

## ***Interactive comment on “Background noise estimation of geomagnetic signal” by Xiuyi Yao et al.***

**Xiuyi Yao et al.**

xiuyiyao@126.com

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Dear reviewer Thank you for the time and effort that you have put into reviewing the previous version of the manuscript. Your suggestions have enabled us to improve our work. Based on the instructions provided in your review report, our point-by-point response to the comments raised by the reviewer was made.

1. Comments to the Author, “In this paper, the method of background noise calculation is based on the quietest days, how about the normal days and disturbed days?” Background noise is nearly invariable due to the stability of observation environment and instrument condition usually. Therefore, we think the estimated background noise based on quietest days could represent that of normal days and disturbed days.

C1

2. Comments to the Author, “Authors put forward a discussion that FFT-filtered data with polynomial degree more than 160 could represent the original geomagnetic signal with period less than 540s. Avoiding over-processing, they choose Z component in the quietest days as analysis object. I think this dispose is effective but not strict. Some short-period variation such as pulsations also occur in quietest days and be recorded in Z component, although that may have no impact on the estimation result. I suggest they could calculate SNR of geomagnetic signal based on part of data that does not contain any short period variations in actual estimation”. We have checked the geomagnetic data of Z component on 29 May 2013 at LYH observatory, and no short period variation with period less than 540s has been found, so the SNR estimation result was correct. Furthermore, we also carried out SNR calculation based on part of data which is stable and in quietest time. The result showed that the SNR result based on part of data was almost same as estimated SNR through daily data. However, it is certain that reviewer’s suggestion is stricter, and which is applicable to any condition, so we will adopt it in actual estimation work.

3. Comments to the Author, “The “spectrum” was appearance many times, but in some parts it is not proper. Such as in P4 Line 87, P3 Line 90, P4 Line 95 and P4 Line 98, authors used data through inverse Fourier transform based on spectrum not spectrum. Please check that through whole text”. We have checked that and modified throughout the text according to the comment. 4. Comments to the Author, “P1 Line 32 “methods” should be corrected to “method”.” We have modified that throughout the text according to the comment.

5. Comments to the Author, “P3 Line 75 “Normal daily variation of the geomagnetic field mainly comprises the first through sixth harmonic components” should be corrected to “Normal daily variation of the geomagnetic field mainly comprises the first six harmonic components”. Same as Figure 1” Modified that throughout the text according to the comment.

6. Comments to the Author, “P4 Line 101 “through the original curve is smoother”

C2

should be corrected to "through the fitted curve is smoother "" Modified that throughout the text according to the comment.

Please also note the supplement to this comment:

<https://www.geosci-instrum-method-data-syst-discuss.net/gi-2018-3/gi-2018-3-AC1-supplement.pdf>

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Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss.,  
<https://doi.org/10.5194/gi-2018-3>, 2018.