Sulfur Cycling on the Continents: Wetlands, Terrestrial Ecosystems and Associated Water Bodies (Scope 48)


The scientist Committee on Problems of the Environment (SCOPE) of the International Council of Scientific Unions has published, since 1974, a series of approximately 50 books dealing with biogeochemical cycles. This book is the latest of at least eight different volumes that considers, at least in part, the subject of the biogeochemical sulfur cycle and is the result of a workshop held at Peterborough, Canada, in May 1989. After a short introductory chapter, 10 chapters follow, all written by world-renowned experts on biogeochemical sulfur cycling. The topics covered in this book include two chapters on the atmospheric sulfur cycle in temperate and tropical regions, a chapter on the interactions of sulfur with other elements, five chapters on sulfur cycling in various marine or wetland environments, a chapter on sulfur dynamics in forest ecosystems, and a chapter on sulfur cycling in upland agricultural systems. There seemed to be considerable overlap among several of the five chapters dealing with sulfur cycling in marine or wetland environments, a chapter on sulfur dynamics in forest ecosystems, and a chapter on sulfur cycling in upland agricultural systems. There seemed to be considerable overlap among several of the five chapters dealing with sulfur cycling in marine or wetland environments, a chapter on sulfur dynamics in forest ecosystems, and a chapter on sulfur cycling in upland agricultural systems. There seemed to be considerable overlap among several of the five chapters dealing with sulfur cycling in marine or wetland environments, a chapter on sulfur dynamics in forest ecosystems, and a chapter on sulfur cycling in upland agricultural systems.

I found the book to be well written and containing a wealth of information. Any researcher of sulfur cycling in the environment would find this book useful. I also found material that I will include in my notes for use in a class on soil biochemistry for graduate students.—W. A. DICK, Department of Agronomy, The Ohio State University, Wooster, OH 44691.


The study of the interactions between biological systems and the physical environment is an exciting yet difficult undertaking. It requires knowledge of the physical processes responsible for changes in the climate as well as the effects of these environmental changes on the physiology of the biological system. Recent progress in computer simulation and experimental techniques has resulted in an expansion of information on these subjects. This is the second book in the review series, Advances in Bioclimatology, devoted to presenting those advances based on scientific principles and not empirical relationships. The subject of this volume is the prediction of frost and its influence on agriculture.

This hardcover book is divided into three parts. The first and longest provides an overview of the physical processes responsible for the occurrence of frost. Kalma et al. begin with the balance laws at the microscale and then give the mechanisms responsible for mesoscale variations of cooling rates within a location. These chapters are the most technical of the book and the reader should have some familiarity with the general concepts of fluid dynamics. This section concludes with a detailed summary of frost risk mapping, including a case study example, and a comment on remote sensing. The second and shortest section summarizes the relationship between frost and crop growth. The emphasis of this section is a statistical analysis of a case study on winterkill of wheat. While this approach is good from a crop management strategy, I would have liked the authors to concentrate more on the mechanisms involved at the plant cell scale that are responsible for plant stress at low temperatures. The third and last section summarizes methods of frost protection. This section is the book’s strongest and most informative. Kalma et al. present a thorough summary of the traditional direct methods of heat, wind, and sprinkler irrigation. A model study optimizing application rate of water for sprinkler irrigation is also presented. They conclude with a brief overview of the many indirect and passive methods of frost protection.

The economic impact of frost damage to agriculture is significant. As the authors initially state, frost events can devastate coffee crops in Brazil or Papua New Guinea and seriously damage the citrus industry in Florida. Because of this book’s global significance, agricultural engineers, extension officers, and horticulturists throughout the world should find this book valuable in understanding and ameliorating the effects of frost on agriculture.—P. B. BLACK, Cold Regions Research and Engineering Laboratory, Hanover, NH 03755.

The Plight and Promise of Arid Land Agriculture


Plight and promise—these two words elicit an immediate curiosity as to how they apply to the world’s arid lands. A vast area of the world’s surface receives less than 525 mm (23 inches) of precipitation to cause arid or semiarid conditions. These arid lands are vulnerable to unwise exploitative human use, which is the most common cause of their plight. Even with their limited precipitation, arid lands have delivered on the promise of valuable plant resources. Yet as the book de-