

Interactive comment on “Atomic oxygen number densities in the MLT region measured by solid electrolyte sensors on WADIS-2” by Martin Eberhart et al.

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Dear reviewer,

thank you very much for your valuable comments that we will try to address in the following:

- The potential effect of excited atomic oxygen on the measurement has been mentioned briefly in the Appendix A: Uncertainty and Sources of Error (page 23). Here we cited our previous work where the analysis of this species within the calibration setup is described in detail. As a result, no evidence for excited molecular oxygen could be

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provided. We have now added some sentences in order to point more prominently to this important fact.

- We agree that the presentation of the results from 6 sensors for each up- and downleg may be confusing and that the reasons for the different absolute values have not been given clearly enough. In fact, all sensors were different in one or more aspects, namely their position on the fore or aft deck, their orientation and their mode of operation (controlled or uncontrolled). This was done in order to define the best configuration for the complex real-life scenario of a rocket flight. As a result, it was found that the best density profiles, compared to the photometer values and the MSIS model, were obtained for the controlled sensor with rotated orientation on the aft deck, during downleg. The conclusion of a reliable, quantitative measurement method is attributed to this preferential sensor configuration which is suggested for future application. We have added an introductory paragraph to the discussion section that helps to clarify this. We have rewritten parts of the conclusion and the statement of "quantitative profiles of atomic oxygen number ... with a very high vertical resolution" is now clearly related to this preferential sensor configuration.

- p.17, fig.11: We agree that the presentation of the photometer data should include a remark on the high density values below 80 km. The reason can be found in auroral emissions during the flight, measured by an additional on board photometer. The emissions were weak and steady in the range of 87 to 96 km, which can be handled during data analysis, but were unsteady above and below this region. This accounts for both up- and downleg and leads to density values that are higher than expected. We have added a paragraph that briefly discusses this.

- p.18: An uneven gold plating and the resulting sensitivity to molecular oxygen can have a large influence on the sensor reaction via the overpotential control. This may as well push the signal during a phase of decreasing oxygen (O₂) concentration (upleg) as well as lowering it during an increase (downleg). We have added a sentence that explains this and highlights the importance of the insensitivity to molecular oxygen that

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has to be checked during calibration.

We have accepted and changed all of the minor points.

Thank you for your time and thoughts The Authors

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