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Interactive comment on "Martian magnetism with orbiting sub-millimeter sensor: Simulated retrieval system" *by* Richard Larsson et al.

Anonymous Referee #2

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Review of: Martian magnetism with orbiting sub-millimeter sensor: Simulated retrieval system, by Larsson et al. submitted to GI.

Summary: The paper gives a description of a simulation of the crustal magnetic field of Mars (6-70 km altitude) based on the Zeeman effect of the molecular oxygen absorption line (368 GHz). The work is totally based on simulations with no comparison (quantitatively speaking) to real data from Mars or previous models. Finally, authors state that with this technique, the crustal magnetic field between the 4 and 36 % of the Mars surface could be roughly estimated. I appreciate the efforts made by the authors to improve the paper to be published in the discussion section. The paper is interesting and after second revision, I consider the paper needs minor revisions to be addressed with this open discussion.

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Discussion paper

Discussion:

1. Figure 6 is not very clear in a grey color scale. Would you mind to change it into a color scale and highlight the 4-36% of the surface to be sampled by this technique with a dashed line? This magnetic field map changes with altitude, so would you mind to show in the paper 3-4 panels with this map at different altitudes and with the percentage of surface sampled at each altitude?

2. The error in the horizontal magnetic components ($\sim$200 nT) is of the same order of the component strength (Figure 3), and this is after considering ideal conditions for this simulation. I would like to see a larger discussion about this fact and how a different orbit configuration would affect that.

3. What's the error of the Cain model at the low altitudes of this paper?

4. ARTS simulator should be briefly described in the text, despite the references.

Minors:

5. Lines 6-7 of second page: ExoMars 2020 surface platform also plans to carry a magnetometer to the surface of Mars, called: MAIGRET.

6. Line 14 of second page: you should add that the Northern Hemisphere is much younger than the Southern Hemisphere.

7. Line 25 of page 5: do authors mean "measurements of the measured noise"?

8. Answer given to referee about the JUICE sideband should be added to the paper.

Good luck!

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