Altitude offsets in the sideways-viewing mode during the Teresina campaign, June 2008

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Abstract

We investigate suspected altitude offsets in the sideways-viewing mode. It has already been noted that the retrieved altitudes (determined from pressure) in the sideways-viewing aircraft-emissions mode from May 2005 are around 3 km higher than nominal, despite being reported as being around 2 km lower than nominal in L1B. We perform a similar analysis for RR nominal sideways-viewing mode data acquired on 7th June 2008 during the Teresina campaign. We find that the retrieved altitudes are around 2 km higher than nominal, despite being reported as around 3 km lower than nominal. Altitude offsets are consistent with previous results.

We investigate suspected offsets in the tangent heights in the sideways-viewing mode for data acquired on 7th June 2008 during the Teresina campaign, so that appropriate corrective action may be taken, if necessary.

It has already been noted that there is an offset in the tangent heights of the sideways-viewing aircraft-emissions mode (A. Dudhia; Dudhia, 2005, 2007). This offset is attributed to a slight tilt in the orientation of the MIPAS instrument with respect to the orbiting platform. However, retrievals reveal further descrepancies between the assumed offset, as reported by the engineering altitudes in the L1B data, and the actual offset, as indicated by the retrieved pressure. For measurements acquired during May 2005, the retrieved altitudes (determined by pressure) were around 3 km higher than nominal, despite being reported as being around 2 km lower than nominal in L1B.

We present a similar analysis using MIPAS NRT data acquired during the Teresina campaign on 7th June 2008. Figure 1 shows the scan locations for orbits on this date. There are 14 orbits in the rearwards-viewing RR nominal mode, and one orbit in the sideways-viewing RR nominal mode (orbit 32785). The measurements are on a floating altitude grid with higher tangent points in the tropics. Figure 2(a) shows the engineering altitudes reported in the L1B data for scan 11, which corresponds to a nominal altitude of around 21 km at mid-latitudes. Engineering altitudes reported for the sideways-viewing mode are between around 2 and 5 km lower than those reported for the rearward-viewing measurements.

The NRT L2 retrieved pressure is used to interpolate the engineering altitudes onto a 10 mb surface, chosen to be well above any cloud contamination in the pT retrieval.

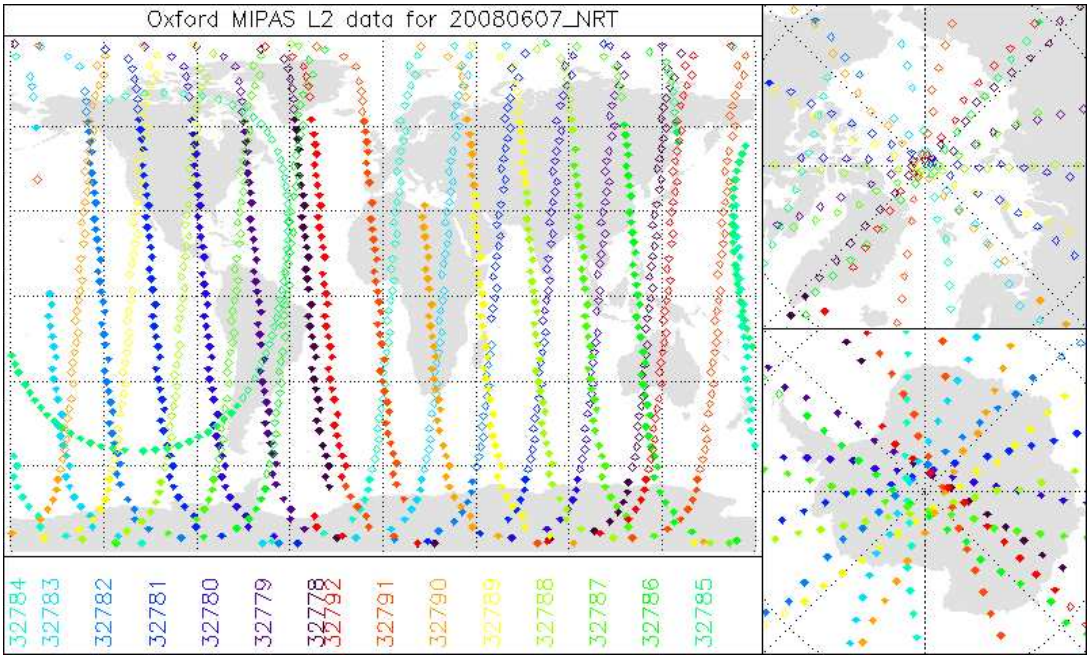
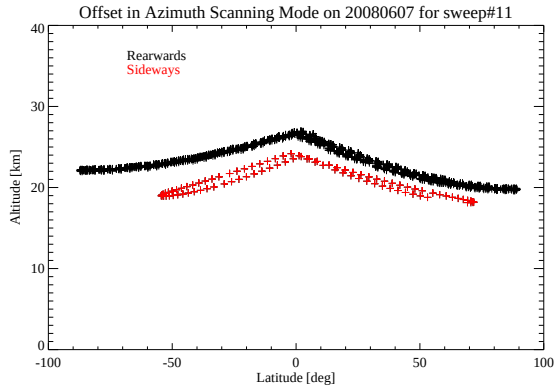
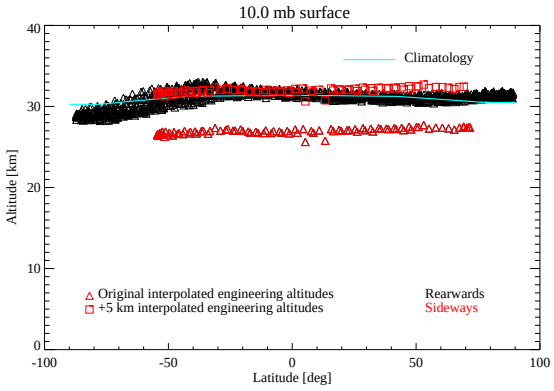


Figure 1: MIPAS scan locations on 7th June 2008 (Dudhia, 2008).

Figure 2(b) shows the engineering altitudes on the 10mb surface. The climatological height of the 10 mb surface, derived from the IG database by Remedios et al. (2007), has also been indicated. The difference between the altitude of the pressure surface for the sideways-viewing and rearward-viewing (assumed correct) modes indicates that the reported altitudes for the sideways-viewing mode are around 5 km lower than the true line-of-sight. These results are consistent with previous studies of the aircraft-emissions mode data from May 2005.



(a) Engineering altitudes, as reported in the L1B data, for the sideways-viewing and rearwards-viewing modes on 7th June 2008.



(b) Engineering altitudes (L1B) interpolated onto the retrieved 10 mb surface for sideways and rearwards-viewing modes on 7th June 2008.

Figure 2(b) also shows the engineering altitudes interpolated onto the 10 mb surface, when +5 km is added to the engineering altitudes reported in the L1B data for the sideways-viewing scans. The altitudes interpolated onto 10 mb now coincide.

Conclusions

The pressure retrieval indicates that the line-of-sight for the sideways-viewing mode is around 5 km higher than the engineering altitudes reported in L1B. However, since the engineering altitudes are around 3 km lower than nominal for this mode, the line-of-sight is in fact only around 2 km higher than nominal for this mode. These results are consistent with previous studies of the aircraft-emissions mode data from May 2005.

References

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