MIPAS version 7.03 temperature and ozone profile validation

Satellite validation with lidar

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Methodology

- MIPAS version 7.03 data filtered on retrieval quality flags
- Collocated with lidar profiles ($O_3+T$) and sonde/micro ($O_3$)

**Temperature:**

- Max. difference 300 km and 5 hours
- Lidar data between 15-70 km (sonde analysis not completed)

**Ozone:**

- Max. difference 800 km & 20 hours for ozone (5h > 50 km)
- Maximum allowed error = 30%
- Sonde < 30 km; Lidar data: 18-45 km; micro > 30 km
- Microwave sites used: Payerne, Mauna Loa and Lauder
- Corrected altitudes
- i.c.t.v.6: Tr warmer, ML warmer <50 km, fewer cold outliers in P
• Same altitude grid, more data: Tropics worse >50 km, larger spread; fewer differences in P & M

• Mostly collocations with night-time observations (>99%)
Limited amount of collocations
Substantially different bias observed in P & M for FR/OR, but amount of data is low.
Conclusions version 7.01 (temperature)

- Bias trending with increasing altitude for mid-latitudes and tropics, and to some extent in the polar regions in the OR period
- Differences between OR and FR periods appear to be substantial, but the amount of collocations is not very large.
• Corrected altitudes
• Differences within a few percent up to 60 km
Most data from OR period

Lower part of profile agrees very well
During OR: day-time observations agree better, FR: nighttime

Worse agreement at bottom of profile for nighttime observations
O₃ version 7.03 Lauder microwave comparison

- Better agreement in OR period
- Large positive outliers above 60+ km
Better agreement in OR period for polar region and part of mid-latitudes, not for tropics
• Bias gets ‘colder’ during the night
Most consistent in mid-latitudes

High ozone outliers in OR period in mid-latitudes
- Spread and bias mostly increasing with pressure
- Need to further look at tropics around 15 km (at many sites, cirrus?)
No definitive conclusions yet

But ozone results are consistent with the delta-validation dataset analysis