CARBON AND NITROGEN CYCLING IN AN ORGANIC RICH ESTUARY – INSIGHTS FROM CONTINUOUS FLOW ISOTOPE RATIO MASS SPECTROMETRY

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Estuaries provide the interface between the export of organic matter from the terrestrial environment into the relatively "organic matter poor" sedimentary marine environment. What happens to this exported organic matter in this intermediate environment is therefore important in determining the organic matter content of both estuarine and the receiving marine sediments.

The relatively recent advent of continuous flow isotope ratio mass spectrometry has made it possible to gain compositional (%C, %N) and isotope (_^{13}C, _^{15}N) information on a relatively large number of samples in a much shorter time and with less cost than traditional techniques. As part of a large study of the Huon Estuary in southern Tasmania, aimed at assessing the impacts of aquaculture, we decided to attempt to apply broad scale stable isotope analysis of estuarine sediments in an attempt to "map" depositional and erosion zones within the estuary and to assign origins to the organic matter. This data, combined with GIS techniques has allowed an overview of the estuary to be developed, which compliments other data, such as hydrodynamic modelling, and within which other studies can be interpreted. This has most recently included a study of the role of intertidal salt marsh mudflat systems in nutrient budgets.

Results from both studies will be presented, indicating how continuous flow isotope ratio mass spectrometry can provide valuable information for both large and fine scale environmental studies.