

## *Preface*

Man's interference with the natural global carbon cycle by fossil fuel burning and changing land use has been receiving increasing attention in recent years. Increasing amounts of carbon dioxide in the atmosphere may cause a detectable change of the global climate sometime early in the next century. When this will occur depends on the rate of increase of atmospheric carbon dioxide and it therefore becomes urgent to develop models of the global carbon cycle to predict the likely future changes as dependent on the use of fossil fuels, deforestation and expansion of agricultural land. It is most important that such work be internationally coordinated as well as is possible since the problem is of a truly global nature.

In 1975 the Scientific Committee on Problems of the Environment, SCOPE, launched a programme for the study of the biogeochemical cycles on earth. A study conference of the global carbon cycle was held at Ratzeburg in 1977 and the general overview of the carbon cycle that was developed has been published as SCOPE Report 13, *The Global Carbon Cycle*. A detailed account of the carbon cycle is given and particular attention is paid to a discussion of the physical, chemical and biological processes that interact to maintain a quasi-balance of the circulation of carbon in nature. The development of models was, however, not dealt with in a comprehensive manner. It seems most important to assess present efforts in this regard and thereby provide a common basis for further developments. The methods of testing models using best possible data sets is an important component of such model development.

With this goal in mind SCOPE called for a workshop on global carbon cycle modelling, that took place at Scripps Institution of Oceanography, La Jolla, Calif., USA in March 1979. The present SCOPE report is the outcome of this workshop. The first chapter is an attempt to summarize the status of the research in this field at the time of the workshop and the second chapter presents a detailed comparison of the three most commonly used models to describe the global carbon cycle. Chapters 3 and 4 contain a series of recommendations for notations, computational procedures and data for validation which should help in standardizing work in the future and to simplify intercomparison between various models. The last chapter of the report finally contains the specific contributions by the participants at the workshop.

The preparatory work for the workshop and the finalization of the results in the form of this report has been supported by the Department of Meteorology, University of Stockholm and the Scripps Institution of Oceanography, with financial contributions from the US Department of Energy (contract DE-AC02-79EV-10022) and the Exxon Corporation.

The detailed technical work required in order to produce this book has been carried out by Anders Björkström, Kim Holmén and Eva Ojde.

Bert Bolin

Charles D Keeling

Anders Björkström

Robert Bacastow

Uli Siegenthaler