

Effects of variable redox conditions on nutrient regeneration during organic matter remineralization

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The effect of oxygenation on N and P remineralization during OM decomposition is not fully understood. It has been argued that: there is no preferential regeneration of either N or P relative to C under oxic conditions (Anderson and Sarmiento 1994); N is preferentially released under oscillating redox conditions (Aller, 1994); and P is preferentially released under anoxic conditions (Ingall and Jahnke, 1997). Upon release, remineralized nutrients may be retained in sediments (Fillipelli, 1997) or diffuse from sediments, becoming available for biological utilization, thereby increasing primary productivity and the potential delivery of OM to the sediments. Four cores were taken from the Orca Basin under different depositional regimes, oxic, transition, oscillating, and anoxic. Results indicate that P_{org} is preferentially remineralized relative to C_{org} under anoxic conditions, and that both N and P are preferentially released from sediments in inorganic forms under oscillating redox conditions. The mechanism appears to be related to prevention of the sorption of inorganic P and N species to minerals (clays & oxides) in sediments under oscillating redox conditions.

