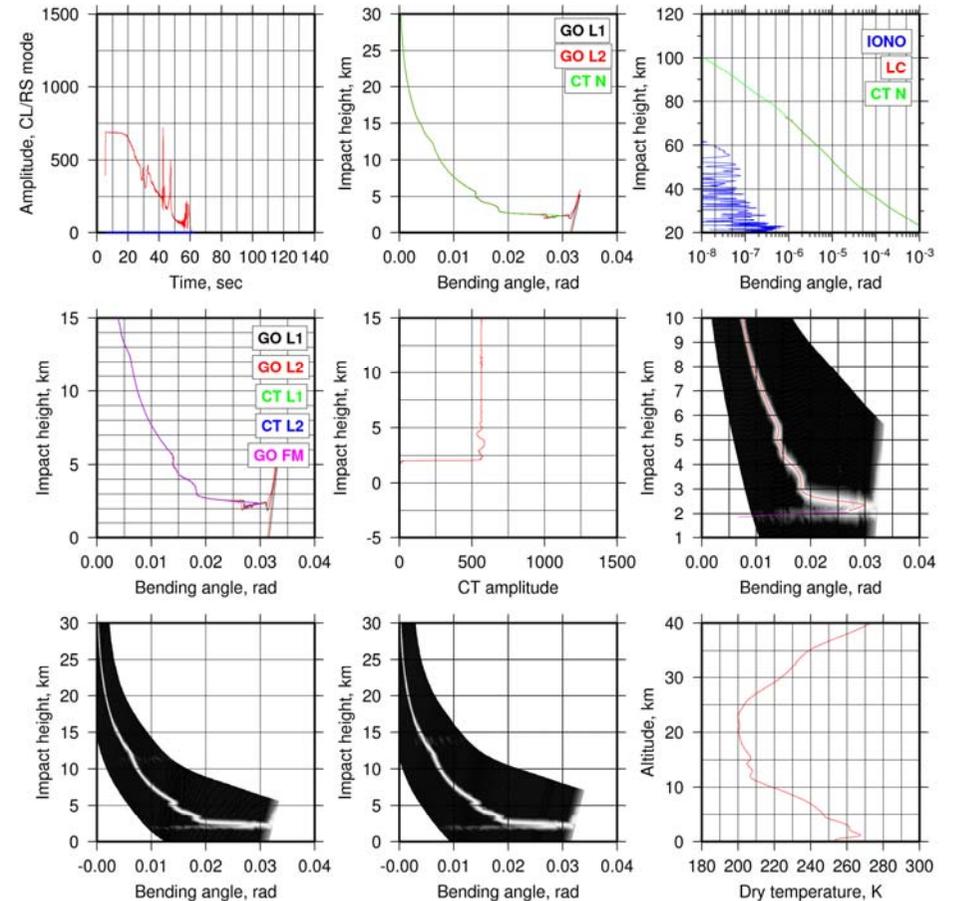
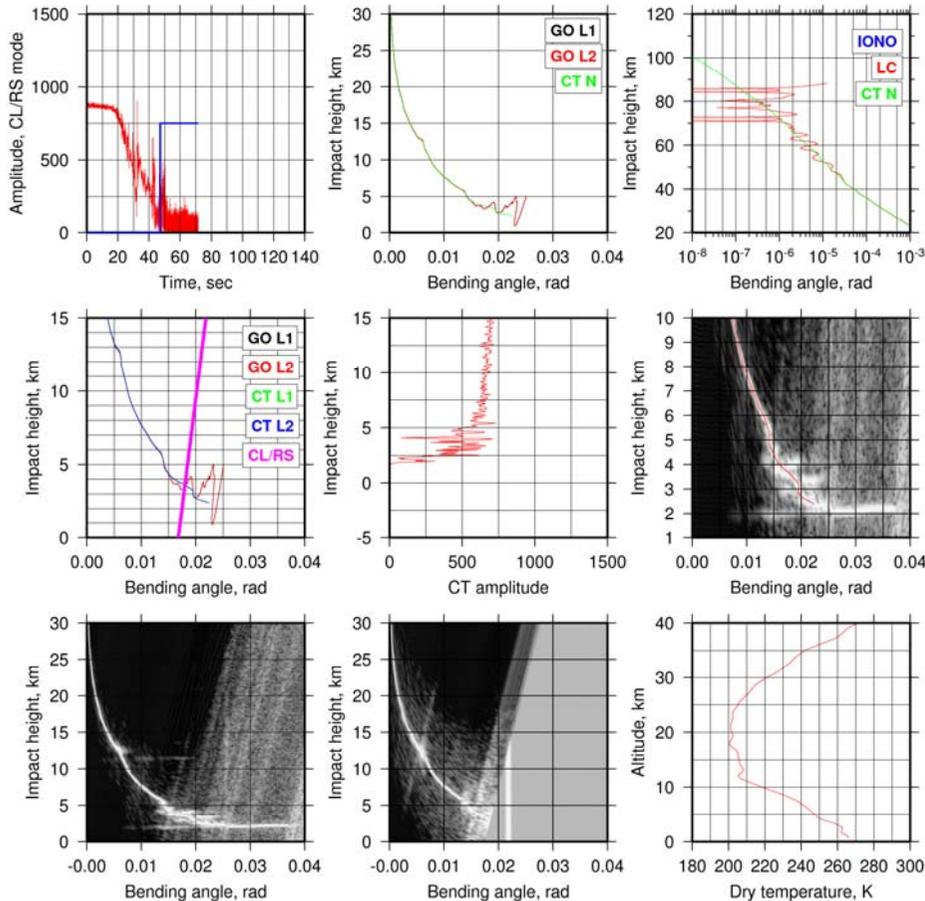
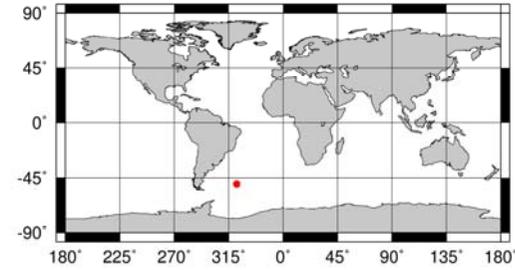
- full RH filtering results in positive bias from suppression of large BAs and MP structures in wide-band signal tails [Sokolovskiy, 2009]

GRAS occ #000155: OCC and WOP-simulation

2007/09/30 UTC 00:01
 Occ 000155
 50.1S 38.3W
 Version: occ 20.2.661
 27525 data
 0 missing bits
 Badness = 24.944
 Retrieval passed

