

Geosci. Instrum. Method. Data Syst. Discuss., referee comment RC1 https://doi.org/10.5194/gi-2021-15-RC1, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

## Comment on gi-2021-15

Anonymous Referee #1

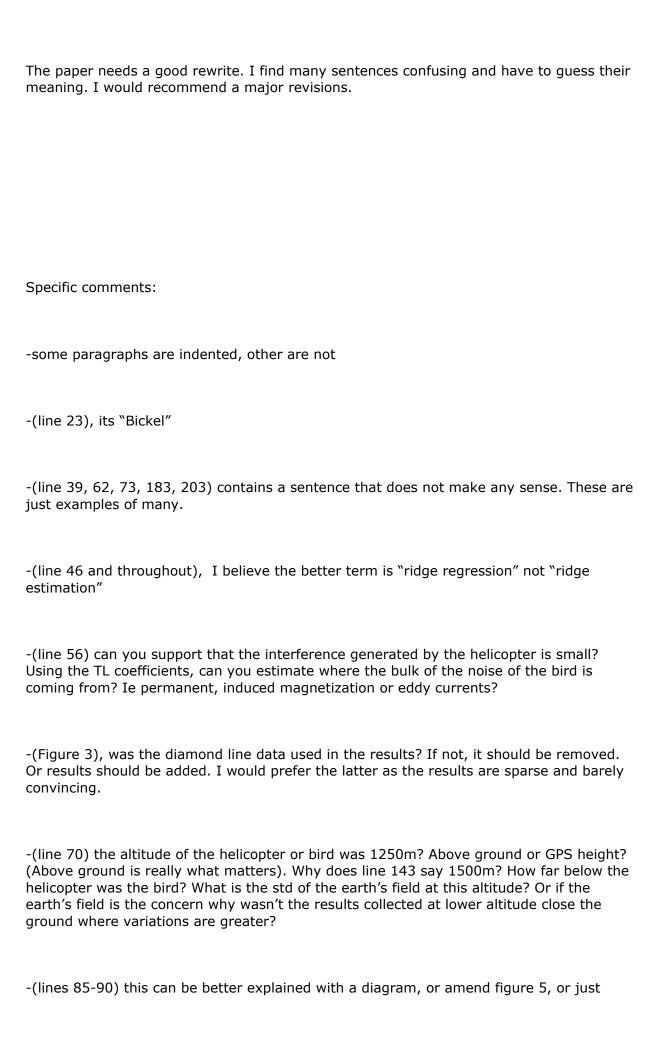
Referee comment on "Analysis and reduction of the geomagnetic gradient influence on aeromagnetic compensation in a towed bird" by Zhijian Zhou et al., Geosci. Instrum. Method. Data Syst. Discuss., https://doi.org/10.5194/gi-2021-15-RC1, 2021

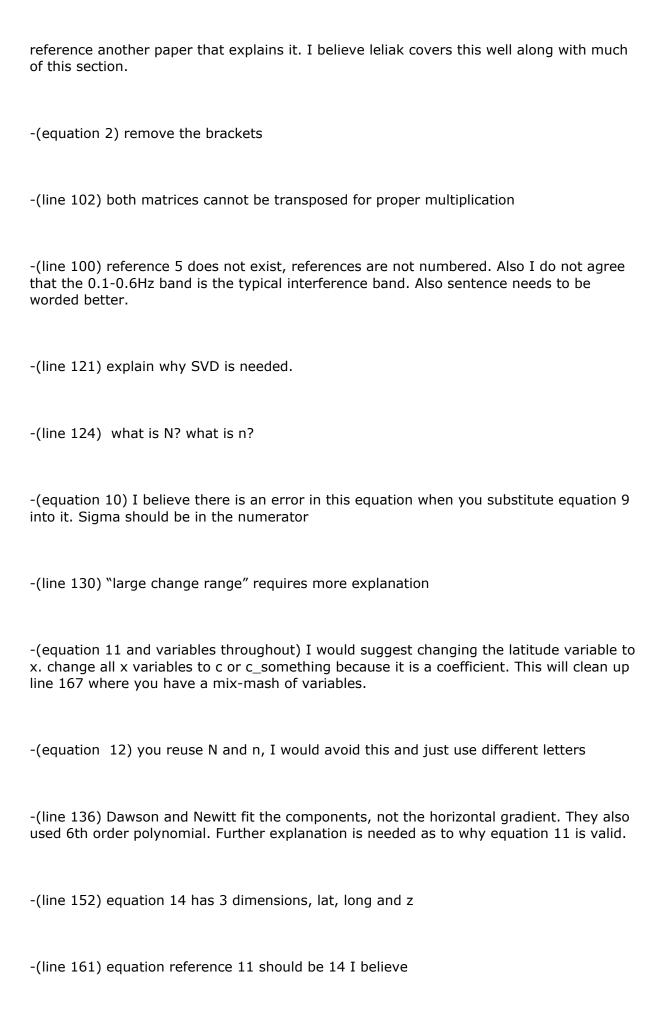
Review of "Analyze and improve the influence of geomagnetic gradient on aeromagnetic compensation in a towed bird" by Zhijian Zhou et al.

## Overall:

This paper is about aeromagnetic noise compensation of a total-field magnetometer mounted in a bird towed by a helicopter. The paper suggests that the Tolles-Lawson noise model can be improved upon by introducing x,y,z position terms to the ridge regression solution. Overall the paper is interesting but I am uncertain if it is novel as the survey method has been around since the mid  $20^{th}$  century and introducing position terms has been around for just as long. I would ask that they highlight what is novel in this paper.

Their reasoning using analytical expressions makes sense but I believe could be made more concise. The use and reuse of certain variables is confusing. Their results presented do suggest reduced noise, although I think they could be a little more thorough. See comments below.





-(line 198) why do you switch the filter bank to 0.03Hz specifically? After say the band should be 0.1-0.6Hz? Is the upper limit still 0.6Hz?
-(line 195) font size change
-what ridge regression coefficient do you use?
-(Figure 6) can you calculate the error on your IR calculations. Are you sure the differences are significant? Can you should the trend between N:1-6? Figure 6 should look like Figure 7. The caption should state the difference in results between Figure 6 and 7 because I am unclear why Figure 6 results are not included in Figure 7. Perhaps they should be combined? Regardless, further clarity is needed here.
-(line 213) what evidence do you have that the noise is a vibration mode of the towed bird? Or do you mean swing?
-(line 216) "greatly improved" may be an overstatement when looking at Figure 6. Or explain why.
-(Figure 7) Why remove N=2? Is the STD the compensated or uncompensated signal?
-(Figure 7) VERY IMPORTANT. Why is the S-N noise reduced so significantly for $N=3$ compared to $N=1$ ? Could this point towards a much better noise model? Or is something else going on here?
-(line 250/254, and other instances in the references) inconsistent naming of B.W. Leach. See other errors in the scanned copy. More thorough review is needed.
Please also note the supplement to this comment: <a href="https://gi.copernicus.org/preprints/gi-2021-15/gi-2021-15-RC1-supplement.pdf">https://gi.copernicus.org/preprints/gi-2021-15/gi-2021-15-RC1-supplement.pdf</a>