KIMRA
Kiruna Microwave Radiometer

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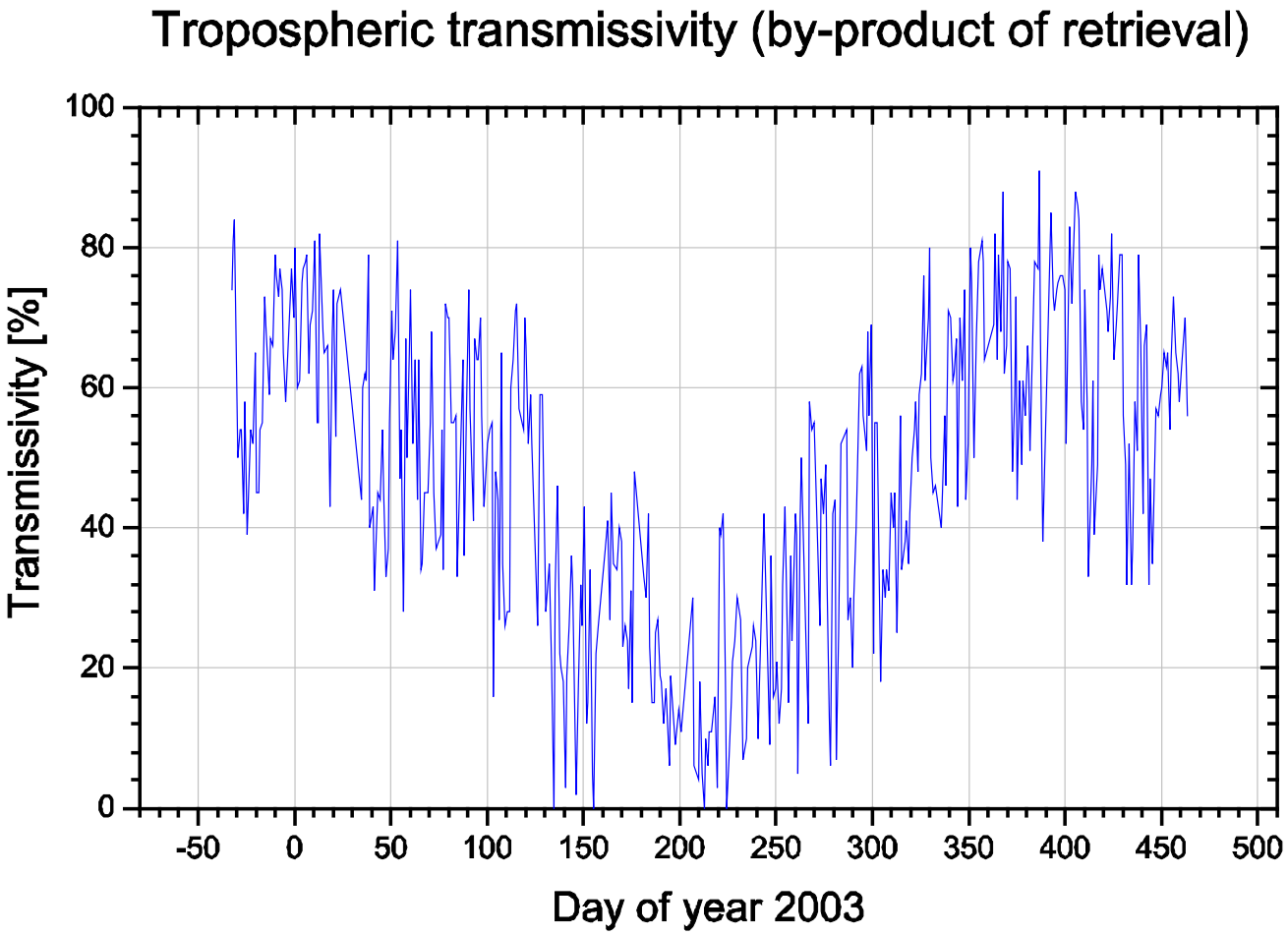
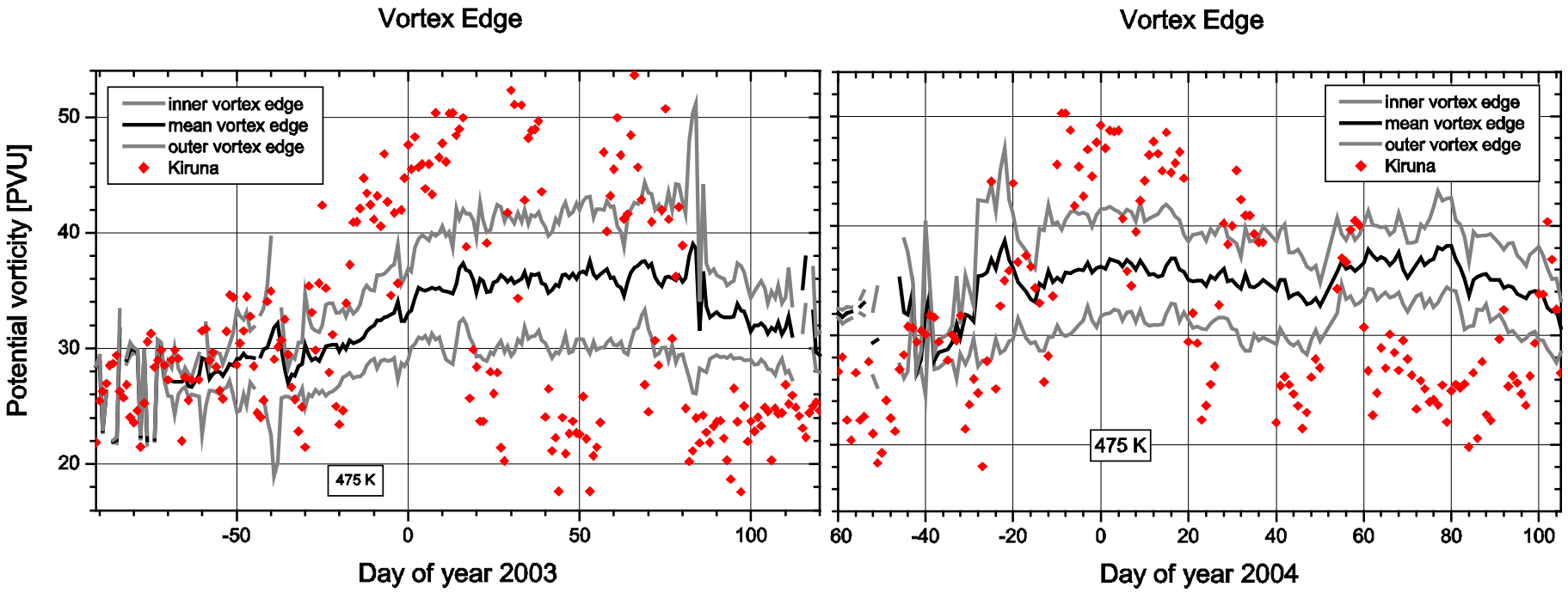
The KIMRA instrument at IRF Kiruna

