Atmospheric Measurement Techniques Discussions

Atmos. Meas. Tech. Discuss., referee comment RC3
https://doi.org/10.5194/amt-2022-214-RC3, 2022

Comment on amt-2022-214

Anonymous Referee #2

Referee comment on "Long-distance propagation of 162□MHz shipping information links associated with sporadic E" by Alex T. Chartier et al., Atmos. Meas. Tech. Discuss., https://doi.org/10.5194/amt-2022-214-RC3, 2022

The paper is about the detection of long distance AIS signals in the western Atlantic ocean, supposedly propagating via sporadic-E layers.

The paper is nicely written, I definitely enjoyed reading it and support its publiction.

My main complains are

1) the statements of tropospheric ducting being limited to roughly 1000km, which is not correct. Indeed, without any distinct inversion/ducting the tropospheric link distances should be in the order of a few 100km as correctly noted in Line 25.

There are many trustworthy reports of bridging several thousands of km in the amateur radio community on 144MHz and above, e.g.:
https://mmmonvhf.de/odx.php

Like the currently reported largest distance on 144MHz tropospehric ducting: Canary Islands <-> Puerto Rico, nearly 5000km

There are tropospheric ducting forecast maps available online, e.g.
https://dxinfocentre.com/tropo_car.html

Perhaps the statements could be relaxed regarding above 1000km can't be tropospheric

ducting.

Hence, even though the Digisonde and COSMIC data is very convincing, maybe it would be possible to rule out strong tropospheric ducting by tropospheric temperature inversion maps for the 2 days in question?

2) I also have little doubts of interpreting the 1000km distances as sporadic-E propagation, this is more typical for lower frequencies, say 50MHz. Otherwise the foEs must have been indeed extremely high at that time. But these are just a few ten examples at the end in your histogram and the general distribution indeed indicates 1000km-ish for the given days.

3) In Line 54 you indicated a maxium distance of 5463km, I'd find it interesting to see this path in the given maps. I'm confident it's been a double-hop Es.

Technical issues:

- inconsistence of value and units , specifically for distances - L 10, 22, 42, 46, 47, 51,....

- caption Fig.1 13 -15 July -> 13 - 15 July

- E.g. in Line 72 explain/note the abbreviation RO, it's not clearly introduced earlier

- Lines 72/73, I suggest to add the coordinates for the Digisondes or quote they are marked in Fig. 5

- Fig. 4 - y-axis label of the middle panel: WALLOPSIS - I'm sure it's Wallops Island, but perhaps just using WALLOPS there? Furthermore should the label be f0Es not FoEs as used in the text, right ? Same for the legend.

- Line 94: Does that mean, the shown intensities are scaled, or are adjusted to the measured foEs by the Digisondes? Perhaps rephrasing would be good...?

- Line 104/105: Could you give a reference of the secant law to calculate the f0Es or necessary electron density?

- Lines 108-114: Is this just a quote, proposal for further improvements or did you already apply such methods in this study? It's not strictly clear to me.

- References: looks like some DOIs are missing, I propose to add them.

Again, I support the publication of this manuscript after adressing the mentioned points.