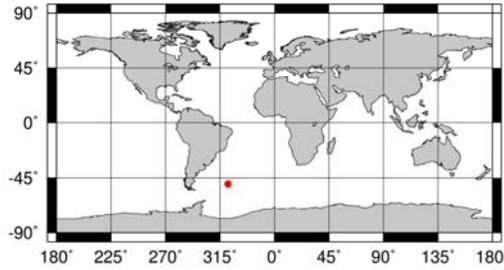


2007/09/30 UTC 00:01
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 50.1S 38.3W
 Version: occ 20.2.661
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 Badness = 3.532
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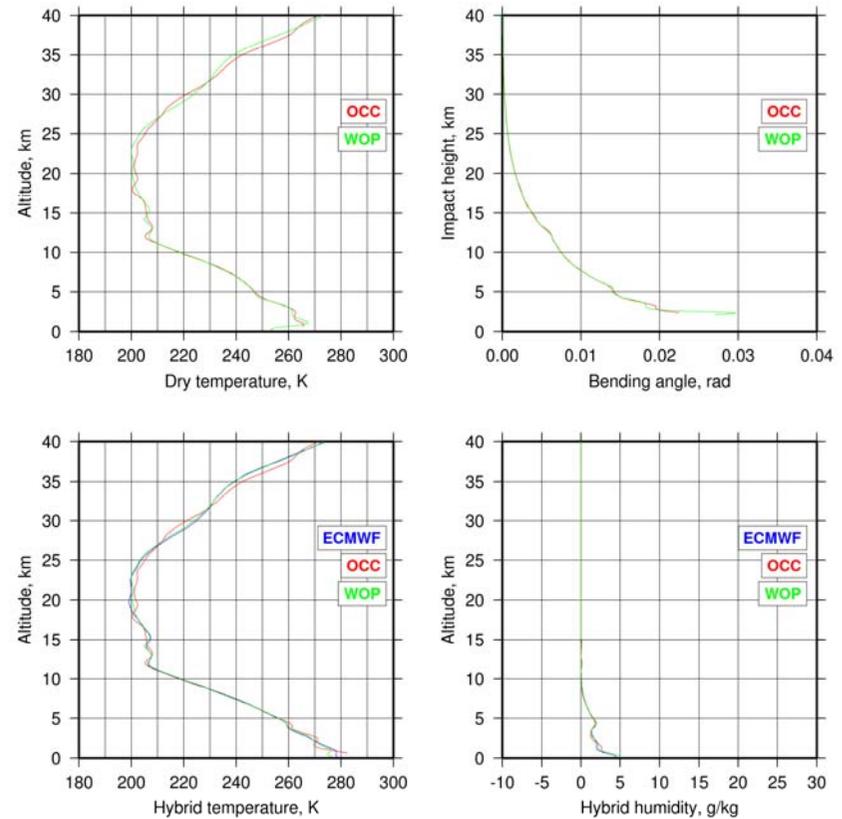
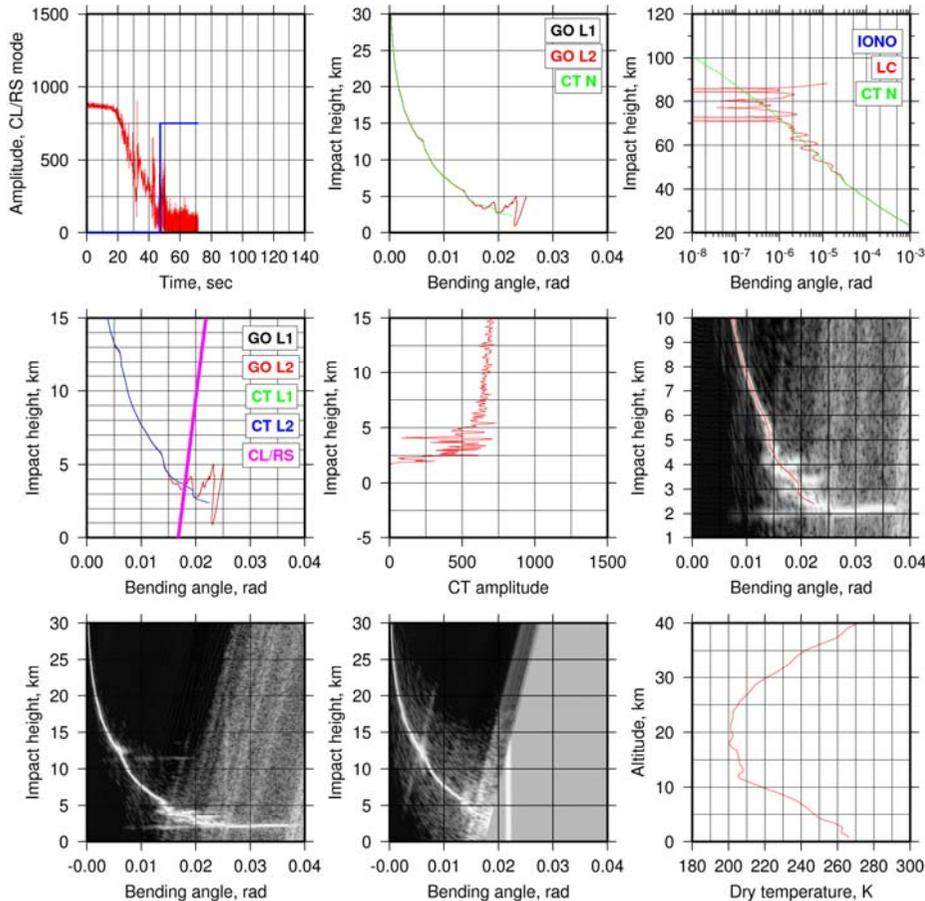
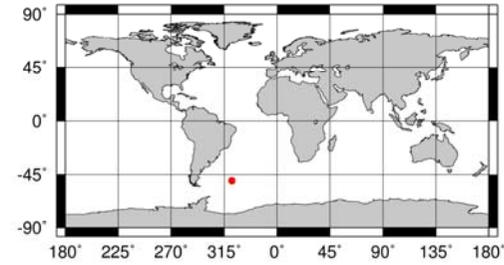


GRAS occ #000155 : OCC and Comparison

2007/09/30 UTC 00:01
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 50.1S 38.3W
 Version: occ 20.2.661
 27525 data
 0 missing bits
 Badness = 24.944
 Retrieval passed

