

國立臺灣海洋大學
海洋環境與生態研究所 專題討論

中文題目：碳酸鹽埋藏在藍碳收支平衡中所扮演的角色

英文題目：Role of carbonate burial in Blue Carbon budgets

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Abstract

Calcium carbonates (CaCO_3) often accumulate in mangrove and seagrass sediments. As CaCO_3 production emits CO_2 , there is concern that this may partially offset the role of Blue Carbon ecosystems as CO_2 sinks through the burial of organic carbon (C_{org}). A global collection of data on inorganic carbon burial rates (C_{inorg} , 12% of CaCO_3 mass) revealed global rates of $0.8 \text{ TgC}_{\text{inorg}} \text{ yr}^{-1}$ and $15\text{--}62 \text{ TgC}_{\text{inorg}} \text{ yr}^{-1}$ in mangrove and seagrass ecosystems, respectively. In seagrass, CaCO_3 burial may correspond to an offset of 30% of the net CO_2 sequestration. However, a mass balance assessment highlights that the C_{inorg} burial is mainly supported by inputs from adjacent ecosystems rather than by local calcification, and that Blue Carbon ecosystems are sites of net CaCO_3 dissolution. Hence, CaCO_3 burial in Blue Carbon ecosystems contribute to seabed elevation and therefore buffers sea-level rise, without undermining their role as CO_2 sinks.

中文摘要

碳酸鈣 (CaCO_3) 經常會累積在紅樹林和海草沉積物中。由於 CaCO_3 的生成會排放 CO_2 ，因此可能會部分抵消掉藍碳生態系統透過有機碳埋藏吸收二氧化碳的作用。全球無機碳埋藏率數據 (C_{inorg} ， CaCO_3 質量的 12%) 顯示，紅樹林和海草生態系統中的無機碳埋藏率分別為 $0.8 \text{ TgC}_{\text{inorg}} \text{ yr}^{-1}$ 和 $15\text{--}62 \text{ TgC}_{\text{inorg}} \text{ yr}^{-1}$ 。在海草生態系中，約 30% 淨 CO_2 吸收會被 CaCO_3 埋藏所造成的 CO_2 釋放所抵消。然而，經質量平衡估算後清楚發現，藍碳生態系中 C_{inorg} 埋藏主要是來自於鄰近生態系統的輸入，而不是由系統內鈣化作用所產生，且藍碳生態系統呈現 CaCO_3 淨溶解的狀態。因此，藍碳生態系中 CaCO_3 的埋藏，不僅有助於海床抬高，進而緩解海平面上升的衝擊，同時亦不會削弱其作為 CO_2 匯的作用。