

## ***Interactive comment on “Iodine chemistry after dark” by Alfonso Saiz-Lopez et al.***

### **Anonymous Referee #1**

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Saiz-Lopez et al. investigate the nighttime chemistry of iodine. The study is very interesting and I recommend publication in ACP after considering several changes as described below.

- Title:

I find the expression "after dark" quite unusual for a scientific paper. Why not simply call it "nighttime chemistry"?

- Section 4:

Instead of presenting the full chemical mechanism, the authors refer to 6 previous publications. I find it quite tedious that I have to obtain and read 6 additional papers if I want to check the currently used mechanism. I suggest to provide the full mechanism (exactly as it was used in this study) together with this paper, e.g. in the supplement.

- Page 11, line 1:

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It is said that "HOI peaks during the daytime". I think a better description would be to say that it peaks just before sunset. What is the reason for the sunset peak?

- Page 11, lines 13-14:

"It should be noted that during nighttime the uptake of emitted species such as I<sub>2</sub> and HOI, and the uptake of reservoir species such as IONO<sub>2</sub>, can play a major role in the cycling of iodine."

What is meant by "uptake"? Uptake on aerosols? On clouds?

- Page 11, line 21:

The outdated JPL recommendation Sander et al. 2006 is cited here for mass accommodation coefficients. Has it been checked if there are any updates in the current recommendation JPL 2015?

- Page 12, lines 16-17:

"The IO dawn spike [...] is due to a buildup of the emitted I<sub>2</sub> and HOI [...] over the night".

I cannot see a buildup of HOI in Fig. 4.

- Page 12, line 21:

"Reactions R1 and R4 also reduce the NO<sub>3</sub> mixing ratio (Fig. 4, middle panels)."

Should this be Fig. 5?

- Page 13, line 17:

Please define "LT".

- Table 2: The numbers listed here are probably wave numbers, not vibrational frequencies.

- Figs. 4 and 5: A color scale should be shown. Also, it would be easier to compare

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the left hand panels with the right hand panels if the same color scale was used.

- Fig. 5: For consistency, the name IONO2 should be used in the plots, not INO3.

- Fig. 7: What is a "vertical mixing ratio"?

- Figs. 7,8,9:

"without reactions (1) and (2)"

Should this be "without reactions (1) and (4)"?

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