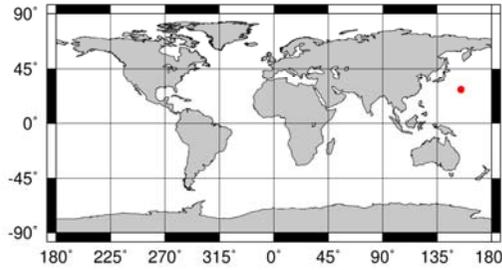


2007/09/30 UTC 00:01
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 50.1S 38.3W
 Version: occ 20.2.661
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 Badness = 24.944
 Retrieval passed

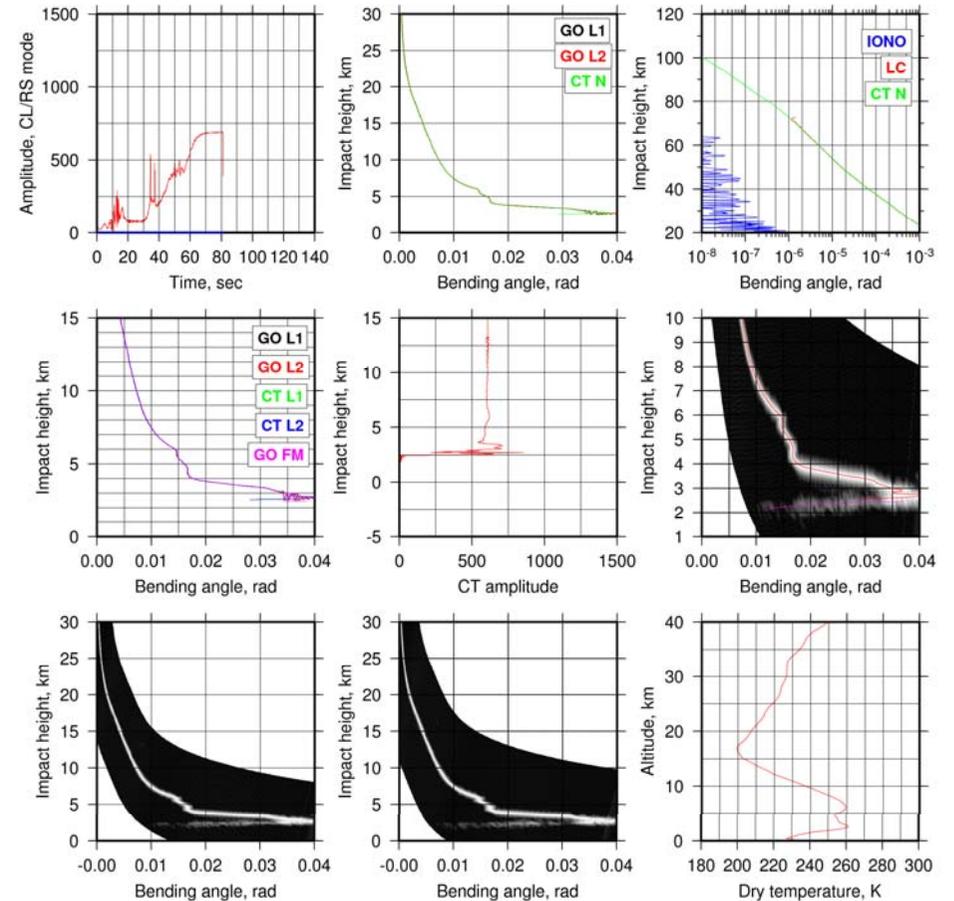
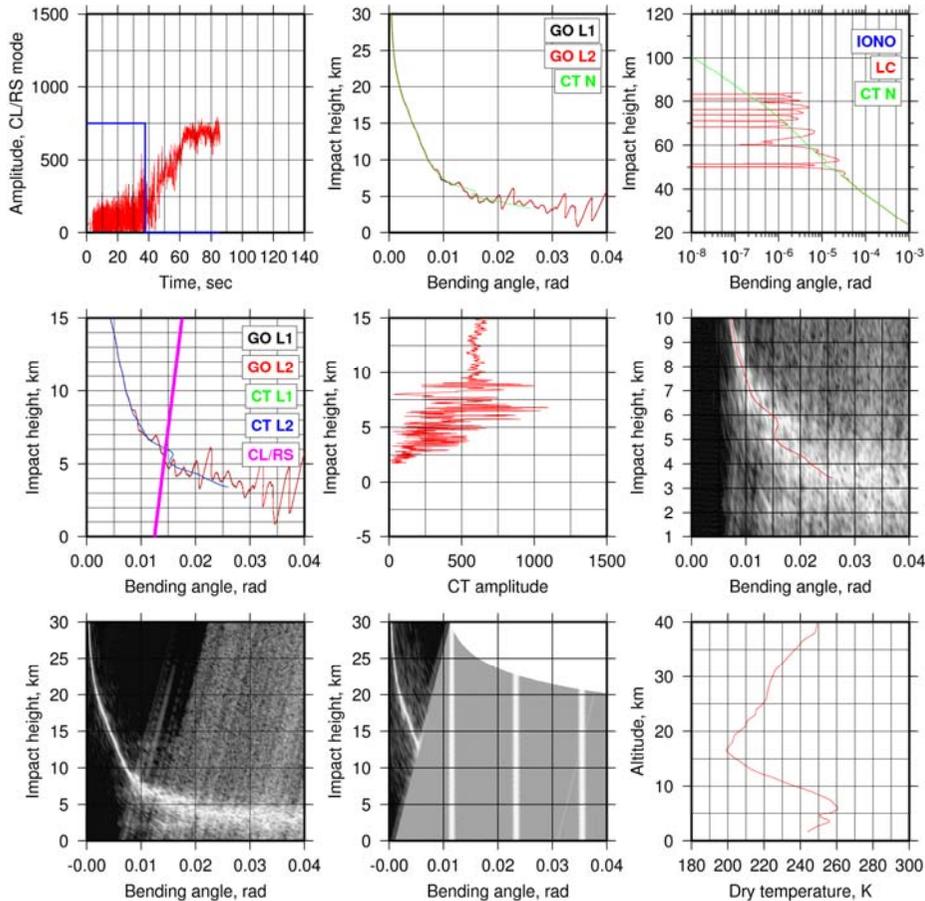
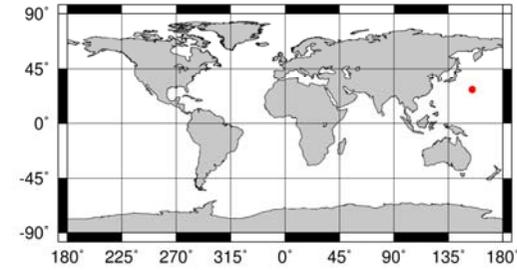


