Geosci. Instrum. Method. Data Syst. Discuss.,
https://doi.org/10.5194/gi-2019-13-AC1, 2019

Geoscientific Instrumentation Methods and Data Systems Discussions

Open Access

EGU

GID

Interactive comment on "Evaluations of an ocean bottom electro-magnetometer and preliminary results offshore NE Taiwan" *by* Ching-Ren Lin et al.

Ching-Ren Lin et al.

zjiang@ntou.edu.tw

Received and published: 1 August 2019

Review of GI-2019-13 "Evaluations of an ocean bottom electro-magnetometer and preliminary results offshore NE Taiwan" by Ching-Ren Lin et al. In this paper, you proposed an ocean bottom electromagnetic receiver (OBEM) for marine MT data acquisition. I think your achievement in this paper is very interesting. However, basic concept of your OBEM was almost based on existing OBEM (ksaya,2009). Hence, I suggest you enhance the difference and advantages of your instruments. This paper also discussed the field operation and data, but there is a lack of necessary data and discussion. Therefore, my decision of this paper is "major revision". My questions and other sug-

Printer-friendly version

Discussion paper

gestions are as follows.

Response: Thank you so much for your patient review and valuable comments. We have tried to improve the manuscript following your comments. Thus, please re-consider the present revision of our manuscript to be published.

1. I suggest add important result of marine MT data acquisition, such as Coherence between horizontal magnetic components and the electric field component, and the Apparent resistivity and impedance phase.

Response: Thanks for your suggestion. The manuscript concentrates on the calibration of the OBEM, its tested procedures, and methodology at the first stage. Therefore, we deployed the first marine OBEM offshore NE Taiwan for testing the hardware, in which the condition of the field was probably not suitable for the marine MT response calculation caused by strong Kuroshio Current passed through the region. Therefore, we would present the marine MT responses after solving all the hardware issues and selecting a suitable region for future deployment at the secondary stage.

2. I suggest add compare with the OBE and OBEM from (kasay, 2009), Qmax3 from Quasar. Add a table present the key specification such as Nosie level, dynamic, power consumption, time drift error size, and cost.

Response: The comparison has added as table 1 and described in lines 60 - 62.

3. The details of electrode, fluxgate sensor and amplifier of your OBEM are not described.

Response: The details of the electrode, fluxgate sensor, and amplifier have described in lines 84 - 90.

4. Figure and tables should be clear and simply. Table1-3 can be replaced with figure. the tables are too large to reduce paper space; figure 1and figure 2 should be redraw to clear; figure4-6, the font size too small to read. Background in Figure 11 is too vague to read.

Response: We have removed all the tables and replaced with the new figures 4 - 6 (pages 35-30)following all your suggestion. The figures 1, 2, and 11 (pages 22, 23 and 33)have also been redrawn in the revised manuscript.

5. The ADS1278 is suitable for audio frequency signal measurement, but the samples is 10Hz, the ADS 1278 is not the best choice. Why choose ADS1278?

Response: We used 8 ch of ADS1278 for issues of multiple input channels, saving circuit volume and the cost of the data logger, whereas the noise level is high through the evaluation. It will be replaced to ADS1281 or others for solving the noise issue in the future. We also mention this as lines 371-373, page 13.

6. The abstract should enhance the innovation design of the OBEM compare the existing OBEM.

Response: We have added the innovative design in the abstract as lines 4-5, page 2. Thanks for your comment.

7. Line 37-line 40 and L45-L49 introduce CSEM method. But your OBEM only used to MT data acquisition. I suggest to delete this sentences.

Response: We have removed all the sentences in the revised manuscript as your suggestion. Thank you.

8. The OBEM integrated the beacon (RF-700A and ST400A) which are expensive. Why not developed a beacon module just like MicrOBS from Sercel?

Response: The reason is that we have used a large amount of these beacons (RF-700A and ST400A) in the broadband OBS system. Thus, we selected the same beacons for the OBEM based on the compatibility and maintenance issues. We are integrating and developing the flash beacon and GPS unit installing into the glass sphere. It would greatly cost down the OBEM system in the future. Thanks for your suggestion.

9. The fluxgate sensor is installed in glass sphere, the distance between data logger

and sensor may be very short, how to reduce the disturbance (EM noise) from data logger while writing data to SD?

Response: The distance of the data logger and the magnetic sensor is 45 cm away. The data logger and preamplifiers have been shielded by aluminum foils to GND reducing the EM noise form the data logger. We also separate the battery supplies for the data logger and magnetic sensor, respectively. It could reduce the EM noise from the writing SD card.

10. In 4.1, the description of noise and linearity is too simple to give details. And the test of release is too detailed because the release is from EdgeTech not developed by author.

Response: We have added the noise level of the data logger and its dynamic range in lines 246-247, page 9. The released procedure is very important that would greatly affect the recovery rate of the OBEM. Thus, we would strongly recommend making a detailed of the standard testing procedure although the release hardware made from the EdgeTech instead of the authors.

11. Reference 2 is the same as reference 3?

Response: The reference 2 and reference 3 is different articles. Do you indicate that the references of Chiang et al., 2011 and Chiang et al., 2010 are the same? The Chiang et al., 2011 was a corrigendum of Chiang et al., 2010. If right, we have modified the typing error in the lines 391-393, page 14. Thanks for your comment.

Please also note the supplement to this comment:
https://www.geosci-instrum-method-data-syst-discuss.net/gi-2019-13/gi-2019-13-AC1-supplement.pdf

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss., https://doi.org/10.5194/gi-2019-13, 2019.