



## Some thoughts on the concept of colimitation: Three definitions and the importance of bioavailability

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Limnol. Oceanogr., 53(1), 2008, 276-290 | DOI: 10.4319/lo.2008.53.1.0276

**ABSTRACT:** We discuss the concept of colimitation of primary productivity in aquatic environments, with an emphasis on reconciling this concept with recent advances in marine bioinorganic chemistry. Colimitations are divided into three categories on the basis of their mathematical formulations and visualizations: type I, independent nutrient colimitation (e.g., N and P); type II, biochemical substitution colimitation (e.g., Co and Zn); and type III, biochemically dependent colimitation (e.g., Zn and C), where the ability to acquire one nutrient is dependent upon sufficient supply of another. The potential for colimitation occurring in the marine environment and the critical importance of understanding nutrient bioavailability are discussed.

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