- **Location above polar circle (67.8 N, 21.4 E)**
  - **Cold and dry winter troposphere transmissivity 0.53±0.18 (1σ) during period Nov - Apr 2003/04**
  - **Polar vortex**
  - **Vicinity to PSC**
- **Target species: O_3, ClO, N_2O, HNO_3**
- **Continuous measurements since Jan 2002 (ozone)**
- **Data retrieval by G. Kopp, IMK**

The KIMRA instrument at IRF Kiruna



The KIMRA instrument at IRF Kiruna



Definition of edge region according to *Equivalent Latitude Method*

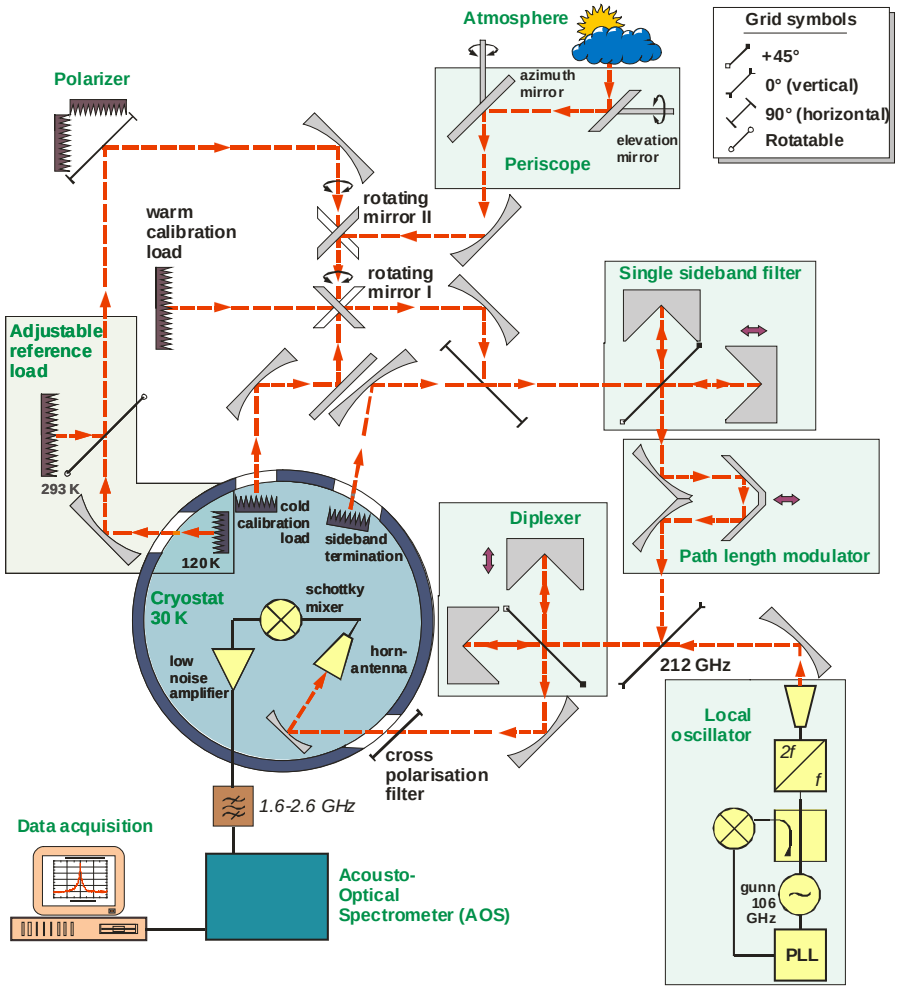
The KIMRA instrument at IRF Kiruna

System parameters

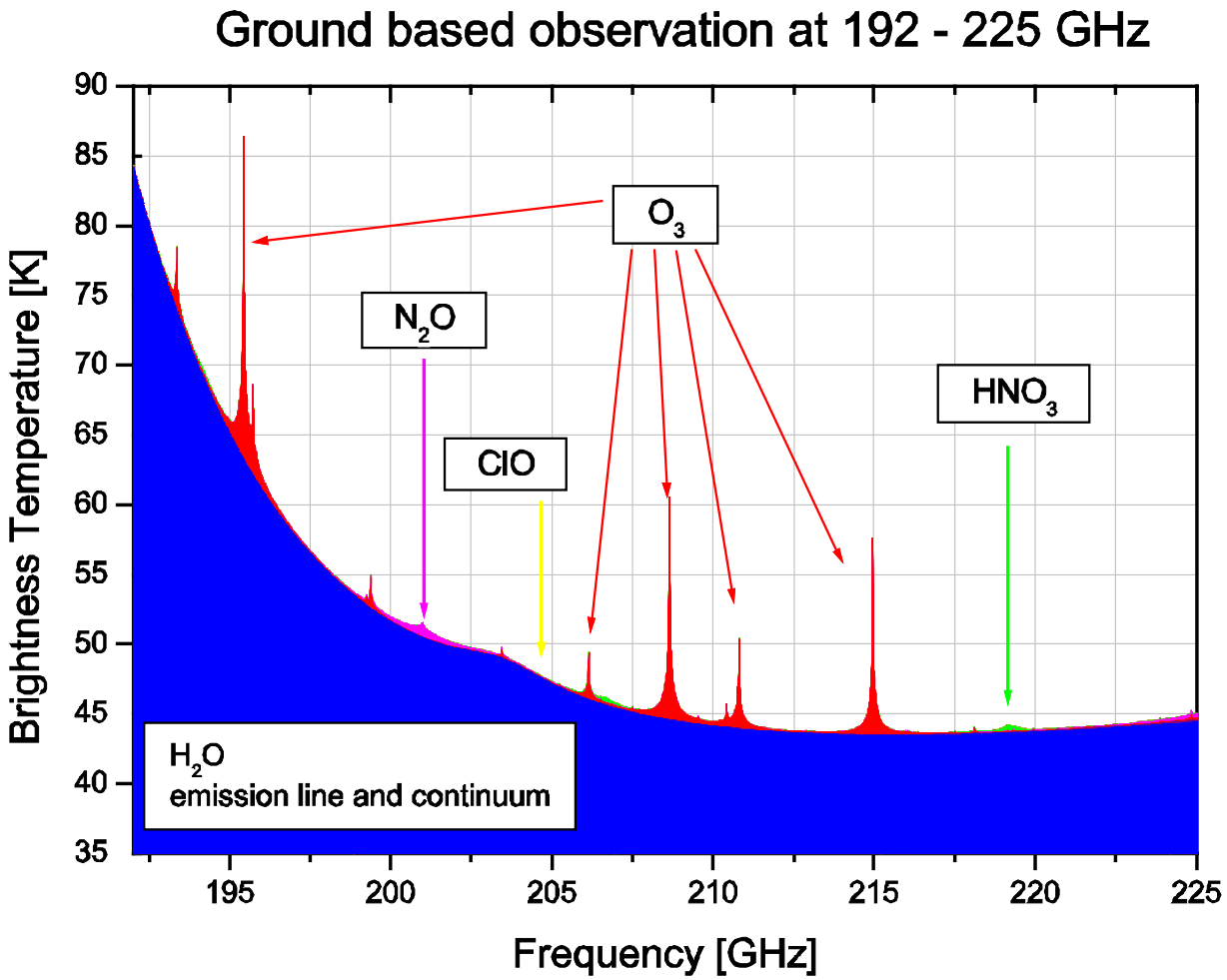
Frequency range	192 – 228 GHz
Local oscillator	Gunn diode (200 – 220 GHz)
1st and 2nd IF frequency	8 and 2.1 GHz, resp.
SSB-Filter	2 Martin-Puplett Interferometer
LO-Diplexer	
Receiver noise temp. (SSB)	1000 – 1600 K
Cooling system	2 stage cryogenic

