

Preface to the Second Edition

During the past three decades, there has been a veritable explosion of books on environmental problems. However, this book is different in that it approaches the environment almost entirely in terms of global geochemical cycles both as they occur naturally and as they are affected by human activities. Here we emphasize such important problems as global warming, acid rain, rock weathering, erosion, eutrophication of both lakes and estuaries, and ocean acidification.

This book is intended for those who have a fundamental understanding of elementary chemistry, but it requires no other background in science, whether it be in biology, geology, meteorology, oceanography, hydrology, soil science, or environmental science. Our approach is multidisciplinary and covers all of these fields, but we do it from an elementary standpoint. Mathematical complexity is held to an absolute minimum, with the only requirement being some previous training in chemistry at the college freshman, or even the advanced high school, level. The book is appropriate as a primary or secondary text in junior- or senior-level undergraduate courses, or beginning graduate courses, in environmental geochemistry, environmental geology, global change, biogeochemistry, water pollution, geochemical cycles, chemical oceanography, and geohydrology. Because we provide extensive data on natural fluxes of chemicals, the book is also of reference value to researchers on global geochemical and environmental problems.

Much of this book is devoted to the natural behavior of the Earth's surface. We attempt to quantify the rates by which the major constituents of rocks, water, air, and life are transferred from one reservoir to another and to track down the sources of each constituent. We feel that a knowledge of geochemical cycles in the prehuman state is necessary before one can discuss how humans have perturbed these cycles.

The present book is a second edition of our 1996 book by the same title. Here we have put in extra effort to update the increasing amount of information being published on important global environmental problems. This includes,

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among other things, an exhaustive study of changing climate and atmospheric chemistry by the Intergovernmental Panel on Climate Change (ICPP) in 2001 and 2007; new findings on how the problem of acid rain is being ameliorated somewhat; further information on the eutrophication of lakes, rivers, and estuaries; major advances in the study of chemical weathering; and the new global environmental problem of ocean acidification.

The material in this book has been used in courses over the past three decades by E. K. Berner at Wesleyan University and the University of Connecticut and by R. A. Berner at Yale University. We are grateful for the various suggestions made to us by both students and teaching assistants during the preparation of this book and its predecessor. Special thanks are due to Danny Rye for help in photograph preparation.

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