

研究报告

海洋碳迁移转化与主要化学驱动因子的相互关系

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摘要

分析了化学驱动因子对海洋碳迁移转化过程的影响.海洋碳迁移转化与各种化学驱动因子参与的生物地球化学过程密切相关.营养盐水平、pH、溶解氧浓度(DO)、氧化还原电位(Eh)、 SO_4^{2-} 及硫电位(Es)等主要化学驱动因子的消长导致了海洋化学环境的变化,进而对海洋碳的迁移转化产生影响.在营养盐的供给和生物吸收情况良好的海域, CO_2 由于光合作用,并通过沉降有机物的氧化,不断被转移到海水深层,使得海水中的 CO_2 分压(P_{CO_2})降低, CO_2 的海-气交换量和有机碳输出通量增大,从而使该海域表现为 CO_2 的汇.由于 CO_2 的溶解与吸收以及有机物的降解造成了海洋环境的日益酸化,引起了海水中碳酸盐溶解度增大;沉积物中酸碱环境的变化也与有机物的矿化以及碳酸盐的溶解、沉淀过程密切相关.此外,DO、Eh、 SO_4^{2-} 及Es的变化与水体中有机碳的矿化分解过程和碳在沉积层中沉积埋葬过程相耦合.在水体中,高DO、高Eh利于有机碳向无机碳转化;而在DO和Eh较低的沉积环境中,高 SO_4^{2-} 不利于有机碳的埋葬与保存.

关键词 [化学驱动因子](#) [海洋碳迁移转化](#) [生物地球化学过程](#)

分类号

Migration and transformation of marine carbon and related chemical driving factors

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Abstract

The study showed that the migration and transformation of marine carbon had a close relation with the biogeochemical processes driven by various chemical factors. The growth and decline of nutrient concentration, pH, dissolved oxygen (DO), redox potential (Eh), SO_4^{2-} , and sulfur potential (Es) could change marine chemical environment, and thus, affect the migration and transformation of marine carbon. When the nutrient supply was adequate to the nutritional demand of phytoplankton, CO_2 was conveyed to deep sea through photosynthesis and organic matter oxidation, which caused the decrease of sea water P_{CO_2} and the increase of sea air CO_2 flux and organic carbon output, making the sea area as a CO_2 sink. But, the increasing acidification of marine environment caused by CO_2 dissolution and organic matter degradation brought about the solubility augmentation of carbonate in seawater. Moreover, the mineralization of organic carbon was coupled with the changes of DO, Eh, SO_4^{2-} and Es, and the deposition and burial process of carbon in sediments. In sea water body, high DO and high Eh accelerated the transformation from inorganic carbon to organic carbon, while in sediment, high SO_4^{2-} was adverse to the burial of organism with low

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DO and low Eh.

Key words

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