Interactive comment on "Ozone-sensitive channel selection over IASI full spectrum with correlated observation errors for NWP" by Olivier Coopmann et al.

Anonymous Referee #3

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We would like to thank the Referee for his/her valuable comments. Referee's comments will be answered one by one in the following. As the manuscript has been thoroughly modified after the suggestions of several referees, some minor points will not be addressed here, as the corresponding sections may have been deleted or replaced.
Please note that the objectives of the paper have changed a bit. We now are using the full band 1 and band 2 of IASI to carry out a new channel selection from scratch, as advised by referees. Title has been modified accordingly: Update of IASI channel selection with correlated observation-errors for NWP.
Original text from the referee is in black, our answers in blue.

General comments

This manuscript describes a study on selection of channels in the 10 micron ozone band, geared towards improving the representation of not only ozone, but also temperature and humidity in NWP analyses. As indicated by the references, there has been quite a lot of previous work on channel selection and it is not easy to show strong improvements relative to existing channel sets already in use. The authors have obviously taken care and paid attention to details in this study, but in general, I found the discussion of various different channel sets and subsets confusing. I was not able to follow the argument leading to the numbers presented in the abstract that described the magnitude of the improvements in temperature and humidity analyses. I might suggest that the Introduction could be better formulated to provide a clear re-view of what other work is out there and what is important/significant about this work compared to previous studies. For example, the Ventress and Dudhia channel selection study is not mentioned until fairly deep in the paper, but it seems as though if this is an example of another study that utilized a non-diagonal observation error covariance, then it ought to be cited in the introductory material. Would it be possible to include a table or tables to (1) review previous work on channel sets for ozone radiance assimilation and summarize the important advantages (or short comings) of how they were selected and (2) summarize the channel sets considered here and their performance/impact on the ozone/temperature/humidity analyses?

We now present results from a channel selection which is not aiming at adding channels to an existing one, but at building a new channel selection with nowadays standards. Large parts of the paper have been removed, re-arranged, re-written. We hope that the paper is now offering a more useful material in a more legible manner.
Other studies now are also cited in the introduction.
Please note that we are not focusing only on ozone this revised version of the paper.

Minor comments/typos:

Page 5, line 24: Is PAN the appropriate abbreviation for Peroxyacetic Nitric Anhydride? My understanding would have been that PAN would usually refer to Peroxyacetyl Nitrate, which decomposes to form thermally stable Peroxyacetic acids (PAAs), which are then photolyzed. I am not a chemist, but it may be worth checking this one.

The description of MOCAGE has been shortened and there is no reference to PAN anymore.

Page 9: "The ozone profiles from MOCAGE are realistic but do not represent reality."This is an odd statement. The profiles may be closer to the truth than using a standard RTTOV profile, but that isn't necessarily saying much. It would be better to just say that the ozone profiles from MOCAGE are, on average, biased (high) relative to reality.

Agreed, the description has been modified (the whole section containing this statement has been revisited).