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Ocean Science
Discussions

Interactive comment on "Changes in detrital sediment supply to the central Yellow Sea since the Last Glacial Maximum" *by* Hyo Jin Koo and Hyen Goo Cho

Hyo Jin Koo and Hyen Goo Cho

hgcho@gnu.ac.kr

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Interactive comment on "Changes in detrital sediment supply to the central Yellow Sea since the Last Glacial Maximum" by Hyo Jin Koo and Hyen Goo Cho Anonymous Referee #3 Received and published: 24 July 2020

1. General comments: This manuscript discussed the sediment provenance of Central Yellow Sea mud (CYSM) and their controlling factors based on the analysis of clay mineral composition, rare earth elements and radiogenic Nd isotope of core 11 YS-PCL14 in the Yellow Sea. This manuscript present some new evidences to trace the sediment provenance of the mud deposition in the middle Yellow Sea since late deglaciation. It

is helpful to better understand the variation of sediment supply to this area and the formation history of the mud deposition in the Yellow Sea. However, some key parts of the manuscript are not clearly displayed or described. There are some inconsistence in the manuscript. The language should be polished further because some expression are hard to understand. Therefore, I suggest that this manuscript should be major revised before it can be accepted. ANSWER. Thank you for the valuable remarks. We modified the manuscript according to comments.

2. Specific comments: (1)The time period in the title need to be revised. The core records the sedimentary history for the last 15.5ka (from the last deglaciation to present). The whole text of the manuscript also use the last delgaciation, why the title use the Last Glacial Maximum? ANSWER. We agree with the comment. The time period in the title was revised to 'last deglaciation' as mentioned.

(2)The core name is different in the manuscript. Two different names are used in the manuscript, e.g. 11YS-PCL14 and PCL14. Although this research use the same core sediemnt as Badejo et al. (2016), the core name is different from Badejo's paper. ANSWER. We revised all core names in manuscript to '11YS-PCL14'.

(3) In the abstract, the meaning of this sentence is not clear. "The late last deglaciation (Units 3 and 4) sediments originated from all potential provenance rivers, while the source of coarse sediments changed to Huanghe in Unit 3". What does all the potential provenance rivers mean? Which rivers are not clear here and should be indicated. ANSWER. Potential provenance rivers means the Huanghe, Changjiang, and western Korean rivers (Han River, Yeongsan River, and Keum River) that can supply sediments to the Yellow Sea. We added river names as well as revised this sentence to understand clearly.

The authors argue that the late last deglaciation (Units 3 and 4) sediments originated from all potential provenance rivers, here, sediments indicate fine sediments or not? If the answer is no, then it is contradict with the following sentence: "while the source of

coarse sediments changed to Huanghe in Unit 3." ANSWER. We suggested that the provenances of fine and coarse sediments during Unit 3 and 4 are different. Fine sediments were supplied from all rivers (the Huanghe, Changjiang, and western Korean rivers) during these periods based on the clay mineral compositions. Coarse sediments were supplied from all rivers during the Unit 4, but mainly from the Huanghe during the Unit 3 based on the Nd isotopes. We modified this sentence clearly. "During the late last deglaciation (Units 3 and 4, 15.5–12.8 ka), Unit 4 sediments originated from all potential provenance rivers such as the Huanghe, Changjiang, and western Korean rivers, while the source of coarse sediments changed to Huanghe when beginning the Unit 3. Fine-grained sediment still supplied from all rivers during the Unit 3"

(4) The age boundary of unit 3 and unit 2 are inconsistent in the manuscript. In some parts (e.g. Abstract, Discussion, Conclusion and Fig.7), the boundary is 12.1ka, in other parts, it is 12.8ka, which one is correct? ANSWER. Thank you for your great effort to check our manuscript thoroughly. The boundary between Unit 3 and Unit 2 is 310 cm and 12.8 ka. All miswritten parts including the abstract, discussion, conclusion, and figures were checked and revised.

