

Abstract

Oxygen-poor waters occupy large volumes of the intermediate-depth eastern tropical oceans. Oxygen-poor conditions have far-reaching impacts on ecosystems because important mobile macroorganisms avoid or cannot survive in hypoxic zones. Climate models predict declines in oceanic dissolved oxygen produced by global warming. We constructed 50-year time series of dissolved-oxygen concentration for select tropical oceanic regions by augmenting a historical database with recent measurements. These time series reveal vertical expansion of the intermediate-depth low-oxygen zones in the eastern tropical Atlantic and the equatorial Pacific during the past 50 years. The oxygen decrease in the 300- to 700-m layer is 0.09 to 0.34 micromoles per kilogram per year. Reduced oxygen levels may have dramatic consequences for ecosystems and coastal economies.

摘要

在熱帶海洋東側，缺氧的海水佔有中層海水相當大的體積，其對生態系統有相當長遠的影響，因為重要的自營有機體會避免或無法在缺氧環境下生存。氣候模式預測全球暖化使得海洋的溶氧量減少，藉由近期的測量資料增加了歷史資料庫，我們在選取的熱帶海域建構了 50 年的溶氧濃度時間序列，時間軸上顯示了，在過去 50 年，大西洋東側和太平洋熱帶地區的中層低氧區域上下擴散情形，水平面以下 300~700m 的水層，以每年 0.09~0.34 微莫耳每公斤的速率減少，減少的氧氣量可能會對生態系統和沿海經濟造成重大影響。