GRAS occ #004305: OCC and WOP-simulation

2007/09/30 UTC 00:43
Occ 004305
27.7N 154.8E
Version: occ 20.2.661
37151 data
0 missing bits
Badness = 34.489
Retrieval passed

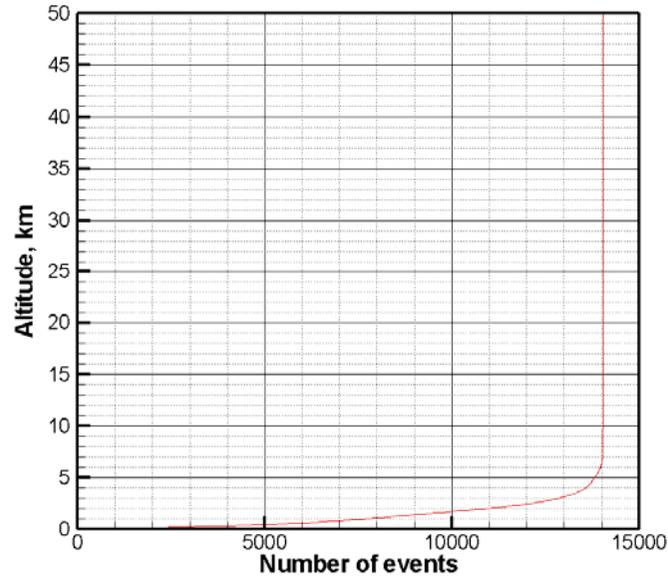


2007/09/30 UTC 00:43
Occ 004305
27.7N 154.8E
Version: occ 20.2.661
4611 data
0 missing bits
Badness = 6.116
Retrieval passed

