

Response to Reviewer Comments

Manuscript: “Surface sediment grain-size characteristics of the Bohai, Yellow, and East China seas: a comprehensive survey based on unified laser diffraction analysis”

Dear Editor,

We sincerely thank the two reviewers for their careful reading and constructive comments, which have helped us improve the manuscript. Below we provide point-by-point responses. All changes are marked as tracked changes in the revised manuscript, and the locations of the edits are additionally indicated by margin comments. Reviewer comments are shown in italics; our responses in plain text; quotations from the revised manuscript are indented.

Reviewer 1

General comment 1 — Drawbacks of laser diffraction versus sieving

“One general question: I am curious whether the authors believe there are any drawbacks of using the particle size analyzer compared to, say, sieving? Do you lose characterization of coarser fractions?”

Response:

We thank the reviewer for this pertinent question. Yes — the main drawback of laser diffraction lies at the coarse end of the distribution. The Mastersizer 2000 resolves particle sizes between 0.02 and 2000 μm ; material coarser than 2 mm (gravel and very coarse material) is therefore not characterized, whereas sieving would directly capture the coarsest fractions. Consequently, the sand fraction reported in our dataset represents the 63–2000 μm component. Within its measurement range, however, laser diffraction offers far finer size resolution (100 bins per measurement versus typical half- Φ sieve intervals), better reproducibility, and much smaller sample requirements, which underlies its adoption as the standard method for fine-grained marine sediments. We have added a dedicated paragraph entitled “Coarse-fraction characterization” to Section 5.2 (Methodological Considerations) so that users are fully aware of this limitation.

Changes in the manuscript:

Section 5.2, new paragraph: “Coarse-fraction characterization: the laser analyzer resolves particle sizes between 0.02 and 2000 μm ; material coarser than 2 mm (gravel and very coarse material) is therefore not characterized, whereas sieving would directly capture the coarsest fractions. The sand fraction reported here consequently represents the 63–2000 μm component. Within its measurement range, however, laser diffraction offers far finer size resolution (100 bins per measurement versus typical half- Φ sieve intervals), better reproducibility, and much smaller sample requirements, which underlies its adoption as the standard method for fine-grained marine sediments (Konert & Vandenberghe, 1997; McCave et al., 2006).”

Comment 1 — Dispersant concentration (line 113)

“Line 113. Could you state the concentration of sodium hexametaphosphate so the methods are entirely documented and reproducible?”

Response:

We agree that the dispersant specification was incomplete. The concentration and chemical formula of sodium hexametaphosphate have been added, following the Specifications for Oceanographic Survey (GB/T 12763.8–2007, Sect. 6.3.2.3, laser method), which prescribes dispersion with 0.5 mol L⁻¹ sodium hexametaphosphate.

Changes in the manuscript:

Section 3.2: "... samples were dispersed in deionized water with sodium hexametaphosphate ([NaPO₃]₆) as a dispersant (0.5 mol L⁻¹, following GB/T 12763.8–2007) and ultrasonicated for 60 s ..."

Comment 2 — Rationale for the graphical parameters (lines 122–127)

"Lines 122-127. Can you explain the selection of graphical parameters over other options, since you have the full CDF from the particle size analyzer?"

Response:

We have added an explicit justification. The graphical (Folk–Ward) method was selected over moment statistics because (i) it is the de facto standard in sedimentological practice, ensuring direct comparability with most published shelf-sediment datasets; (ii) it is robust to outliers and to the truncated fine tail inherent in laser-diffraction data; and (iii) it is defined directly on the cumulative distribution curve, which is exactly what the analyzer provides. Moment-method parameters (Mz^* , σ_i^* , Ski^* , Kg^*) are nevertheless included in both data files for cross-reference (Sections 3.3 and 4.1).

