

Response to Referee #2

General comments:

a) I am not sure the reviewer comments are based on the discussion paper. In fact I believe the reviewer is commenting the original version of the manuscript. For instance, in the *Additional comments* section, the reviewer refers to page 7, line 6 and suggests to replace *night-time* with *day-time*. In fact, *nigh-time* appear on page 7, line 6 of the original manuscript. The reviewer also refer to missing references (Rizzi and Tjemkes) that are present in the discussion paper but in fact absent in the original manuscript. The discussion paper is a much revised version of the original paper where the issues related to the structure and length of the various sections has been, in my view, thoroughly addressed.

The only true acronym that is not defined in the paper is *IFS*. I will clarify it in the paper. Any other symbol used in the figures or elsewhere is properly explained in the main text.

b) LBL models are used in many applications, among those, the retrieval of atmospheric profiles (or column amounts) of trace gas species that can be used in climatology or atmospheric chemistry. In that respect, the paper has its own merits. If the better understanding of LBL model errors can lead to the improvement of LBL calculations, then any retrieval scheme based on the use of LBL models can benefit from that and in turn, any application that makes use of LBL models. I can make this point explicit in the paper. I do not agree, however, that this should be done in the abstract but rather in the introduction.

Additional comments:

I am not sure why retrievals should be mentioned in the paper and what is the merit of commenting on the use of LBL models in retrieval schemes [see comments in section b)]. The objective of the paper is to assess fast radiative model errors using IASI observations.

I will try to address the point made by the reviewer regarding the way the spectra are denoted in the plots. However, I should emphasize that what is used in the figures are not acronyms but symbols whose meaning is clearly explained in the main body of the paper.

I agree with the reviewer that the meaning of 33R1 and IFS should be clarified (IFS is indeed an acronym). I will change the text accordingly. I will also clarify the meaning of *experiment* and change to 3 the number of experiments discussed in the conclusions.

In the discussion paper the grey literature has been reduced to the barest possible amount.

The references to Rizzi and Tjemkes are present in the discussion paper.

I will correct the bracket on the y-axis of figures 1 and 2.

I do not agree with the reviewer that figures 7, 11 and 15 should be all made consistent (figures 11 and 15 are in fact consistent). There is no reason why this should be. Figure 7 is inconsistent to figure 11 and 15 because it describes different results.