Reply to comments from Editor:

Dear Frédérique and co-authors,

Your revised version addresses the key comments and suggestions raised by both reviewers, and I can therefore accept your manuscript for Biogeosciences pending a few minor corrections and clarifications which I have outlined below.

Best regards
Steven Bouillon

→ *We thank the editor for his positive evaluation of our manuscript and acceptance for publication in Biogeosciences. We address the minor corrections and clarification below.*

-Terminology of how stable isotope ratios are referred to, or how they are compared to each other, needs to be corrected here and there. Some examples below- please give the ms an extra readthrough to check specifically for this.

→ *We checked and corrected this in the revised MS.*

+ L62: “drought enrichment in Godavari C3 plants” : should read something like “an enrichment in 13C of Godavari C3 plants due to drought effects”, or “a 13C-enrichment due to drought in Godavari C3 plants”

→ *Corrected, throughout the MS.*

+ L70: “distinct d13C composition” : should be “distinct d13C values”, or “distinct stable carbon isotope composition”, …

→ *Corrected, throughout the MS.*

+ L71: avoid the use of “signatures”

→ *We replaced “signatures” with (stable carbon isotopic) “values” throughout the MS.*

+ L135: Carbon fractionation : carbon isotope fractionation

→ *Corrected, throughout the MS.*

+ L 176-177: “soil degradation processes enrich OC isotopes” : soil degradation processes enrich the remaining OC in 13C, or : soil degradation processes lead to a 13C-enrichment in the remaining OC, ..

→ *Corrected.*

+ L178: this enrichment : this 13C-enrichment

→ *Corrected, 13C-enrichment and 13C-depletion was specified throughout the MS.*

+ L713: ‘more negative, C3-derived OC’: the OC is not more negative, its d13C values are more negative, rephrase

→ *Rephrased as: “C3-derived OC with typically more negative δ13Corg values”*

+ L715: depleted : 13C-depleted

→ *Corrected, throughout the MS.*

-section 2.5: you now mention (line 358) that the isotope mixing model is concentration-weighted. Can you clarify if this is correct – if so, you need to mention which C concentrations were used for your end-members.

→ *Concentration-weighted δ13C values were calculated for the soils and sediments in order to deal with variability in OC concentrations of these samples collected in the different subbasins, which varied considerably from ~0.03 to 3.13%. This is now detailed as: "The δ13CS values were concentration-weighted using the TOC content (%) of the individual samples in the (sub)basin". Notably, endmembers are based on plant δ13C values and not affected by this.*

- Regarding the C/N ratios, your Methodology does not specify whether you express these as mass or as molar ratios, please add this information to avoid confusion.

→ *The TOC and TN content were reported as weight% for the soil and sediment samples. This information was added in Methods section 2.3. C/N ratios were reported as mass ratios, this is now also specified in section 2.3 and in the caption of Fig. 6.*

- Also, in Figure 6 you refer to data from Balakrishna and Probst for phytoplankton (C/N ratios between 1 and 8) which seem somewhat implausible – it is highly unlikely that phytoplankton can attain C/N ratios as low as 1 – hence use these values more critically.

→ *Balakrishna and Probs reported that the majority (2/3) of C/N ratios for the Godavari main stem and tributaries fell in the range of 1-8. These samples were mostly collected in the dry season from stagnant to slow moving clear waters composed of fine algal material. However, we agree that only one sample had a C/N ratio <2, and the next lowest C/N ratios equalled 2.5 and 2.6. So we revised Fig 6 and changed the lower limit for phytoplankton C/N ratios to 2.5.*

-L839: C3-domianted : C3-dominated.

→ *Corrected*

-The intro might benefit with some more references on the specific conditions favoring C3 versus C4 plants and their global distribution, for example:
Still et al. (2003) Global distribution of C3 and C4 vegetation: Carbon cycle implications. https://doi.org/10.1029/2001GB001807

→ *Thank you for the suggestion. We added a reference to Still et al. (2003) and references therein in the introduction.*

-Color Figures: thank you for addressing some issues with the color maps. There is some room for improvement though in Figures 3 and 6, these are not accessible to readers with color vision deficiencies as not all symbol-color combinations can be distinguished. This can easily be fixed by using different combinations and/or full versus open symbols.

→ *We thank you for pointing this out. We corrected the colours of Fig 3 and 6 to a palette (Color Universal Design) that is accessible for colourblind readers, following the guidelines described in Katsnelson, A.: Colour me better: fixing figures for colour blindness. Nature 598,*

224-225, 2021, doi: https://doi.org/10.1038/d41586-021-02696-z. These colours were also applied in Fig 4, to have a consistent colour palette throughout the MS.