

國立臺灣海洋大學
海洋環境與生態研究所 專題討論

題目：地中海沿經度梯度的溶解態與顆粒態基礎生產力

Dissolved and particulate primary production along a longitudinal gradient in the Mediterranean Sea

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中文摘要

這項研究測量了地中海在夏季時光合作用下藻類的溶解態基礎生產力 (Dissolved primary production; DOCp) 和顆粒態基礎生產力 (Particulate primary production; POCp) 沿經度梯度的分布狀況。透光層積分值的溶解態基礎生產力介於 50-130 mgC m⁻² d⁻¹；顆粒態基礎生產力則介於 95-210 mgC m⁻² d⁻¹，兩者皆呈現由東到西增加的趨勢。整體來說，透光層積分值的溶解態基礎生產力約占總基礎生產力 (即胞外釋放百分比; Percentage of extracellular release; PER) 的 37%，且隨著經度變化並無明顯趨勢。儘管有相對較高的胞外釋放百分比，溶解態基礎生產力卻遠低於細菌碳需求，顯示浮游植物釋放的有機碳與細菌活性的耦合度較低。綜合過去在不同生產力生態系的調查，本研究也支持了溶解態基礎生產力在營養鹽限制條件下相對重要的觀點。

Abstract

We have determined the photosynthetic production of dissolved (DOCp) and particulate organic carbon (POCp) along a longitudinal transect in the Mediterranean Sea during the summer stratification period. The euphotic layer-integrated rates of DOCp and POCp ranged between approximately 50–130 and 95–210 mgCm⁻²d⁻¹, respectively, and showed an east to west increasing trend. For the whole transect, the relative contribution of DOCp to total, euphotic layer-integrated primary production (percentage of extracellular release, PER) averaged ~37% and did not show any clear longitudinal pattern. In spite of the relatively high PER values, the measured DOCp rates were much lower than the estimated bacterial carbon demand, suggesting a small degree of coupling between phytoplankton exudation and bacterial metabolism. Our results, when compared with previous measurements obtained with the same methods in several ecosystems of contrasting productivity, support the view that the relative importance of DOCp increases under strong nutrient limitation.