

## Steve R. Emerson and John I. Hedges: Chemical Oceanography and the Marine Carbon Cycle

Cambridge University Press, ISBN 9780521833134, £90 or \$90

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There are currently two outstanding text books available in Marine Biogeochemistry. One is the book covered in this review, and the other is the book by Sarmiento and Gruber titled Ocean Biogeochemical Cycles (2006). The latter book uses a more mathematical approach to the ocean's biogeochemical cycles, whereas the Emerson and Hedges book uses a more descriptive approach and starts with the basics of oceanography for beginning postgraduate students and finishes with research level text in chemical oceanography and the carbon cycle.

The first part of the book provides a basis for students new to marine biogeochemistry, and serves as an introduction to chemical, biological and physical oceanography, and also covers thermodynamics and elemental ocean mass balances. The material forms an ideal course text for students (MSc level). The inclusion in the book of material on the carbonate cycle, stable and radioactive isotopes and paleocenography provides for a well balanced teaching course, which will intellectually challenge the students.

The multi-disciplinary approach used by the authors results in a text book covering all aspects of marine biogeochemistry that students require to understand ocean biogeochemical cycles and their links to climate change.

The last five chapters provide higher level material on molecular diffusion and reaction rates, air-sea gas exchange, the global carbon cycle and marine organic geochemistry. These chapters will serve as an excellent basis and reference for PhD students and other researchers. However, the challenge with inclusion of research level material in a textbook is that parts of the text are superseded by the time the book is published.

Overall, this is an outstanding book, which provides excellent material for MSc level courses. The authors have succeeded in producing an excellent multi-disciplinary textbook, which is key for the education of the next generation of marine biogeochemists and chemical oceanographers.

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