

## ***Interactive comment on “Effects of Earth’s magnetic field variation on high frequency wave propagation in the ionosphere” by Mariano Fagre et al.***

**Anonymous Referee #2**

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“Effects of Earth’s magnetic field variation on high frequency wave propagation in the ionosphere” by Fagre et al.

The manuscript reports on HF wave propagations with respect to different conditions of internal magnetic field. Especially, the manuscript presents the propagation effects including the reflection from the lower ionosphere using ray tracing analysis. The contents may be interesting to the community for ionospheric dynamics during dipole field decrease. However, I find a serious problem that the manuscript does not deal with the effects of wave propagation by the irregularity of electron density in the ionosphere. From equations (1) to (7), I would like to point out that the effects of wave propa-

C1

gation by the irregularity of electron density in the ionosphere not addressing in this manuscript are dominant rather than them by geomagnetic field change focusing in this manuscript. I think that the results are not well discussed due to no discussion on the effects causing by irregularity of electron density. The author must address the advantages on this study for neglecting the wave propagation effects from the irregularity of electron density in the ionosphere. Moreover, I have also some incorrect statements in the text (see the following comments).

Comment 1 (in Section of “Theory”) Most of texts and equations in this section are general talk. It looks like only equations (8) and (9) are important in this manuscript. The authors must improve making an important summary of related theory and mostly rewrite.

Comment 2 (line 242) The authors should address why the calculation took different resolution for latitudes and longitudes. I think the irregularity of electron density is smaller than the spatial resolution used in this ray tracing.

At this moment, I recommend that the manuscript requires major revisions from above serious problems related to the effects of wave propagation causing by irregularity of electron density.

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C2