

Interactive comment on “A comprehensive data quality evaluation method for the current of marine controlled-source electromagnetic transmitter based on Analytic Hierarchy Process” by Rui Yang et al.

Rui Yang et al.

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Dear Anonymous Referee. Thank you very much for your appreciation of our work and for your precious comments on our manuscript. We reply the comments point by point in this letter, and corresponding changes will be made to improve the manuscript.

1) However, marine electromagnetic technology is a very money-intensive and quite narrow subject. Not many researchers are in this area. To better attract a wider readership, I suggest the authors add some comments on how this new technique can be

C1

used in other instruments, for example, the EM transmitter designed for land surveys or borehole geophysics.

Reply: That's a very great suggestion. This algorithm can indeed be applied to other electromagnetic transmitters. The core of it is transmitting current data. For EM transmitter of land surveys or borehole geophysics, similar algorithms can also be made to control the quality. The corresponding QTC index can be calculated by inputting current data and corresponding parameters. And the calculation method is basically the same.

2) I also think the computing time or the costs of running this method should be mentioned. It makes sure the new method is practical in the sea.

Reply: Thank you for your kind reminding. The computing time of this method depends mainly on the number of each data block “N” and data length. Take Figure 3 in Section 4 as an example. The length of time is about 2 hours and 58 minutes and the sampling rate is 150Hz. The number of each data block is 32768. The calculation times of Fig.3a, Fig.3b and Fig.3c are 1.0410s, 1.4447s and 46.1602s respectively in MATLAB. And Fig.3a and Fig.3b are the most commonly used, so this computing time is acceptable in the sea.

3) The authors used "mutation" for many times to refer to fluctuation or variation. Please check whether this usage is appropriate.

Reply: The control of marine controlled source electromagnetic transmitter is usually on deck. Sometimes it is misoperated or some human factors lead to a sudden change of transmitting current. So, the word “mutation” used to emphasize these situations. However, I looked it up in the dictionary and found that the word is mostly used in genetics, which may not be suitable for use here. Thank you very much for your reminding. Now we have changed "mutation" to "variation".

4) I am also curious if the introduction of the proposed method will change how a

C2

marine electromagnetic survey is carried out or how the data should be processed in comparison with the common practice.

Reply: As stated in the manuscript, the algorithm uses data from the current sensors of electromagnetic transmitter for comprehensive evaluation. Once we detect anomalous through the QTC index, we will immediately find out where the problem is and correct it in time. For example, frequency changes are usually not observed, but the QTC index can capture that. And then we check each attribute monitoring interface, quickly find out the fluctuation of frequency sub-curve, feedback to the host computer, adjust the transmitting frequency. For data processing, it's the same as the common practice.

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