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Geoscientific Instrumentation Methods and Data Systems Discussions

Interactive comment on "A Compact Ocean Bottom Electromagnetic Receiver and Seismometer" *by* Kai Chen et al.

Anonymous Referee #1

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The manuscript has integrated OBEM and OBS into a compact OBEMS system used for offshore gas hydrate and petroleum exploration. The OBEMS system could probably improve the efficiency in fieldwork, but the scientific purpose is uncertain. In general, the CSEM is a useful tool for mapping gas hydrate whereas multiple channels of reflection seismic exploration used in petroleum exploration. These two offshore active geophysical explorations have been jointly used to provide a complementary image to identify natural resources and/or geology structure. The target depth is less than a few kilometers. OBS mainly provides deep geological information extracted by the refracted wave in which the lateral resolution is less than reflection seismic exploration, whereas OBEM has provided a deep sounding. It seems that the instrument has only installed a seismometer into the OBE (Chen et al., 2017) and the OBEM platform

(Chen et al., 2015). Thus, I don't really understand how to join the OBEM and OBS data to investigate gas hydrate or petroleum exploration within a few kilometers below seafloor? I would recommend the authors to distinguish what is the scientific purpose of the instrument? Although the authors have claimed that the seismic signal came from the air gun source that is an insufficient demonstration, more evaluations related to the seismometer and the signal should be required. How to avoid the seismometer generates noise for magnetic sensors? Finally, my personal think that the manuscript should be rejected.

Minor comments: 1. Please comparing and demonstrating the accuracy between the USBL attached to the OBEMS and other OBEM. 2. I can't find the related descriptions of figures 2 and 4 in the context. Please either add the descriptions or remove these figures. 3. P5, L159: How about the gain of the magnetic sensors? 4. P6, L206: Which method? Please cite the reference or specify it in detail. 5. P6, L209: At high frequency ranges, the seafloor responses……Please rewrite it. 6. P6, L198: Figure 7 should be replaced by figure 5? 7. P6, L218: Fig.8 should be replaced by Fig. 7? 8. P6, L220: Figure 9 should be replaced by Figure 8? 9. P6, L224: Fig.10 should be replaced by Figure 9? 10. Table 1 should specify the seismometer in detailed.

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