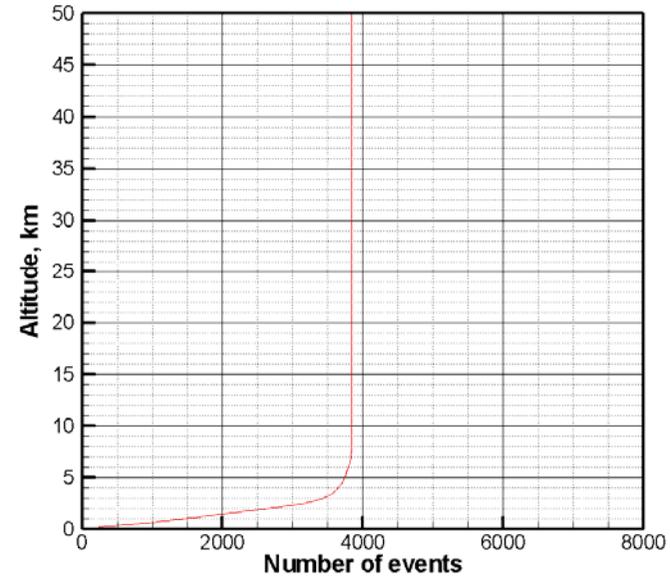


GRAS RS data: Oct 2007 #occ

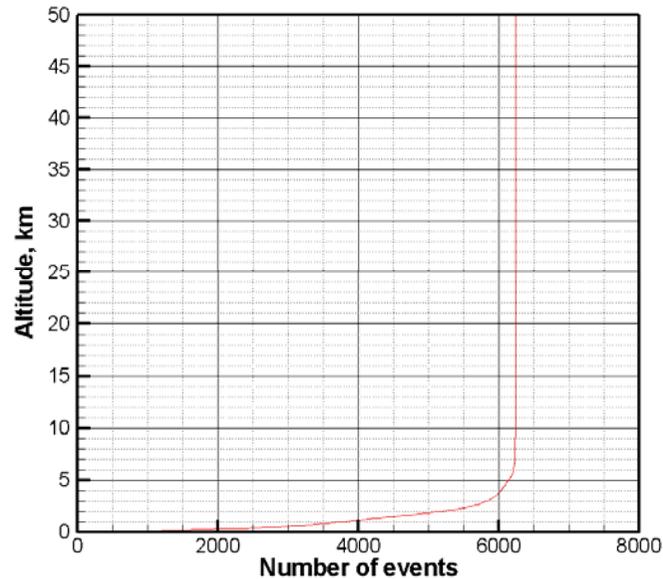
2007.10. GRAS - ECMWF. World



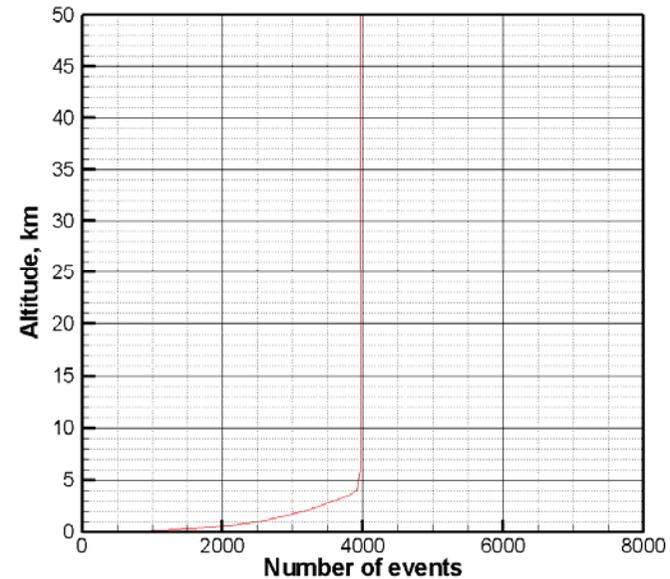
2007.10. GRAS - ECMWF. 0-30



2007.10. GRAS - ECMWF. 30-60

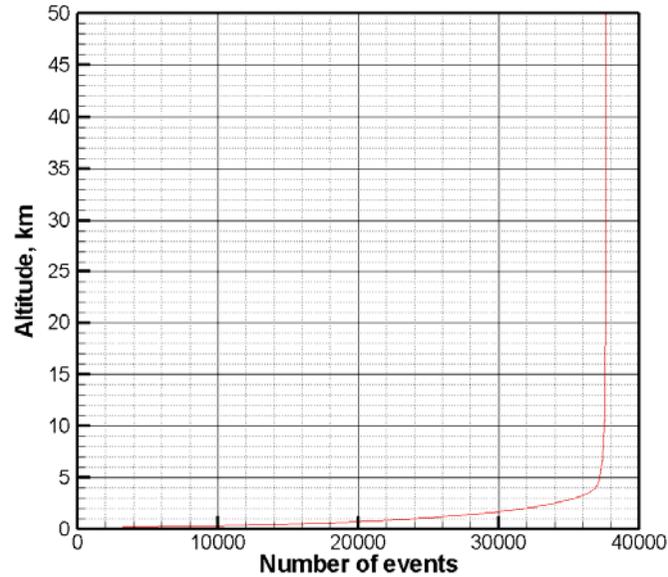


2007.10. GRAS - ECMWF. 60-90

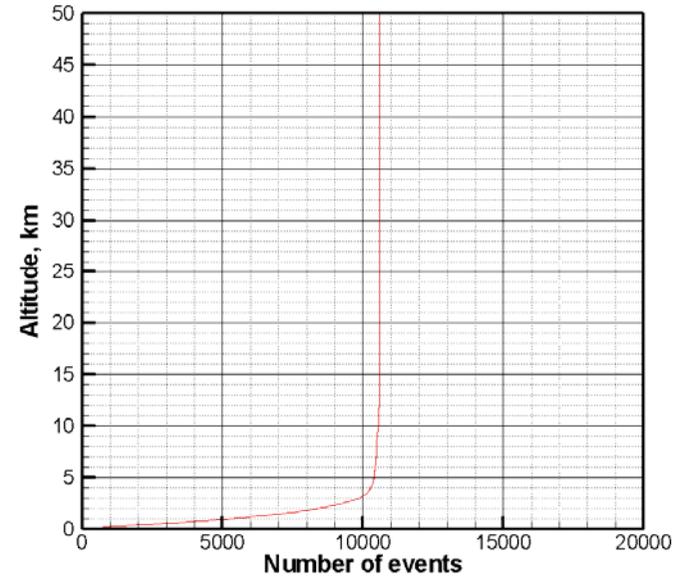


Compare to COSMIC April 2009: #occ

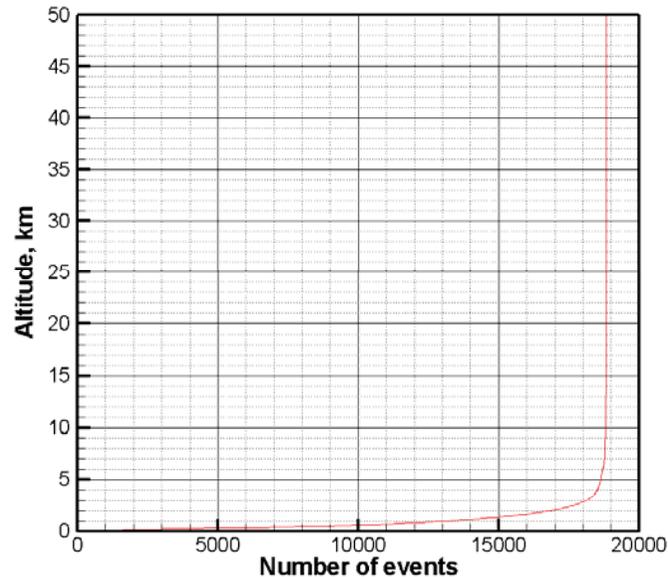
2009. COSMIC - ECMWF. World



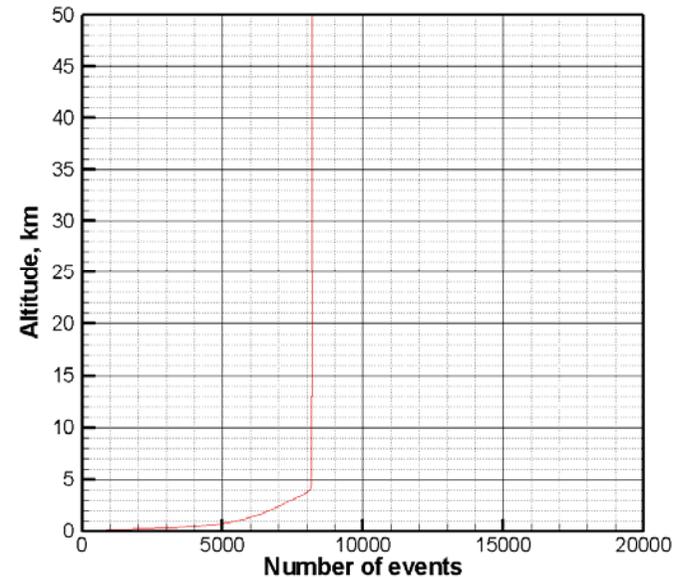
2009. COSMIC - ECMWF. 0-30



