



Latitudinal variation of the balance between plankton photosynthesis and respiration in the eastern Atlantic Ocean

Serret, Pablo, Carol Robinson, Emilio Fernández, Eva Teira, Gavin Tilstone

Limnol. Oceanogr., 46(7), 2001, 1642-1652 | DOI: 10.4319/lo.2001.46.7.1642

ABSTRACT: A knowledge of the balance between plankton gross primary production (GPP) and community respiration (CR) in the open ocean is vital to the accurate determination of the global carbon cycle, yet the paucity of open ocean measurements severely limits our understanding. This study measured GPP, net community production, dark CR, and size-fractionated primary production in the upper 200 m of a 12,100 km latitudinal (32° S-48° N) transect in the Eastern Atlantic Ocean during May and June 1998. This comprehensive data set, which spans five contrasting plankton regimes, including two open ocean oligotrophic provinces, is used to derive a GPP:CR relationship, which suggests that net heterotrophy (GPP < CR) prevails in the eastern Atlantic when primary production falls below ~100 mmol O₂ m⁻² d⁻¹. The predictive capability of this relationship is compared with that of the only other published relationship based on similar methodologies and is found to give a more representative description of the autotrophic (GPP > CR) to heterotrophic seasonal cycle in the Bay of Biscay. This improved predictive power is attributed to the increased representativeness of the current data set. Specifically, the interpretation suggests that the influence of community structure on net ecosystem metabolism implies that prediction of GPP:CR balances in pelagic ecosystems can be best achieved by use of a data set that covers a wide range of community structure and not only a wide range in the magnitude of primary production.

Article Links

[Download Full-text PDF](#)

[Return to Table of Contents](#)

Please Note

Articles in L&O appear in PDF format. Open access articles may be freely downloaded by anyone. Other articles are available for download to subscribers only, or may be purchased for \$10 per article. All L&O articles are moved into Open Access after three years.

