**The East-West divide, nutrient cycling & 'health' in Moreton Bay**

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Sediment TOC, TN, TP & BSi concentrations, benthic $TCO_2$ and DSi fluxes and pore water metabolites DSi, DIN & DIP all indicated contrasting modes of primary productivity and nutrient cycling between east and west MB. Fresh diatoms or diatomaceous debris were the dominant OM in the muddy sediments of western MB and principally responsible for releasing nutrients to pore waters. Diatoms, which are heavy and sink rapidly, are the principal vector to transport N & P to sediments where denitrification and P-trapping may remove river-borne nutrients. Diatoms however were not as important in the sandy sediments of eastern MB. Benthic DSi and $TCO_2$ ratios and pore water DIN/DSi and DIP/DSi ratios all indicated a significant source of sedimentary OM (organic mater) was undergoing degradation – which was not diatomaceous. We suggest that benthic photosynthesis driven by N-fixation was most important in these sandy sediments. N-fixation, very efficient oxygen reduction, nitrification and denitrification control the ephemeral formation and degradation of OM, the OM & N-budgets so that little OM is preserved and buried.

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