Changes in the manuscript:

Section 3.3, added sentence: "The graphical (Folk–Ward) method was chosen over moment statistics because it is the de facto standard in sedimentological practice, is robust to outliers and to the truncated fine tail inherent in laser-diffraction data, is defined directly on the cumulative distribution curve, and ensures direct comparability with most published shelf-sediment datasets; moment-method parameters are nonetheless provided in the data files for cross-reference (Sect. 4.1)."

Comment 3 — Production of the spatial maps (lines 175–182, Fig. 3)

"Lines 175-182, Figure 3. How were these spatial distribution maps produced? Was it interpolation? Some description should be provided. This is especially relevant for the % composition maps, because interpolation of compositional data requires some additional considerations (see Aitchison, 1982; Lark et al., 2012; Stephens & Diesing, 2015)."

Response:

We thank the reviewer for this suggestion. A new subsection (3.4 Spatial Mapping) has been added describing the production of the maps: the station values were interpolated by ordinary point kriging using a spherical variogram model onto a regular 0.1° grid, restricted to the surveyed shelf area. Following the reviewer's advice, we now explicitly caution that sand, silt, and clay contents are compositional data and that the interpolated maps should be interpreted as smoothed representations of broad regional trends rather than precise local estimates, citing the

three references suggested by the reviewer (Aitchison, 1982; Lark et al., 2012; Stephens and Diesing, 2015). These references have been added to the reference list, and both figure captions now state that the maps are based on ordinary kriging interpolation (Sect. 3.4).

Changes in the manuscript:

New Section 3.4 (quoted in full in the revised manuscript); captions of Figures 3 and 4 extended with: “Maps are based on ordinary kriging interpolation of the station values (Sect. 3.4).”

Comment 4 — Cartographic quality of Figures 3 and 4

“Figure 3, 4. The quality of these maps could be improved. There are some cartographic conventions that are not critical, but that you could choose to implement, such as adding a scale, using sans serif font, and selecting a unidirectional or lightness-based color palette (which are colour blind-friendly). I would also note that the rivers in Figure 4 are the same colour as some of the mapped values. ... there is inconsistent font sizing between maps, with some text (e.g., Figure 3) too small and low-resolution to read without zooming way in. It seems there are tiny low-resolution contour labels of specific mapped values on the maps. These are essentially not interpretable, and in the case of Fig 3c, are not readable at all.”

Response:

We fully agree, and both spatial-map figures have been completely redrawn. Specifically: (a) the rainbow colour scale was replaced by a perceptually uniform, lightness-based, colour-blind-friendly palette (YlGnBu) for sand, silt, clay, Mz, σ_i , Ski, and Kg; (b) all text now uses a sans-serif font with uniform font sizes across panels, and the panels and legends were enlarged so that all labels are legible at single-page size; (c) a scale bar (200 km) was added; (d) the rivers are now drawn as dark-grey lines that are clearly distinct from the mapped colour scale, eliminating any potential misinterpretation (see also Reviewer 2, comment 3); and (e) the tiny, unreadable inline contour labels were removed altogether. Figures 1 and 2 were not modified.

Changes in the manuscript:

Figures 3 and 4 replaced by the redrawn versions; captions unchanged except for the kriging statement added under Comment 3 above.

Technical correction — Spacing issues (line 23)

“Some spacing issues remain, for example in line 23.”

Response:

We apologize for these typographical oversights. The missing space in the abstract (“units.The” → “units. The”) and all similar instances throughout the manuscript have been corrected, including “(Duan et al.,2026)” → “(Duan et al., 2026)”, “Section 4.Both” → “Section 4. Both”, a doubled space in Section 5.2, “(φor μm)” → “(Φ or μm)”, and “1.Qingdao” → “1. Qingdao” in the affiliations.

Reviewer 2

Comment 1 — File naming (“phi” in the file name)

“One dataset provides data in microns, the other in phi-scale. Since the ‘microns’ datafile is entitled ‘micron’, maybe the Phi dataset should carry ‘phi’ in the name of the datafile as well to make it clearer.”

