

Interactive comment on “Understanding the effects of early degradation on isotopic tracers: implications for sediment source attribution using compound-specific isotope analysis (CSIA)” by Pranav Hirave et al.

Anonymous Referee #1

Received and published: 15 July 2019

Review on the manuscript ‘Understanding the effects of early degradation on isotopic tracers: implications for sediment source attribution using compound specific isotope analysis (CSIA)’ by Hirave et al.,

The manuscript deals with the robustness of CSIA values of long chain alkanes and fatty acids as sediment source finger printing during early degradation in the soil. Their results show that bulk $d^{13}C$ values show enrichment from plant biomass to the soil mineral horizon, whereas CSIA of fatty acids and alkane showed enrichment from plant biomass until the O horizon overlaying the mineral soil. Also their results show that

C1

bulk soil (<2 mm) can be safely used to determine tracer signatures in CSIA- based sediment source finger printing irrespective of particle size of sediments.

Overall the manuscript is well written. But certain specific comments may be addressed before publication.

Abstract:

Page 1 lines 8-10: The application of CSIA is not restricted only to freshwater systems, as many studies from marine environment (For eg., Canuel et al., 1997; Limnol Oceano, 42, 1570) also show its importance.

Introduction:

Page 2 line 16: Huang et al. (1997) Punctuation- please remove comma here and many other places Page 2 line 28: I feel it should be ‘fresh plant material with organic matter to the organic horizons and upper mineral soil horizon’

Carbon preference Index of alkanes can also be given in addition to average chain length.

2. Materials and methods

Page 3, line 13: It is better to define Oi-Oe-Oa horizons to the readers at the first time

Line 15: ‘moder’ type spelling correction

2.4 Page 4 line 7: Please define OM at the first usage Line 5: please remove the bracket for reference Schmidt et al., 1999

Page 5 line 1: please elaborate or give reference how the correction for $d^{13}C$ values was applied for additional carbon atom introduced during methylation.

Section 3.2 summarizes that bulk $d^{13}C$ values should not be relied for sediment source attribution compared to compound specific isotope values. However the issues/reasons (other than enrichment) while considering bulk isotope values are not

C2

discussed in detail.

The manuscript is written well, but the novelty and importance of present study need to be highlighted in the manuscript.

Citation of references in the text is given alphabetical order. Normally it is cited in chronological order (ascending). Anyway please follow the journal format and modify accordingly.

The following reference may be cited if found applicable. They also emphasize the usage of $\delta^{13}\text{C}$ of $>\text{C} 20$ fatty acids for source apportionment compared to short chain fatty acids.

Upadhyay et al., (2017) Methodological perspectives on the application of compound-specific stable isotope fingerprinting for sediment source apportionment; *J Soils Sediments* (2017) 17:1537–1553; DOI 10.1007/s11368-017-1706-4

The manuscript can be accepted after minor revision.

Interactive comment on Biogeosciences Discuss., <https://doi.org/10.5194/bg-2019-205>, 2019.