

***Interactive comment on* “Bacterial carbon sources in coastal sediments: a review based on stable isotope data of biomarkers” by S. Bouillon and H. T. S. Boschker**

Anonymous Referee #1

Received and published: 8 November 2005

The authors have brought together both previously published and new stable isotope data from various coastal environments, from mangrove systems to C3 and C4 marshes to seagrasses and unvegetated sites, to better generalize the source of carbon that is being remineralized by bacteria in these coastal systems. Phospholipid fatty acids (PLFA) were used as bacterial biomarkers; the isotopic composition of *i*+a 15:0 was compared to the isotopic composition of both bulk sedimentary organic carbon and macrophyte biomass. It was determined that in most settings, bacteria depend on carbon from many different sources, and not just the dominant macrophyte present. The bacterial PLFA $\delta^{13}\text{C}$ values tend to be more ^{13}C -enriched in C3 marshes (and mangrove sites) and ^{13}C -depleted in C4 marshes (and seagrasses and macroalgae sites) relative to the dominant $\delta^{13}\text{C}$ of the macrophytes present.

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper

This is a nicely organized and written manuscript. The authors have also done a good job in describing how representative their data is of the various coastal environments and the veracity of the conclusions drawn. The main suggestion that I have would be to better incorporate the possibility that the bacteria are using specific components of the macrophyte biomass, which can have either ^{13}C -enriched or ^{13}C -depleted $\delta^{13}\text{C}$ values relative to the bulk plant material. Overall, this manuscript is a nice addition to field of estuarine/marine isotope biogeochemistry. I have only a few specific comments to add that the authors might want to take into consideration.

Specific comments:

Page 1628, lines 11-16: The isotopically-enriched source that the bacteria appear to be using could be either proteins or carbohydrates. Both components tend to have ^{13}C -enriched isotope values relative to the bulk. Proteins and carbohydrates also tend to be more labile than other plant components.

Page 1628, lines 23-24: I am not familiar with a “cumulative sum analysis.” Could the authors describe this?

Page 1630, lines 3 on: Only if the isotopic composition of the input organic matter is different would differences in lability and degradability be seen in the isotopic composition of the bacterial fatty acids. Are the authors assured that the algae and the macrophyte derived materials are different at the various sites?

Figure 3: When average values of isotope data were used to assign plant values, how many points made up these averages (what was the n)? What was the error on the values?

Figure 5: I'm surprised that the standard deviation of D_d around the low %TOC values does not appear to be any larger than around the high %TOC values, yet the scatter in the data (5a) is so much greater. Is the standard deviation depicted the s.d. overall or was it binned?

[Full Screen / Esc](#)[Print Version](#)[Interactive Discussion](#)[Discussion Paper](#)

Technical corrections:

Table 1: The abbreviation for Delaware is DE, so Canary Creek should read Canary Creek (DE, USA).

Interactive comment on Biogeosciences Discussions, 2, 1617, 2005.

BGD

2, S673–S675, 2005

Interactive
Comment

Full Screen / Esc

Print Version

Interactive Discussion

Discussion Paper