

Reply on RC4

Yutian Ke et al.

Author comment on "MOdern River archivEs of Particulate Organic Carbon: MOREPOC" by Yutian Ke et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-161-AC4>, 2022

Dear Dr. Jin Wang,

Thanks for the comments. We have revised the manuscript accordingly.

MOREPOC v1.1 is an updated version of MOREPOC v1.0, both available on Zenodo. The number of data entries increases to an amount of 3,546 during revision, among which 3,053 with POC content, 3,402 with stable carbon isotope ($\delta^{13}\text{C}$) values, 2,283 with radiocarbon activity ($\Delta^{14}\text{C}$) values, 1,936 with total nitrogen content.

Our replies to your comments are as follows:

General comment:

- We realized that there was only a poor introduction to the interest of the Al/Si ratio in the context of POC studies, a parameter included in MOREPOC v1.1. We added to section 2.7: "Lastly, if available, the aluminum-to-silicon mass ratio (Al/Si) is also provided in MOREPOC v1.0 1. This elemental ratio is an efficient proxy for the particle size of riverine sediment, allowing to characterize the particle size effect of sediments on POC loading in fluvial delivery (Galy et al., 2008b; Bouchez et al., 2011; Hilton et al., 2015). The mineralogy and particle size of sediments are generally related, with coarse particles being quartz-rich (low Al/Si ratios) and fine particles being clay-rich (high Al/Si ratios) (Galy et al., 2008b). POC contents are usually positively related to the fraction of fine grains in the sediment (Mayer, 1994; Galy et al., 2008b; Bouchez et al., 2014)."
- This confusion has been resolved in the revised manuscript: in Line 210, we changed the term "POC concentration" to "POC content".
- We added a color bar (for POC wt.%) in Figure. 4 to indicate the dilution of organic carbon by inorganic materials. The constant-POC contour lines drawn in the figure also provide the same information.

Specific comments in the text:

- Line 47: We changed to "riverine POC_{bio} " in the text.
- Line 78: In some references, data tables were indeed images, such that we had to use automatic conversion tools to transfer image data into tables. However, this may result in some numbers being converted into letters, which we had to carefully check. We

should have not taken any data from figures that need to use Digitalizer to take the approximate number, we sent emails to corresponding authors to inquire data.

- Line 129: Reference to this carbonate removal method was added to the manuscript, although it seems more common in soil OC studies than riverine POC studies. We also added the data from Menges et al. (2020) to MOREPOC v1.1 (section 2.6).
- Line 201-205: We provided extra explanations to strengthen the statement: "This might reflect the major POC components: 1) dominated by POC_{bio} , the combined effects of increasing coverage of C4 plants in tropical regions and the input of pre-aged OC_{bio} of C3 plants from degrading permafrost at high latitude (Cerling et al., 1997; Still et al., 2003); 2) dominated by $\text{POC}_{\text{petro}}$, rivers in mountainous regions tend to erode ^{13}C -enrich petrogenic OC (Hilton et al., 2010; Galy et al., 2007)."
- Line 220: We added the suggested references.
- Line 222: We realized that there was a problem with this sentence, which we reworded to "Small SPM concentrations (less than 10 mg/L) are generally found in rivers during cold seasons, or in rivers draining either high-latitude or tropical areas characterized by low-relief settings, in which POC content is relatively high (Gao et al., 2007; Holmes et al., 2022)."
- Missing references were added to the Reference section.