Biogeosciences
Discussions

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Interactive comment on "Assessing the potential of amino acid δ^{13}C patterns as a carbon source tracer in marine sediments: effects of algal growth conditions and sedimentary diagenesis" *by* T. Larsen et al.

Anonymous Referee #1

Received and published: 1 April 2015

A very useful exploration of the use of compound-specific isotope analysis of amino acid carbon (δ13C-AA) as a proxy for organic matter sources in sediments. The first part of the study is quite convincing, using culture experiments to show that oceanic conditions are unlikely to alter the phytoplankton δ13C-AA 'fingerprint', in contrast to large changes known for bulk δ13C. The second part of the study, focusing on δ13C-AA in a Peruvian upwelling core sample, is somewhat less convincing but the unknowns are well discussed and should guide future work (e.g. bacterial alteration in the water column vs in the sediment). The only major concern relates to carbon fractionation dur-

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ing derivitiation, with the paper generally well written beyond some apparently missing words early on.

Major comment

1. p1621,L7-10: Isn't the fractionation during derivitization likely to vary (in an uncontrolled way) between samples and standards dependent on the material matrix? More information is needed on the standards used, and justification for comparing δ13C-AA values between different sample matricies in the context of fractionation during derivitiazation.

Minor comments

2. Abstract: There seem to be a number of words missing in the abstract, and elsewhere in the manuscript (e.g. p1615,L6: "for tracing THE biosynthetic origin"; p1616,L28-29: "as well as THE direct bacterial role"? 3. L7: "natural occurring" –> "naturally occurring"? 4. p1617,L14: "largely independent OF variation". 5. p1619,L22: "collected IN 2008". 6. p1622,L10: "subdivided INto the following. . ."

Interactive comment on Biogeosciences Discuss., 12, 1613, 2015.