Acousto-optical Spectrometer

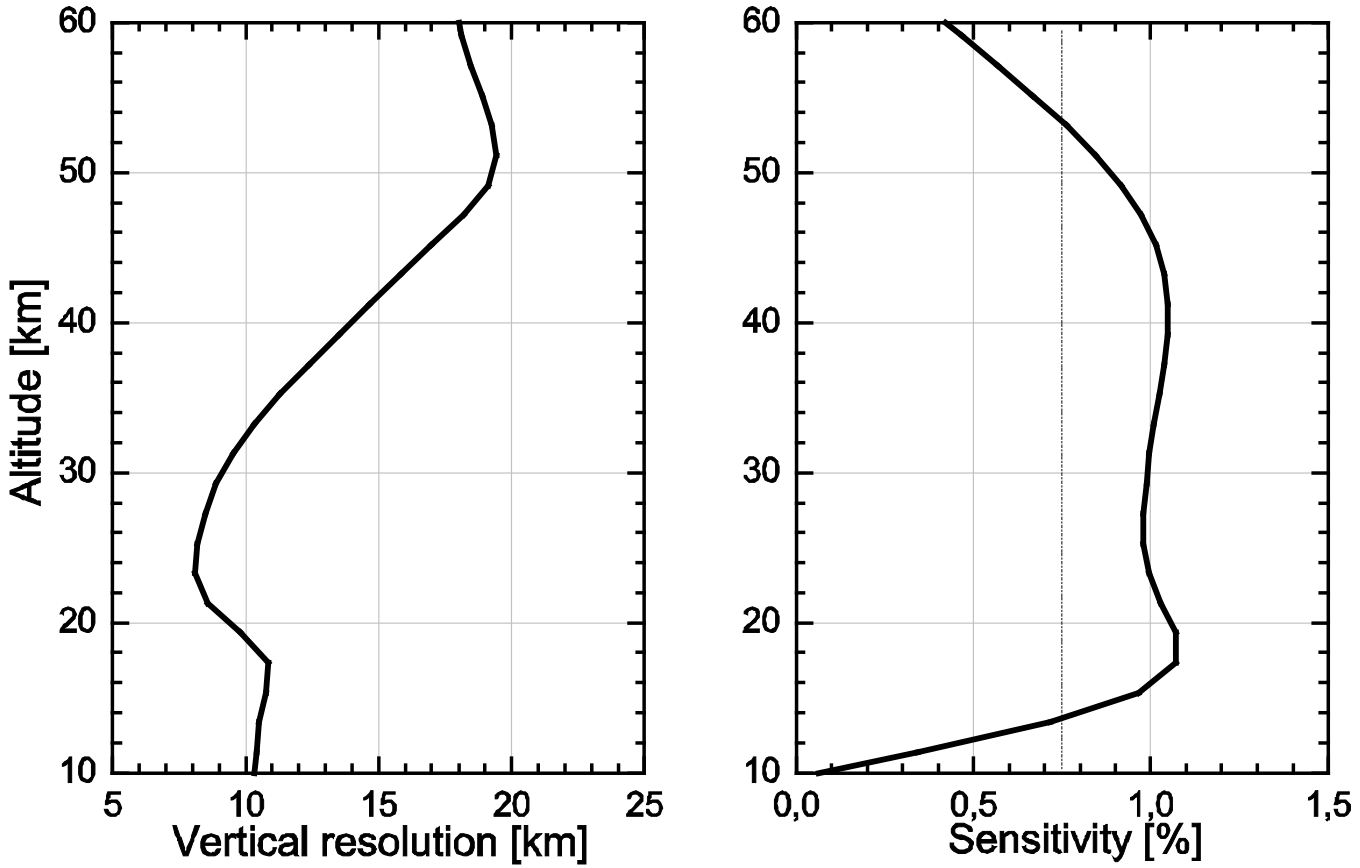
Number of channels	2048
Total bandwidth	1 GHz
Spectral resolution	1.2 MHz



The KIMRA instrument at IRF Kiruna



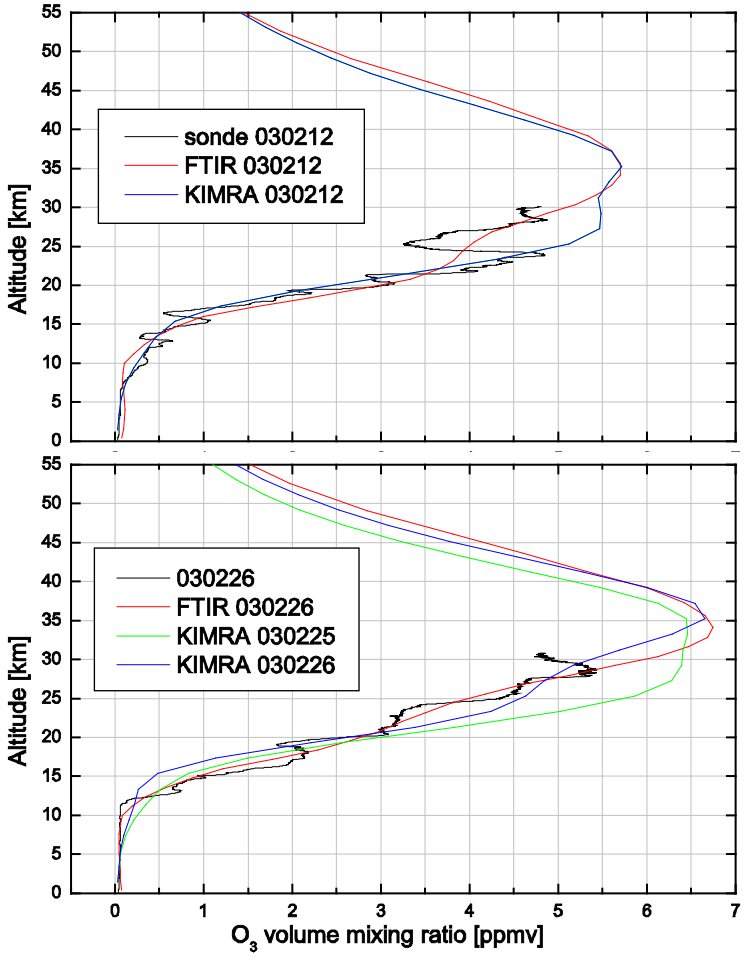
Vertical resolution and sensitivity of KIMRA

