



Phytoplankton growth rates in the Atlantic subtropical gyres

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ABSTRACT: Reported estimates of phytoplankton growth rate (μ) in the subtropical gyres range widely from 0.1-0.2 to 1-2 d^{-1} . Dividing chlorophyll a (Chl a)-normalized photosynthesis (PB) by the phytoplankton carbon (C) to Chl a ratio (C : Chl a) yields an estimate of phytoplankton μ . To reduce the current uncertainty regarding phytoplankton μ in the subtropical gyres, I have reviewed >230 determinations of Chl a -normalized photosynthesis (PB) and >40 determinations of phytoplankton C: Chl a obtained in surface waters of the eastern North Atlantic Subtropical Gyre (NAST-E), the western NAST (NAST-W), and the South Atlantic Tropical Gyre (SATL). Means (95% confidence intervals) of μ were 0.26 (0.19-0.36), 0.51 (0.42-0.62), and 0.17 (0.13-0.22) d^{-1} at NAST-E, NAST-W, and SATL, respectively. These values are all significantly lower than the expected maximum μ for phytoplankton living in the warm, surface waters of the subtropical ocean. Thus, phytoplankton growth rates, and not only their biomass, seem to be nutrient-limited in the oligotrophic ocean. A low phytoplankton μ in the open ocean is consistent with our knowledge of the relationship between elemental composition of the cells and their physiological state and agrees with other ecological and biogeochemical observations in the subtropical gyres.

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