

BENTHIC FLUXES OF DISSOLVED ORGANIC CARBON:
TOMALES BAY, CALIFORNIA, AND KANEOHE BAY, HAWAII

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CHAPTER 6

CONCLUSIONS

Recent improvements in sampling techniques have facilitated the collection of porewater DOC. The porewater “sipper” core is the latest in a long line of sediment core designs which simplify porewater extraction and minimize sediment manipulation. Comparisons of sediment centrifugation and use of the porewater “sipper” core in Kaneohe Bay indicated similar results. However, previous research indicates centrifugation may artificially elevate porewater DOC, thus suggesting that further study in a wider variety of environments is still needed.

HTC proved to be an effective and expedient means of analyzing DOC. Questions remain, however, as to the difference in DOC sensitivity between this method and chemical oxidation for saline water samples. Fresh water analyzed by each method gave comparable results, while increasingly saline samples differed by as much as a factor of four in Tomales Bay. Further research is necessary to explain these discrepancies.

Benthic DOC fluxes were determined for Tomales Bay and Kaneohe Bay. Fluxes for both sites ranged between a quarter and a third of water column respiration values. The nature of this DOC, however, is unknown. It is possible

that a fraction of this DOC is resistant to biological consumption, prompting the need for further study to determine its influence on water column processes.

Early estimates of globally integrated benthic DOC fluxes are an order of magnitude less than Tomales Bay and Kaneohe Bay on an areal basis. While previous estimates indicate that the role of estuaries and bays in global DOC fluxes is small, these numbers could be considerably larger depending on the percent of global estuaries represented by sites like Tomales Bay, Kaneohe Bay, and Pontchartrain Estuary (Argyrou et al., 1997). If these sites comprise just half of all estuaries/bays, benthic DOC fluxes from these systems are comparable to those of coastal upwelling regions and shelf and slope sediments. Further study is suggested in order to better constrain the range of estuarine benthic DOC fluxes, and determine the fraction of estuarine sediments represented by locations like Tomales Bay and Kaneohe Bay.