2009. COSMIC - ECMWF. 30-60

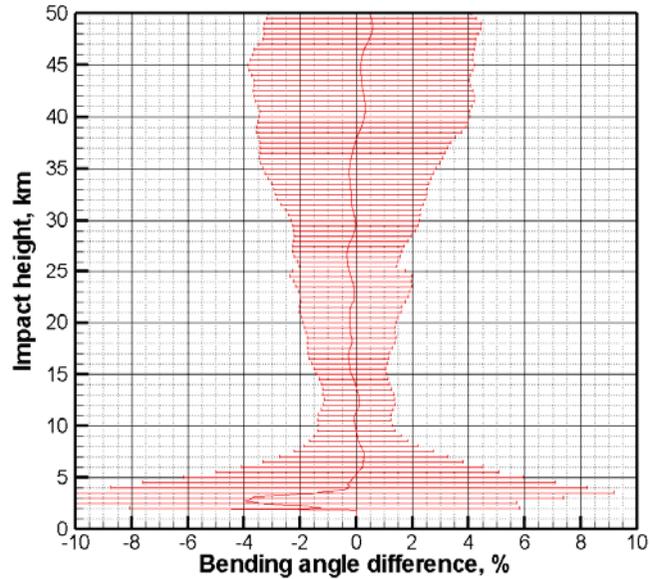


2009. COSMIC - ECMWF. 60-90

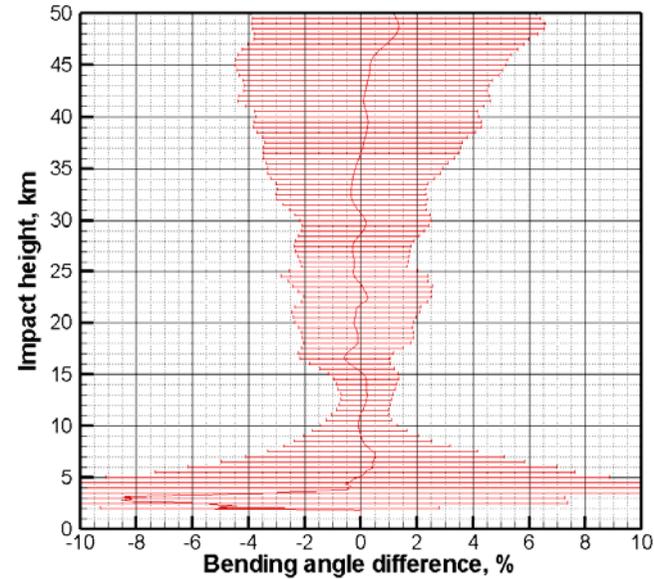


GRAS RS data: Oct 2007 smooth BA

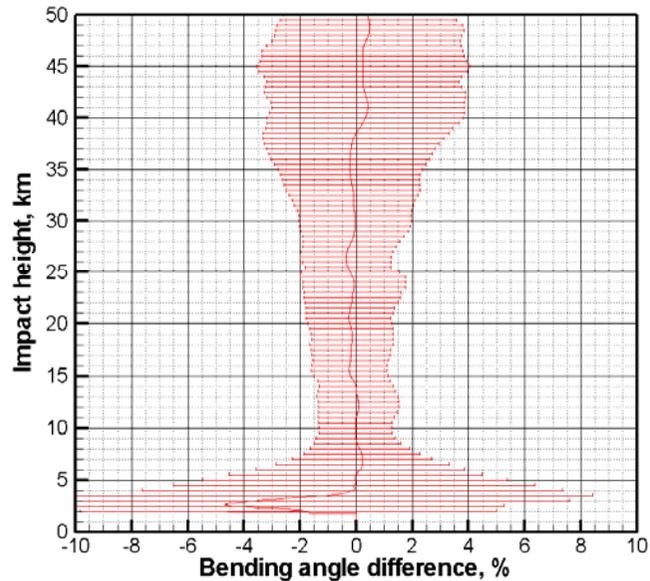
2007.10. GRAS - ECMWF. World



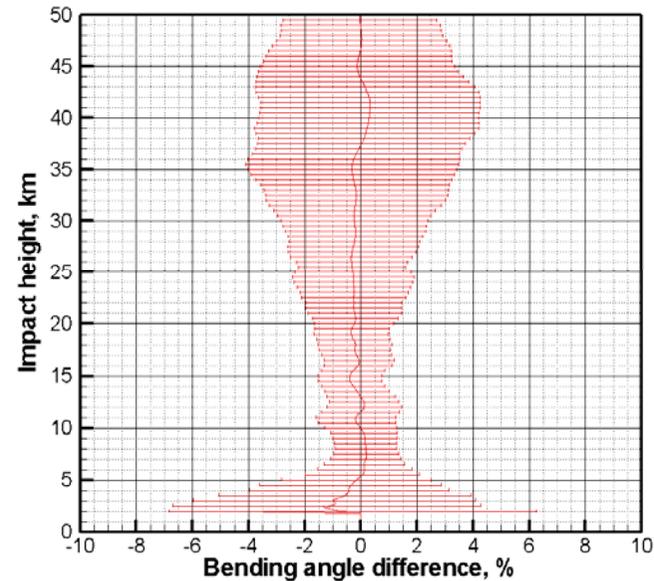
2007.10. GRAS - ECMWF. 0-30



2007.10. GRAS - ECMWF. 30-60

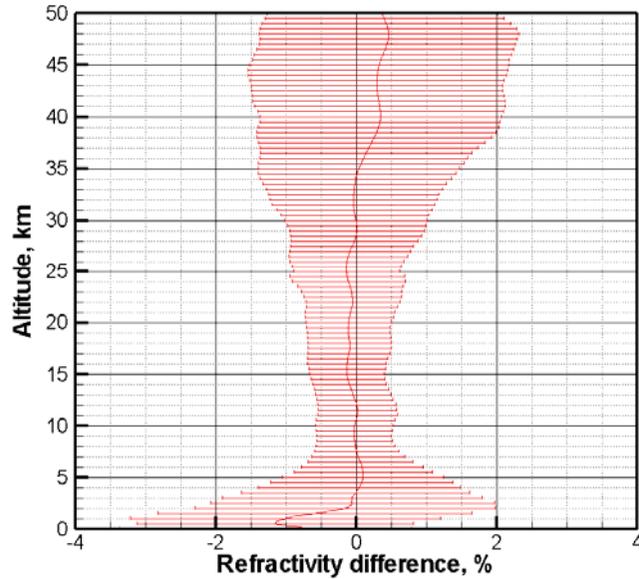


2007.10. GRAS - ECMWF. 60-90

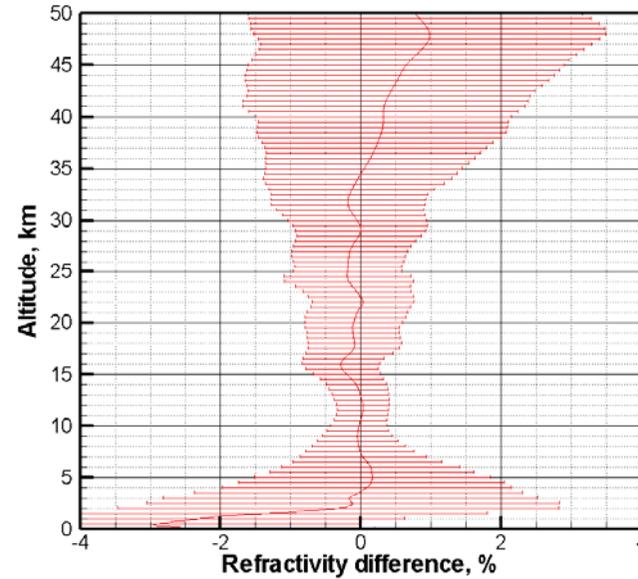


GRAS RS data: Oct 2007 REF

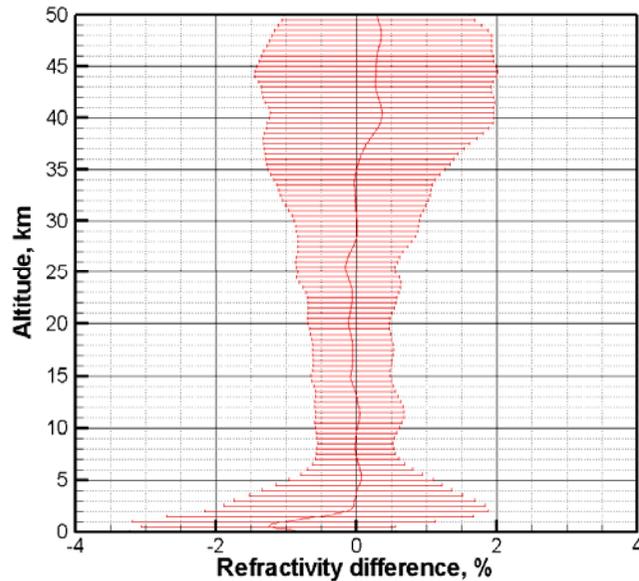
