

## ***Interactive comment on “Profiling wind and greenhouse gases by infrared-laser occultation: algorithm and results from end-to-end simulations in windy air” by A. Plach et al.***

**Anonymous Referee #3**

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General This paper is one is a series of papers charting the development of algorithms from a specific measurement concept using a laser on one satellite in LEO and a receiver on another satellite. The author have dubbed this “LMIO”. The particular focus of this paper is the introduction of an improved algorithm for deducing line-of-sight winds from the data and at the same time providing a correction to the gaseous retrievals that are also influenced by the line-of-sight winds. The paper discusses six retrievals drawn from a variety of atmospheric conditions.

The paper is well-written but is highly technical and an appreciation of the paper relies on familiarity with an unusually large number of other technical papers with the authors

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of this paper also appearing as authors of those papers.

There are a considerable number of references that are to various documents that are only available on the web or from similar sources. It is not clear whether these documents are peer reviewed and these documents may not be available in the future. The authors should be encouraged to substitute peer-reviewed papers as references wherever possible.

Since the Abel transform is considered foundational to this study, a short review of the Abel transform and its relevance to this study would have been appropriate.

There are only six profiles considered in this study and these consist of three pairs. Although the authors make the case that these profiles encompass “a good diversity of atmospheric conditions” a more comprehensive set of profiles would increase the confidence in the results.

On page 408 line 5 it is stated that “we use the clear-air conditions as context”. It is not quite clear what is meant by this statement as in the paragraph it appears it seems to imply that a number of effects are being neglected, but later in the paper (e.g. page 421 line 5) it appears that these effects are being included.

There is a great deal of detailed explanation of the sub-processes involved in performing these calculations – along with a large number of acronyms for these modules – but these explanations did not seem to further understanding of the fundamentals of the simulations. The problem is partially that this work relies on so much else, but more thought to clarity of explanation rather than the technicalities of the modules would aid the utility of the paper.

Figure 4 is redundant and could either be combined with figure 5 or the relevant data (six sets of lat/long co-ordinates) could be included in the text.

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