

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

**Kai Chen et al.**

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A Compact Ocean Bottom Electromagnetic Receiver and Seismometer (ID: gi-2019-25) Response to Reviewers

Dear Anonymous Referee,

Thank you very much for your comments and suggestions regarding this manuscript. The comments were very valuable and helpful for revising and improving our manuscript, as well as for elucidating the significance of our research. We have studied all the comments carefully and have made the necessary corrections, which we hope meet your approval. All changes have been indicated using red color. According to your advice, we have revised this manuscript as follows.

C1

Comment 1: Each single shot waveform, its spectrum, and the background noise spectrum should be indicated in the figure. Response 1: Single shot waveforms, spectra, and background noise spectra have been added to Figures 9 and 10 in the revised manuscript. Comment 2: Omni direction geophone without the leveling (gimbal). Because of the ocean bottom instrument has some amount of tilt on the seafloor, 3-comp. geophones should not be true UD/H1/H2 output. The tilt may be estimated by cross correlations between channels. Response 2: Omnidirectional geophones were used because traditional geophones cannot effectively and reliably receive vibration signals on an inclined seabed. In addition, an AHRS was installed to measure the orientation and inclination of the geophone for further data processing. Comment 3: Problem of the use of the flag is a high level noise source at the seafloor, which is well known in the OBS world. Response 3: This is an unfortunate deficit in instrumental design. We will remove the flag in future deployments. Comment 4: reference in Line 49 and Line 51 Response 4: “QUASAR, 2016” has been corrected to “QUASAR 2019” in the revised manuscript. Comment 5: Difference between “towed streamer EM system” and “towed-streamer EM system” from line 86 to line 88. Response 5: “towed-streamer EM system” has been corrected to “towed streamer EM system” in the revised manuscript. Comment 6: First appearance of the “OBEMS”, in line 101. Response 6: “Ocean Bottom Electromagnetic Receiver and Seismometer (OBEMS)” has been added to the text. Comment 7: Indicate the model name/number and company of the omni-directional geophone in line 119. Response 7: We have added this information to the revised manuscript. The instrument was an ODG8 geophone manufactured by the Chongqing Geological Instrument Factory. Comment 8: “Li-ion batteries” in line 121 should be corrected as “Li-ion rechargeable batteries” Response 8: “Li-ion batteries” has been corrected to “Li-ion rechargeable batteries” in the revised manuscript. Comment 9: Please add the condition of this power consumption clearly in line 124. Response 9: The power consumption was approximately 1 W at a maximum sampling rate of 2400 Hz and the power supply module supported data acquisition for 30 days. We have added this information to the revised manuscript. Comment 10:

C2

No explanation about the “U-profile”. Please add some text here or in Fig.1. in line 144. Response 10: A single U-shaped stainless steel strap connects the two release mechanisms, passing through two stainless steel loops set into the anchors. An explanation of this “U-shape” has been added to the text and to Fig. 1 in the revised manuscript. Comment 11: MCXO should be explain as “microprocessor controlled crystal oscillator” in line 147. Response 11: MCXO has been defined as a “micro-processor controlled crystal oscillator” in the revised manuscript. Comment 12: This buoyancy looks large, please add the reason why it is required in line 151. Response 12: The redundant buoyancy is designed for adding more batteries for longer seafloor working times. We have added this explanation to the text. Comment 13: “24-bit ADC” should be corrected as “a 24-bit ADC” in line 158. Response 13: “24-bit ADC” has been corrected to “a 24-bit ADC” in the revised manuscript. Comment 14: Chopper should be an OP-amp, please indicate model number and company from line 158 to line 159. Response 14: The pre-amplifier for the E-field channel is an ultra-low noise chopper amplifier that has been upgraded from Constable (2013). We have added this information to the text. Comment 15: “ADS1282” should be corrected as “a ADS1282 (TI)” in line 162. Response 15: “ADS1282” has been corrected to “ADS1282 (TI)” in the revised manuscript. Comment 16: This value is in your OBEMS system or the ADC only? Please indicate clearly in line 165. Response 16: This is for ADC only. We have added this information to the text. Comment 17: Indicate model and company of the MCU in line 166. Response 17: This is an ATmega16 from ATMEL. We have added this information to the text. Comment 18: Indicate model and company of the CPLD in line 169. Response 18: This is an EPM570 from INTEL. We have added this information to the text. Comment 19: Indicate the model of the MCXO inline 171. Response 19: This is a MX-503 from Vectron. We have added this information to the text. Comment 20: The resolution in each sampling rate should be different, please indicate from line 173 to line 174 Response 20: The sampling rate can be set to 2400 Hz, 600 Hz, or 150 Hz, and the dynamic range reaches approximately 115 dB, 121 dB, and 127 dB, respectively. We have added this information to the text. Comment 21: What is the reason to

C3

measure the pressure inside in line 176? Response 21: A pressure sensor inside the glass sphere is used as a negative pressure monitor for determining if there is a leak in the glass sphere. Comment 22: Does “set” mean “group” or “pack”? Better to change the word in line 178. Response 22: “Set” has been corrected to “pack” in the revised manuscript. Comment 23: the landing position or the true position at the seafloor in line 202. Response 23: “True position” has been corrected to “landing position” in the revised manuscript. Comment 24: “fast Fourier transfer(FFT)” should be corrected as “Fast Fourier Transform (FFT)” in line 217. Response 24: “Fast Fourier transfer (FFT)” has been corrected to “Fast Fourier Transform (FFT)” in the revised manuscript. Comment 25: “Fig.8” should be corrected as “Fig.7”; “Fig.9” should be corrected as “Fig.8”; “Fig.10” should be corrected as “Fig.9”; Response 25: The typos have been corrected in the revised manuscript. Comment 26: References should be corrected. Response 26: The references have been corrected in the revised manuscript. Comment 27: The caption of Fig.3 should be corrected. Response 27: The caption of Fig.3 has been corrected in the revised manuscript. Comment 28: Site name of Fig.5 should be simple. Response 28: All of the site names have been renamed in the revised manuscript. Comment 29: Explain “Global Mapper”. Response 29: Global Mapper is a mapping software package. Comment 30: At which sampling rate? Or values of sensor (and Amp.) itself in table 1? Response 30: This is at a sampling rate of 2400 Hz for a channel with a sensor, amplifier, and data logger

We would like to reiterate that we are deeply grateful for your comments and suggestions. We have tried our best to improve the manuscript and have made all of the necessary changes in the revised version. We truly appreciate the time and efforts of the editors and reviewers, and we sincerely hope that our corrections will be met with your approval.

Sincerely, Kai Chen

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C4

