

The Source and Fate of Nutrients :

Nutrients can enter the ocean through many routes. One of the major pathways is aeolian deposition, such as the input of ash from volcanic eruptions, lithogenic particles brought by sandstorms, and anthropogenic aerosols. Naturally occurring nutrients in terrestrial systems and those produced by human activity enter the ocean via the input of river water and groundwater. Phytoplankton utilize nutrients to grow and to produce organic matter. Most of the organic matter (90-99%) generated through photosynthesis is internally recycled in the surface layer of the ocean. Only a small amount of the material is transported to the deep ocean (export production). In contrast to regenerated production regulated by internally recycled limiting nutrients, new production represents the primary production generated by the input of external limiting nutrients. These inputs of limiting nutrients, mainly bioavailable nitrogen and phosphorus, determine new production in the ocean. If the amount of organic matter generated in the surface layer of the ocean is maintained at a steady state, the export production is equal to the amount of new production.



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