(5) The last sentence in the abstract is hard to understand. "Possible transport mechanisms in the riverine sediment sources change and contributions to this include position shifts of river mouths, tidal stress evolution, and the development of the Yellow Sea Warm Current and coastal circulation systems". ANSWER. We revised the sentence more clearly. "Possible transport mechanisms concerning such changes in the sediment provenance include paleo-river pathways, tidal stress evolution, and the development of the Yellow Sea Warm Current and coastal circulation systems, depending on the sea-level fluctuations."

(6) Lines 50-52: this sentence is hard to understand. "Particularly, paleoriver pathway associated with sea-level change that was recently reconstructed using highresolution seismic data in the Yellow Sea can be explained reasonable for understanding CYSM formation during low stand period (KIGAM, 1993; Xu et al., 1997; Yoo et al., 2015,

2016)." ANSWER. We revised the sentence more clearly. "In addition, paleo-river pathways, recently reconstructed by high-resolution seismic researches in the Yellow Sea, can account for sedimentation and sediment provenance since the last deglaciation because they become an important route of sediment transport during the low stand period."

(7) Figure 1 have some errors. The boundarie lines between different countries are missing. Some locations are missing, for example, Cheju Island and Tsushima Strait etc. ANSWER. We added a location (Jeju Island) mentioned in the manuscript. However, national boundaries were not expressed because they are not important in this study and are generally not expressed in research papers.

(8) Biogenic carbonate is a major component in the marginal sea sediments, it may significantly influence the grain size, and Sr-Nd isotopic compositions. However, the authors didn't clearly describe what kind of samples are use to be analyzed, bulk sediments or siliclasitic fractions. In addition, the content of biogenic carbonate composition of the core should be displayed. ANSWER. We acquired the major and trace elements data from bulk sediments but Nd isotopes from the <63 μm fractions. In this study, we don't used the major elements because they are different with grain size. We only used the UCC-normalized REE and Sr-Nd isotopes independent to grain size. Besides, Sr-Nd isotope composition was measured after removal biogenic carbonate. We added detail procedure for Sr-Nd isotope analysis in the Materials and method. "The inorganic silicate fraction was extracted from 18 samples following the method described by Rea and Janecek (1981). The samples were treated with acetic acid buffered to pH 5 with sodium acetate to remove calcium carbonate. They were subsequently treated with a hot sodium citrate-sodium dithionite solution buffered with sodium bicarbonate to remove coarse biogenic components and finally treated with Na2CO3 solution to remove biogenic silica. 143Nd/144Nd and 87Sr/86Sr analyses, including chemical separation and multicollector thermal ionization mass spectrometry (VG54-30, Isoprobe-T) analyses were performed at the Korea Basic Science Institute following Cheong et al.

(2013)." In addition, the total organic carbonate (TOC) was already reported in Badejo et al. (2015) which studied the same core (11YS-PCL14).

(9) Line 80: The clay mineral analysis for was conducted: : :. "for" should be deleted. ANSWER. We deleted the 'for' as mentioned

(10) The discussion part are poorly written. There are some mistakes, especiall in the provenance parts, I list some of them as follows: Line 172, "while Chinese rivers have abundant MREE (middle REE) and "Nd (Table 3, Fig. 6)". This description is not accurate. Abundant cannot be used to describe "Nd. ANSWER. We revised this description to "abundant MREE (middle REE) and high εNd".

LINE 173, "In these plots, the REE values represented the source of both coarse and fine sediments because the analysis was performed with coarse grains." This sentence is very hard to understand. ANSWER. We revised this sentence clearly. "In these plots, the REE values could represent the source of all sediments including coarse and fine sediments because the REE analysis performed using the bulk powder samples."

Line 174-175: Unit 1 is generally close to the Changjiang with slightly influence of the Korean rivers, as well as the clay mineralogy(Fig.4 and 6). This sentence is very confused. In addition, the author didn't mention the influence of Korea Rivers on the sediment of UNIT1 in the former discussion. It is contradict with this discussion. ANSWER. We revised this sentence and deleted the content related to the Korean rivers because it was not clearly observed. "Unit 1 sediments are generally close to the Changjiang, which is consistent with results in clay mineralogy (Figs. 4 and 6)."