Response:

We agree that the unit should be evident from the file name. The Φ -unit file has been renamed to grain_size_chinese_shelf_seas_744_phi.xlsx, so that the two companion files now read “..._phi.xlsx” and “..._micron.xlsx”. The file names in Sections 4.1 and 6 of the manuscript and in the README.txt accompanying the dataset have been updated accordingly.

Changes in the manuscript:

Sections 4.1 and 6: file name updated to grain_size_chinese_shelf_seas_744_phi.xlsx.

Comment 2 — Repetitive sampling and station identifiers

“It is not clear whether there has been repetitive sampling at some stations across the years. From what can be judged at the scale of the map it seems that it is not the case, but if it is then a sampling station ID should be added to the datasets.”

Response:

We carefully re-checked the full dataset at the level of individual coordinates. The reviewer's reading is correct: no location was revisited, so there is no repetitive sampling: the 744 samples correspond to 744 unique sampling stations. Following the reviewer's suggestion, we have added a Station ID column (the original field station identifier) to both data files.

Changes in the manuscript:

Section 3.1: repeat-sampling clarification extended to state that the 744 samples were collected at 744 unique sampling stations and that a Station ID column is now provided. Figure 1 caption and Section 4.2: corrected to “744 sampling stations”. Sections 4.1 and 6: the column count was corrected from 76 to 77, and Section 4.1 now documents the new Station ID column.

Comment 3 — Figure 3 too small; legend and fonts not readable

“Fig.3: Maps are way too small. Legend is not readable and fonts are too small.”

Response:

We agree. Figure 3 has been completely redrawn (see our response to Reviewer 1, Comment 4): the panels were enlarged, the colour bar and all fonts were increased to a uniform, legible size, and the palette was changed to a colour-blind-friendly lightness-based scale. Figure 4 was improved in the same way.

Comment 4 — River colour in Figure 4

“Fig.4: The color of the rivers matches the color scale used for the data. It can be misleading.”

Response:

We thank the reviewer for pointing out this potential misinterpretation. In the redrawn Figure 4 (and Figure 3), the rivers are now drawn as dark-grey lines that are clearly distinct from the colour scale of the mapped values.

Summary of changes

- Section 3.1: repeat-sampling clarification extended to 744 unique stations and the new Station ID column; Figure 1 caption and Section 4.2 corrected to 744 sampling stations; Sections 4.1 and 6 corrected from 76 to 77 columns (Reviewer 2, comment 2).
- Section 3.2: dispersant ($[\text{NaPO}_3]_6$) and concentration (0.5 mol L^{-1} , GB/T 12763.8–2007) added (Reviewer 1, comment 1).
- Section 3.3: rationale for the Folk–Ward graphical parameters added (Reviewer 1, comment 2).
- New Section 3.4 Spatial Mapping: kriging-based production of the spatial maps, compositional-data caveat, and three new references (Reviewer 1, comment 3).
- Figures 3 and 4: completely redrawn (colour-blind-friendly palettes, sans-serif fonts, uniform sizes, scale bar, dark-grey rivers, contour labels removed); captions extended (Reviewer 1, comment 4; Reviewer 2, comments 3 and 4).
- Section 5.2: new paragraph on coarse-fraction characterization versus sieving (Reviewer 1, general comment 1).
- Sections 4.1 and 6: Φ -unit data file renamed to grain_size_chinese_shelf_seas_744_phi.xlsx (Reviewer 2, comment 1).
- Abstract: bin range corrected to “ -1Φ to $>10 \Phi$ ” for consistency with Section 3.2; all spacing/typographical issues corrected throughout (Reviewer 1, technical correction).
- References: Aitchison (1982), Lark et al. (2012), and Stephens and Dising (2015) added.

We hope that these revisions satisfactorily address all the reviewers' concerns. We remain at your disposal for any further questions or modifications.

Sincerely,

Xiaoyong Duan (on behalf of all co-authors)

Qingdao Institute of Marine Geology, China Geological Survey

dxiaoyong@mail.cgs.gov.cn