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Ocean Acidification and Biogeochemical Cycling: an attempt at an overview

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The carbonate system is one of the elementssignificantlystructuring the environment of marine microbes, thereby impacting their physiology and activity, their community composition and consequently elemental cycling in the ocean. Ocean acidification, a term which describes current and expected future changes in the carbonate chemistry of the ocean,also impacts trace element availability and organic matter equilibria (enzymes, ligands, siderophores),further altering the environment of marine organisms. The joint effects of ocean acidification impact microbial mediated processes, like primary production, nitrogen fixation, denitrification and calcification. Simultaneous changes in temperature and stratification of the surface ocean complicate the response patterns of microbes and frequently lead to non-linear changes in their activity.Shifts in species composition and in the stoichiometry of organic matterwill result. The partitioning of primary produced organic matter between sedimentation, microbial turnover, and respiration within the food web will change.However, due to the complexity of interacting processes and feed-backs the direction and quantity of the expected changes are often difficult to predict.Possibly, a larger fraction of material entering the microbial loop may be stored as recalcitrant dissolved organic matter in the deep sea, or recycling within the microbial loop may increase. The efficiency of the biological pump will change. This presentation reviewsour current knowledge of the effects of ocean acidification on different microbial processes driving biogeochemical cycling, and attempts to summarize possible overall effects on elemental cycles, the efficiency of the biological pump and the microbial loop.