Line177: "the clay-sized particles of Unit 2" are not correct. Clay-sized paritcles indicate <4 m particles. However, the autohr only analysis the provenance of clay minerals (finer than 2m). Actually, the authors use clay-sized particles to represent clay minerals in the manuscript for many times, which should be revised. ANSWER. We modified the expression 'clay-sized particles' to 'fine-grained sediments'.

Lines 185-186: These sentences: "Unit 3 sediments in this plot are certainly plotted close to the Huanghe. This is caused by the many silt fractions in Unit 3 and probably represents a relatively close supply from the Huanghe." is hard to understand, and it is hard to demonstrate the contribution of silt fractions from Huanghe increase. ANSWER. We revised this sentence clearly. Figure 6c was formed using the clay mineral contents and εNd values. This figure can distinguish three potential provenances, and Unit 3 in this figure shows in a distinctly different distribution (close to the Huanghe) than previous plots. Unit 3 contains very little sand, and silt-sized particles dominate. In addition, Nd isotope analysis was performed using the particles smaller than 63 μm (i.g. clay and silt fraction). Therefore, difference in the distribution of Unit 3 in Figure 4 and Figure 6c can be inferred to be caused by silt particles included in the Nd isotope analysis.

Lines 188-189: However, in Unit 3,silt-sized fractions were predominantly affected by the Huanghe. This conclusion is lack of evidence to support. ANSWER. This comment seem to be the same content as the Line 188-189 above. Figure 6c was made from the clay mineral contents and εNd values. This figure can distinguish three potential provenances, and Unit 3 in this figure shows in a distinctly different distribution (close to the Huanghe) than previous plots. Unit 3 contains very little sand, and silt-sized particles dominate. In addition, Nd isotope analysis was performed using the particles smaller than 63 μm (i.g. clay and silt fraction). Therefore, difference in the distribution of Unit 3 in Figure 4 and Figure 6c can be inferred to be caused by silt particles included in the Nd isotope analysis.

Line 213: The authors write "while silt-sized particles were supplied only from the Huanghe (Fig. 5)", but I cannot get this information from Figure 5. ANSWER. Mentioned information can get by comparing figures 4 and 6. This figure number was incorrectly and was modified to 'Figs. 4 and 6'.

Please also note the supplement to this comment:

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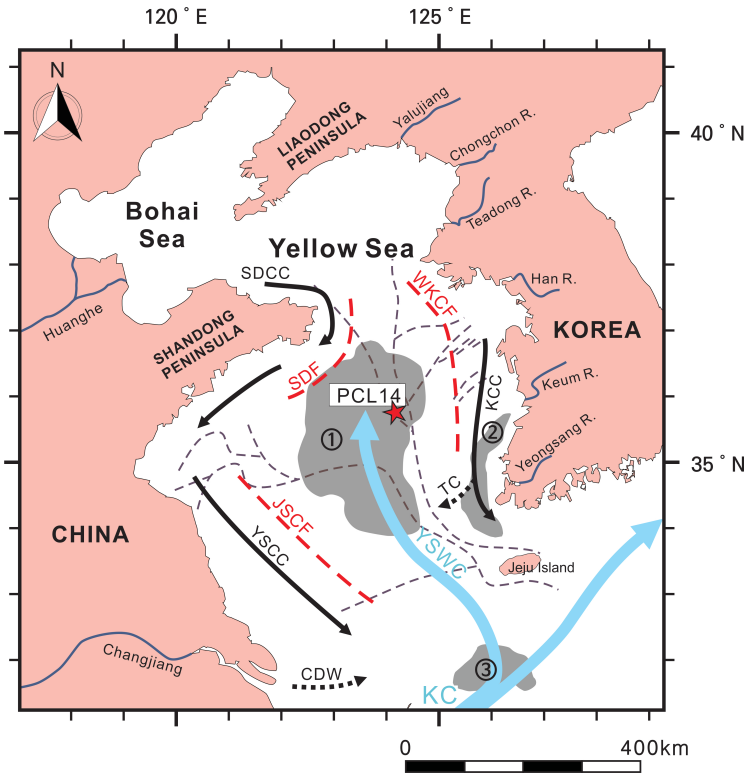

Fig. 1.