



EGUsphere, referee comment RC1  
<https://doi.org/10.5194/egusphere-2022-39-RC1>, 2022  
© Author(s) 2022. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## **Comment on egusphere-2022-39**

Anonymous Referee #1

---

Referee comment on "On the use of high-frequency surface wave oceanographic research radars as bistatic single-frequency oblique ionospheric sounders" by Stephen R. Kaeppler et al., EGU sphere, <https://doi.org/10.5194/egusphere-2022-39-RC1>, 2022

---

The paper describes the use of coastal ocean dynamics applications radar (CODAR) transmissions for ionospheric sounding. This is feasible because these radars operate at HF frequencies and the same signals that scatter from ocean waves can also be reflected from ionospheric plasma. The main point of the study is that there exist relatively many such transmitters and it is relatively inexpensive to use these transmissions for studies of the spatial and temporal structure of traveling ionospheric disturbances. The paper makes use of well known formulas for estimating vertical equivalent plasma frequencies and virtual heights from oblique propagation paths (secant law, Breit-Tuве theorem, and Martyn's theorem) that can be found e.g., in the textbook by Davies that is used as a reference.

The paper is well written and does not contain any significant flaws. I believe that your interpretation starting from line 215 is correct. The "hoops" are the two different propagation paths that are possible. The merging of these hoops should also allow you to estimate the peak O-mode cutoff. Similar behaviour is also seen in the E-region trace.

My only criticism is that if the structure of TIDs is a sufficiently compelling science case, wouldn't you want to setup a network of fast ionosonde transmitters and receivers to optimally study them? I know this is a bit of an unfair point to make, as the point of the paper is to demonstrate a technique.

In addition to the TechTIDEs references, I recommend looking into Andrew Heitmann's thesis and references therein for a review of recent work with multi-static oblique HF radio wave propagation used for studies of TIDs:

<https://digital.library.adelaide.edu.au/dspace/handle/2440/130401>

My recommendation is accept as is.

PS. I just spent two hours writing a review in the textbox of the on-line review system. When I submitted the review, my text disappeared as my session had expired. This is the second time it has happened to me. Please fix the system. My second review (that I had to rewrite from scratch) was significantly shorter than the first.