

Ann. Geophys. Discuss., referee comment RC2
<https://doi.org/10.5194/angeo-2021-31-RC2>, 2021
© Author(s) 2021. This work is distributed under
the Creative Commons Attribution 4.0 License.

Comment on angeo-2021-31

Anonymous Referee #2

Referee comment on "Observing electric field and neutral wind with EISCAT 3D" by Johann Stamm et al., Ann. Geophys. Discuss., <https://doi.org/10.5194/angeo-2021-31-RC2>, 2021

The study describes methodology to estimate uncertainties for the future observations of electric field and neutral wind by EISCAT 3D. Altitude profile variations in these uncertainties are calculated and analyzed in the E and F region ionosphere. This type of analysis is very important for the science community in the preparations for the new facility. However, it seems like some background information is missing. I encourage the authors to consider the following suggestions.

* To meaningfully talk about uncertainties in electric field and neutral wind measurements the actual values of those parameters or their ranges need to be outlined to communicate if the concluded uncertainties are of the order of 1, 10 or 100% of the absolute value.

* The estimated uncertainties are for a time and height resolution of 5 sec and 2 km. How are these selected and how sensitive the results are to the data resolution? E3D is meant to be a versatile instrument, so the resolutions are hardly fixed values there.

* A short paragraph at the end of the introduction stating the motivation and aim of this study, and the knowledge gap that is being filled with this study would be very helpful.

* Providing a sketch of the scattering geometry together with the station locations would help a non-Scandinavian reader very much.

* Proper definitions of the "quiet night-time" and "night-time with auroral precipitation" need to be given to provide the context and background for the comparison.

Additional small items:

Line 6: either field-aligned profile or altitude profile

Line 14: How is significant influence determined?

Line 126: It is not obvious what this downscaling means...

Line 147: Can you put a factor for the lower electron density during the solar minimum conditions?

Line 148: Is integrating over a longer time period not another option?

Figure 2: The nighttime profiles seem to have semi-regular wiggles in them. Where do those come from?

Line 181: Is dropping the subscripts referring to the xyz ones or the i ones or both?

Line 187: "at a certain altitude" rather than "at an altitude"

Line 188 (and on many other lines): "electric" instead of "electrical"

Figure 3: The dotted and dashed lines are very difficult to differentiate. Please use different marking/symbols. "Lines show" instead of "line shows" in the last caption sentence.

Line 285: "by" rather than "in" the rocket experiment

Line 299: Please state the uncertainties of the previous studies for comparison.