

## ***Interactive comment on “Retrieval algorithm for densities of mesospheric and lower thermospheric metal and ion species from satellite borne limb emission signals” by M. Langowski et al.***

### **Anonymous Referee #3**

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In this paper the authors describe the development of an algorithm to retrieve altitude profiles and longitude-latitude density fields of Mg and Mg<sup>+</sup> in the mesosphere and lower thermosphere from limb-scanning measurements of the Earth’s UV dayglow spectrum with the SCIAMACHY instrument on board ENVISAT. As Mg is a major component of the incoming meteoric material, and cannot be studied from ground, this is an important contribution to the understanding of mesospheric metal chemistry. This is a very good work. The paper is well written, with appropriate detail and length, and well illustrated with detailed figure captions. I would, however, suggest replacing figure

C3078

2 with a figure showing the effect of ozone and multiple scattering in connection to the discussion in the text. I think this would be more convincing. Some suggested minor corrections are listed below (see also supplement pdf).

Minor corrections:

Page 4446, line 1: ...the Earth’s atmosphere...

Page 4446, line 5-6: ...retrieval of metal atom and ion number densities...

Page 4446, line 10: Metal atoms and ions are strong emitters...

Page 4446, line 24-25: The meteoroids ablate...

Page 4446, line 25-26: ...around 80 to 100 km altitude... (to be consistent with the rest of the paper).

Page 4447, line 2-3: The ablated metal atoms may also...

Page 4447, line 25: ...until the mid 1990s have been...

Page 4451, line 20: ...absorption paths)...

Page 4453, line 21: ...from this band is negligible small.... “Neglible” is not an English word as far as I know. Correct throughout the paper.

Page 4460, line 15: ...inverted be  $Kx = y$ , where  $y$  represents...

Page 4460, line 16: ...individual measurements,  $y$  is a...

Page 4468, line 17: ...conditions, like e.g. scattering angles...

Caption figure 2, line 4: Rewrite to something like “...remaining light at 285 nm and 280nm, values of the order of 10<sup>-9</sup> and 10<sup>-14</sup>, respectively, are obtained.”

Caption figure 3, line 1, and figure captions in general: This is just my personal opinion, but avoid having abbreviations in the figure captions without defining them. E.g. for figure 3, “Fig. 3. Slant column emission (SCE) determination.” Same for SCD, LOS,

C3079

LFS, etc. They are defined earlier in the text and maybe this is enough. . .

Caption figure 4, line 1: remove comma after "line" i.e. . . .285.2 nm line for a limb. . .

Caption figure 4, line 4: too many "the". . .the differences are nearly the same. . .

Caption figure 17, line 2: ". . .center of the line." or ". . .line center."

Caption figure 17, line 2: something missing between "product" and "solar". . . maybe "of"?

Caption figure 20, line 5: "so" instead of "that"? . . .the self absorption is so strong, that the measured. . .

Caption figure 30, line 6: . . .the differences drastically rise.

Please also note the supplement to this comment:

<http://www.atmos-meas-tech-discuss.net/6/C3078/2013/amtd-6-C3078-2013-supplement.pdf>

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