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Interactive comment on "Maximum likelihood representation of MIPAS profiles" *by* T. von Clarmann et al.

Anonymous Referee #2

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This paper describes a specific representation of trace gas profile retrievals from MI-PAS, a thermal-IR limb sounder. The maximum likelihood representation described here provides a useful alternative to existing MIPAS retrieval products and will address the needs of a subset of data users. The paper is clear and well-written. The subject matter is appropriate for AMT and the paper should be useful to users of MIPAS and other limb-sounding datasets. I recommend publication.

I have a few relatively minor comments/suggestions.

It would be helpful to provide the explanation of the term "maximum likelihood" in the Introduction rather than waiting until Section 2 to define this term. I think it would also be helpful to refer to the Bayesian framework in the introduction.

Page 2504, lines 23-25: In the section above, you state that the "maximum likely" estimate refers to a solution without consideration of prior information, but then in this section you go on to discuss the role of prior information/assumptions in the context of a maximum likelihood retrieval. This is a little confusing. Could you add some language to make this easier for the reader to follow?

Page 2510, lines 1-5: You state that for some species the ML-representation is inadequate. Could you list the species for which the ML MIPAS data products will be made available? Would it be possible to provide a table showing the global grid for each of these species? It would be very interesting to see how the grids for each species compare to the resolution of the master vertical grid. This might be a useful reference for other groups who might want to try this for other limb-sounding datasets and see how their vertical resolution compare.

Typos/grammar:

Page 2502, line 19: "maximum posteriori" should be "maximum a posteriori"?

Page 2503, line 26 to Page 2504, line 2: The mixture of past and present tenses in adjacent sentences is slightly jarring here. Consider changing to: MIPAS, a limb-viewing mid-infrared Fourier transform spectrometer, made global measurements of spectrally resolved atmospheric emission between June 2004 and April 2012. The spectrally resolved radiance measurements are processed to produce global temperature and composition distributions."

Page 2507, line 4: Should read, "The ML-characteristics are guaranteed. . ."

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 2501, 2015.