2007.10. GRAS - ECMWF. World



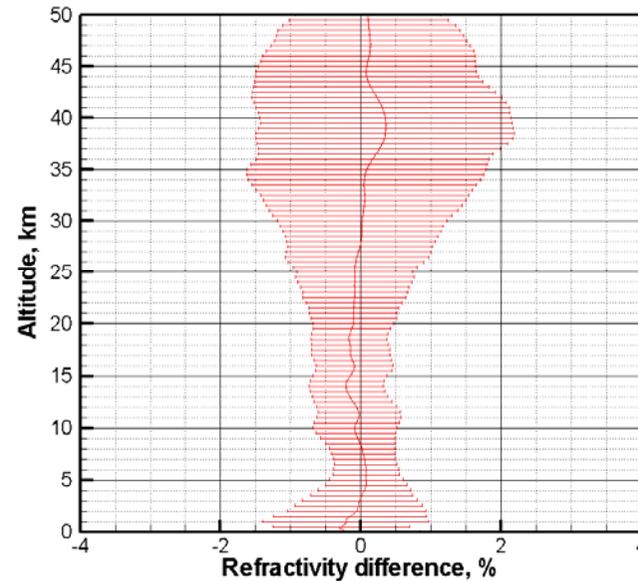
2007.10. GRAS - ECMWF. 0-30



2007.10. GRAS - ECMWF. 30-60

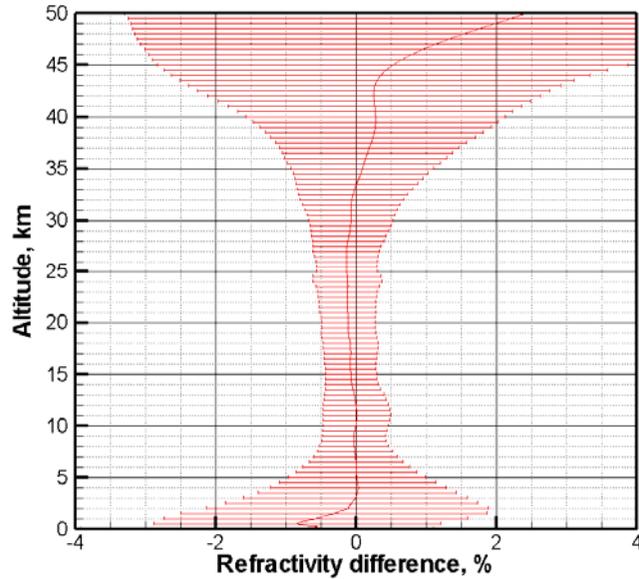


2007.10. GRAS - ECMWF. 60-90

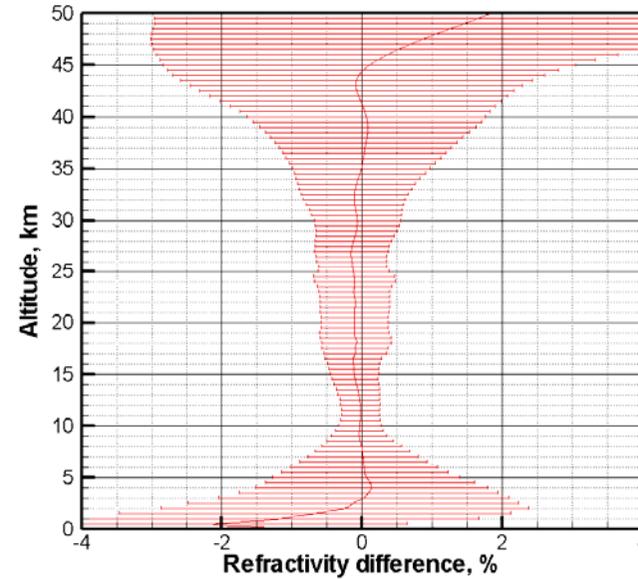


Compare to COSMIC April 2009: REF

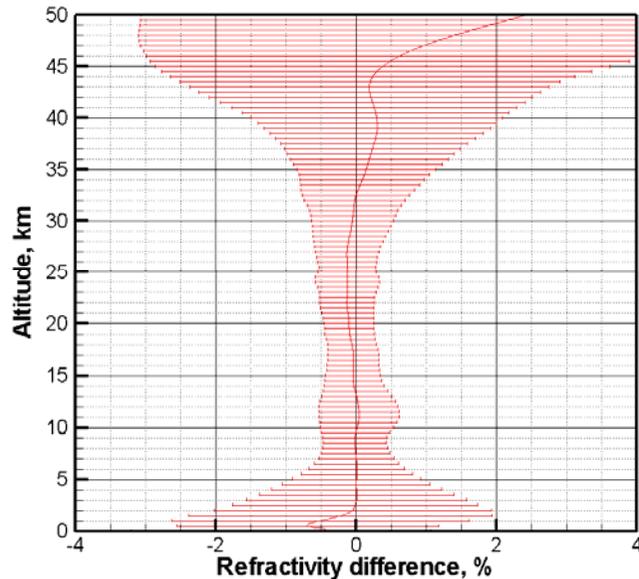
2009. OCC - ECMWF. World



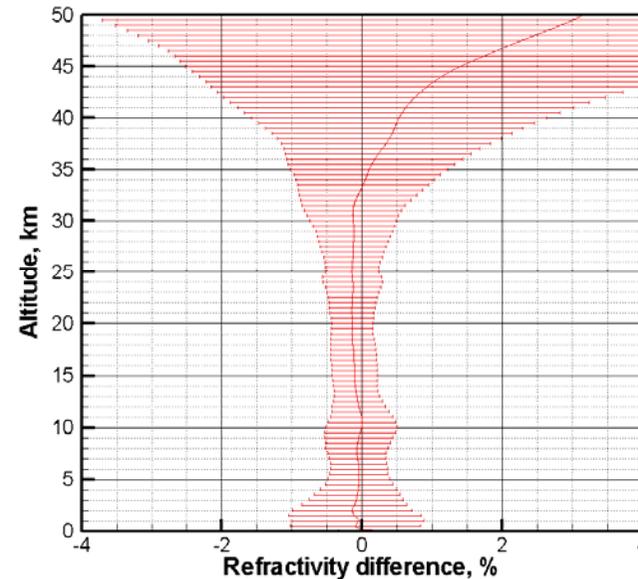
2009. OCC - ECMWF. 0-30



2009. OCC - ECMWF. 30-60

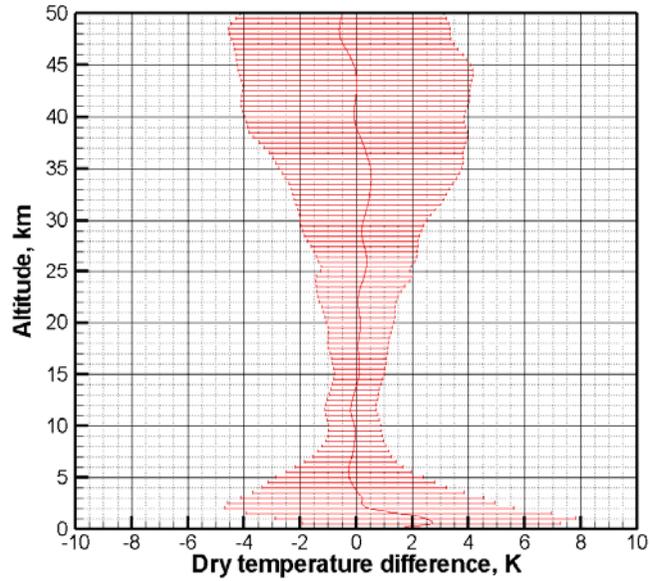


2009. OCC - ECMWF. 60-90

