

Letter to the Referee,

We appreciate the referee's precise clarification regarding the limitations of the Moen and Brekke flat-Earth approximation at large solar zenith angles. It is true Earth's spherical geometry allows for non-zero solar EUV conductance even when the sun is geometrically below the horizon as seen from the ground. However, it is important to distinguish the conditions at Svalbard from those at Tromsø; Svalbard's significantly higher geographic latitude places it in a deeper darkness compared to the auroral zone measurements cited.

We acknowledge that fringe EUV photoionization is likely present in approximately one-third of our 'local winter' dataset (specifically during the transitional periods near the start and end of the winter window, and at low solar elevation angles, adjusting for altitude).

In the paper, we acknowledge the issue, near lines 50, 70, 100, and 195, and Figure 1 caption (line numbers referring to the track changes PDF).

Sincerely,

Magnus F Ivarsen