Atmos. Meas. Tech. Discuss., 2, C9–C10, 2009
www.atmos-meas-tech-discuss.net/2/C9/2009/

Atmospheric Measurement Techniques Discussions

Interactive comment on "New perspectives on gravity wave remote sensing by spaceborne infrared limb imaging" *by* P. Preusse et al.

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Received and published: 23 March 2009

general comments evaluating the overall quality The paper describes the "Infrared Limb Imaging" technique from space and its potential contribution to the observation of gravity waves. The scope therefore encompasses various domains : general atmospheric circulation, gravity waves and their impact on atmospheric chemistry, space based remote sensing, radiative transfer, optimal estimation, 2D-retrievals, atmospheric measurement techniques. All these topics are well presented and references to more detailed recent papers are provided. The need for a 2-dimensional tomographic retrieval to achieve a constant sensitivity to different wave vectors is illustrated using retrievals of temperatures fields from synthetic radiances calculations. An interesting study case was built from gravity waves modeled at ECMWF. It is shown that both along track

limb observations and across track are necessary for a uniform sensitivity and a full determination of the wave vector. This works builds on the experience gained with the CRISTA and MIPAS flights and the rapid spectral simulation code that was developed for these missions. An optimized experiment is proposed and the spectral range of the waves it will be able to measure is characterized. The paper appears as a proposal for a new space experiment that therefore deals with observation strategy for improved climate simulations that could better take into account the interaction with atmospheric chemistry. I appreciate very much this work.

specific comments addressing individual scientific questions/issues Page 828, lines 3-10, technical parameters for the ILI are given. You should more clearly tell that the horizontal coverage of 320 km is across track and corresponds to the 14 parallel tracks of vertical profiles (14 * 24 close to 320. Is that right ?). It is more easy to understand afterwards with page 834 lines 12-15. How was this swath of 320 km determined ?

I understand that the many observations in the vertical plane containing the orbit of the satellite provide better conditions to achieve the sensitivity 1 for all GW wavelengths. Is the retrieved temperature accuracy the same outside this vertical plane (with information from the across track radiance observations) ?

It would be interesting to show how the residual noise level Fig4 e) changes with different values for DeltaX=50 km, DeltaY=24 km, DeltaZ=0.5 km, DeltaR=1 nW/(cm2.sr.cm-1)

technical corrections typing errors, etc 2.1, end of 1st paragraph, last sentence : "For infrared limb sounders vertical resolutions of about 1.0 to 1.5 km are technical(ly) feasible."

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 825, 2009.