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**Title:** Retrieval algorithm for densities of mesospheric and lower thermospheric metal and ion species from satellite borne limb emission signals.

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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 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.

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.... "Negligible" 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  $10^{-9}$  and  $10^{-14}$ , 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, 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**.