Cite abstracts as **Author(s) (2010), Title, *Eos Trans. AGU*, *91*(26), Ocean Sci. Meet. Suppl., Abstract xxxxx-xx**

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HR: 0900h
AN: **BO41B-05**
TI: LINKING SOURCE, ABUNDANCE, AND LABILITY OF ORGANIC MATTER TO METABOLIC ACTIVITY AND SEDIMENT REDOX CONDITIONS
AU: **Briggs, R A**
EM: *briggs@hawaii.edu*
AF: *Dept of Oceanography, University of Hawaii, Honolulu, HI, United States*
AU: **Ricardo, A**
EM: *amandamc@hawaii.edu*
AF: *Dept of Oceanography, University of Hawaii, Honolulu, HI, United States*
AU: **Ruttenberg, K C**
EM: *kcr@soest.hawaii.edu*
AF: *Dept of Oceanography, University of Hawaii, Honolulu, HI, United States*
AU: **Glazer, B T**
EM: *glazer@hawaii.edu*
AF: *Dept of Oceanography, University of Hawaii, Honolulu, HI, United States*
AB: A novel approach was used to document variable sediment metabolic activities in different depositional environments arrayed along a shore-perpendicular transect in coastal Kaneohe Bay, Hawaii. In tact sediment cores were incubated in the laboratory, in the dark, after placing gold amalgam voltammetric microelectrodes at four depths within the core. These microelectrodes enabled us to continuously analyze multiple redox species simultaneously at discrete depth intervals within the core. Solid phase analyses of pre- and post-incubation cores provided molar organic C:N:P ratios and stable isotopic signatures of organic carbon and nitrogen. The coupled C:P - δ13C technique (Ruttenberg and Goni 1997) was used to evaluate sources of organic matter (terrestrial versus marine) to each study site, which has implications for organic matter lability. Apparent metabolic rates were estimated using net rates of oxygen (O2) production and hydrogen sulfide (H2S) consumption from evolving concentrations at each microelectrode depth, detected in real time over the course of the incubation. After normalizing metabolic rates to the concentration of organic matter present, we find the expected trend of lowest rates in sites dominated by terrestrial organic matter, and highest rates at sites dominated by marine organic matter, reflecting the progression from refractory terrestrial- to more labile marine-derived organic matter. Contrasting pre- and post-incubation molar organic C:N:P ratios and stable carbon and nitrogen isotopic signatures reveals alterations to source organic matter during earliest diagenesis as simulated by the incubation experiment (e.g. 48 hours). In conclusion, laboratory whole-core incubations using depth-arrayed microelectrodes

provide a novel and powerful approach to the study of metabolic reactions, and subsequent buildup of porewater redox sensitive constituents, in marine sediments during early diagenesis. When linked with analysis of indices of organic matter source in pre- and post-incubation sediments, metabolic rates can be directly tied to the lability of the organic matter present.

DE: [4805] OCEANOGRAPHY: BIOLOGICAL AND CHEMICAL / Biogeochemical cycles, processes, and modeling

DE: [4845] OCEANOGRAPHY: BIOLOGICAL AND CHEMICAL / Nutrients and nutrient cycling

DE: [4851] OCEANOGRAPHY: BIOLOGICAL AND CHEMICAL / Oxidation/reduction reactions

DE: [4894] OCEANOGRAPHY: BIOLOGICAL AND CHEMICAL / Instruments, sensors, and techniques

SC: Biological Oceanography (BO)

MN: 2010 Ocean Sciences Meeting

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