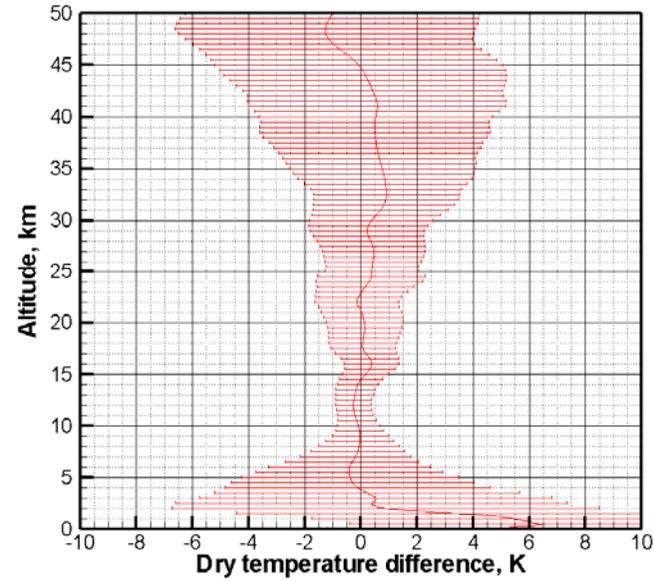


GRAS RS data: Oct 2007 Tdry

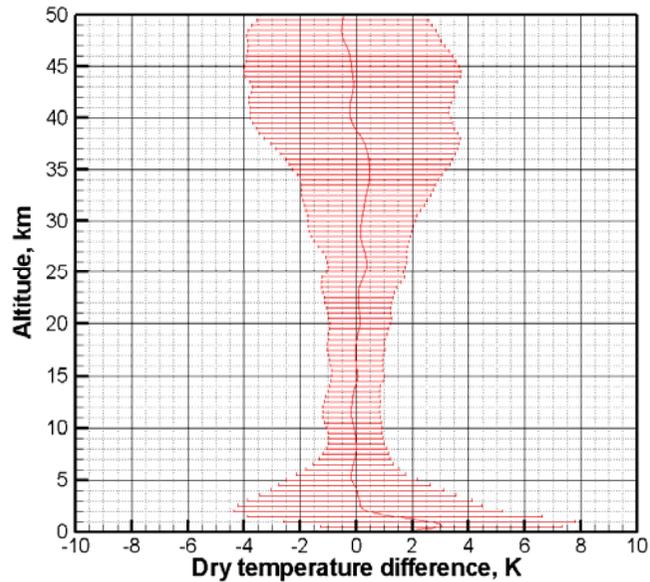
2007.10. GRAS - ECMWF. World



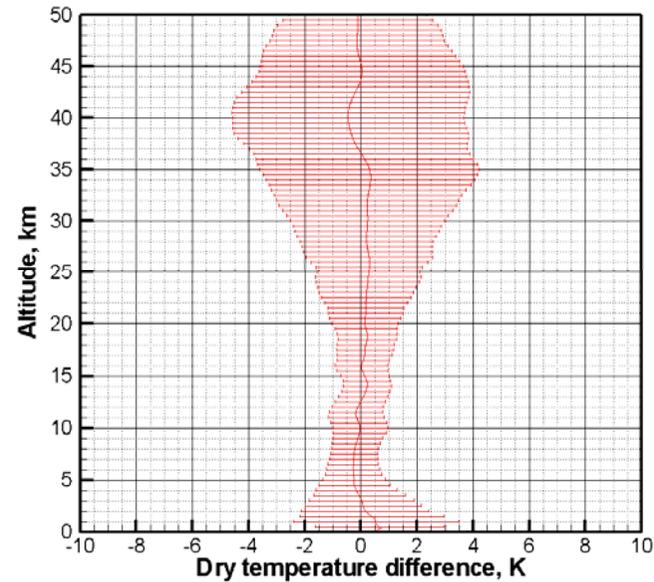
2007.10. GRAS - ECMWF. 0-30



2007.10. GRAS - ECMWF. 30-60



2007.10. GRAS - ECMWF. 60-90



GRAS RS results

Fractional BA deviation from ECMWF:

- smaller than 0.3% from 5-30 km
- lower troposphere negative bias: up to -6-8% at 2-3 km

Fractional REF deviation from ECMWF:

- smaller than 0.1% from 5-30 km
- lower troposphere negative bias: up to -3% at 500 m

fin