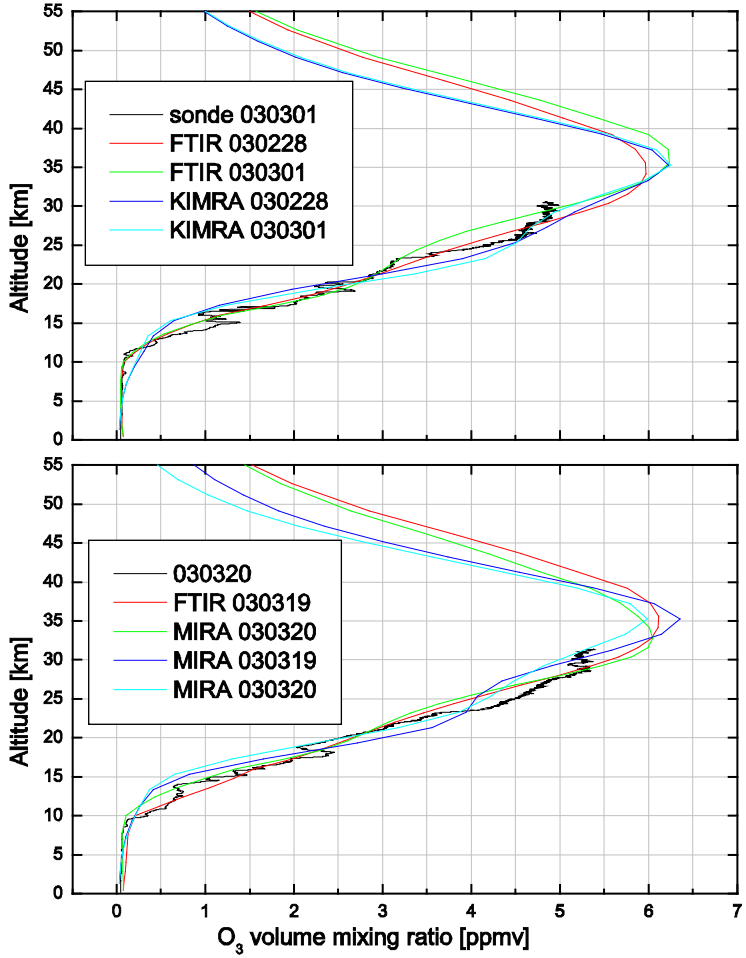


Comparison radiometer/FTIR/sonde

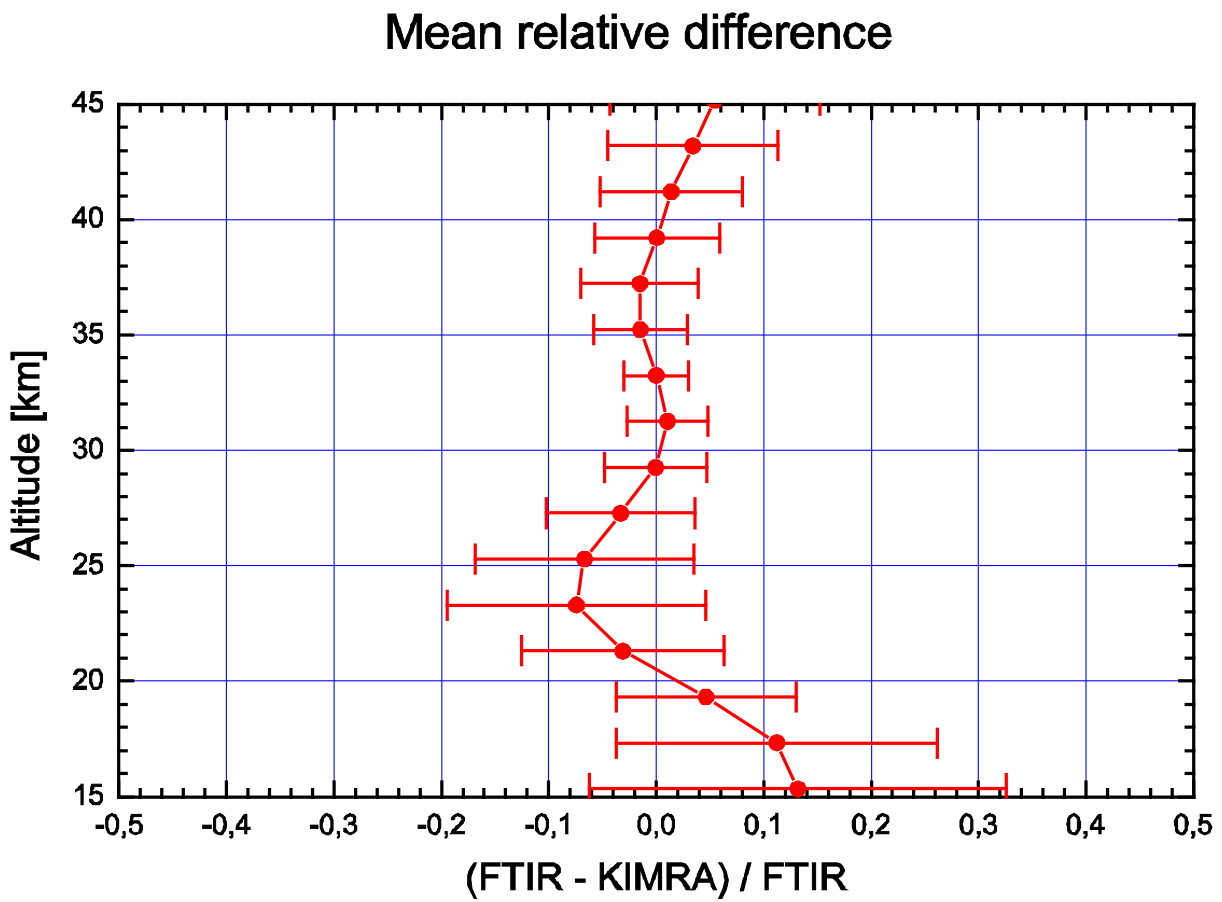
- Data from 030205 - 030321
- 14 Ozone sondes from Sodankylä
- 16 FTIR ozone profiles
- 28 millimetre wave ozone profiles

Comparison KIMRA/FTIR/sonde





Comparison KIMRA/FTIR



Summary

- A new mm-wave radiometer is operated at IRF
- Target species **O_3, ClO, N_2O, HNO_3**
- Frequency range 192 – 225 GHz
- Cryogenically cooled Schottky-mixer (25 K)
- Continuous ozone observations since Jan 2002

Problems

- Strong baseline of the order of 2-3 K …
  - quite stable
  - most likely between LO and mixer
  - impairs measurements of **ClO, N_2O, HNO_3**
- Cold calibration load temperature (value, drift)
- …

Further work

- Baseline effects have to be reduced
  - measurements of ClO, N_2O, and HNO_3
- Upgrade to higher resolution in the line center
  - ozone at high altitudes
  - time sharing with a future (?) H_2O radiometer