The Role of Carbon in Marine Biogeochemistry

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Geochemistry at the Earth surface has been largely transformed to biogeochemistry with the origin of life. The formation of bio-products (primary organic and skeletal shells) from inorganic constituents of a geochemical system (water or soil) is the first stage of the biogeochemical cycles. As the produced materials decompose upon the death of organisms or other wise the forms and abundances of elements associated not only with its production but also several others indirectly involved are strongly influenced. The most of the biologically synthesized materials have carbon as their skeletal element around which a variety of organic and inorganic substances form. Among the inorganic ones the carbonate shells assume significance among marine organisms. Therefore, the biogeochemical cycles largely revolve around the transformations of carbon in the oceans. Processes of several elements in the oceans are invariably linked to carbon cycle at some point of their journey through the water column. It is thus fundamental to understand carbon, along with its associated nutrient elements, cycle and its transformations to understand marine biogeochemical cycles. In these processes not only the primary producers but also the destroyers (microbes involved in decomposition) assume equal significance. Microbial processes not only regulate elemental cycles and transformations in the ocean but also in determining the extents of exports of materials of climate importance into atmosphere and that of geochemical significance to sedimentary layers.