

# CARBON CYCLE MODELLING: ILLUSTRATIONS OF MODELLING PROBLEMS IN IGBP STUDIES

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## 1. INTRODUCTION

The International Geosphere-Biosphere Program (IGBP) is a proposed multi-disciplinary study of the geosphere-biosphere system. The various elements of this system are the atmosphere, hydrosphere, terrestrial and aquatic biota, soils and sediments. The main elements of the IGBP defined in the 1986 ICSU report [1] are:

- Studies of interactive processes that govern global change.
- Development of a new generation of coupled models of the environment.
- Design of suitable tests to guide the development of these models and the understanding of the processes.
- Programs of observations tailored to provide data needed for these activities.

The present report explores some of the issues involved in modelling and other theoretical studies within the IGBP. The perspective reflects the author's experience in atmospheric science; the global carbon cycle is used to illustrate many of the issues.

The proposed IGBP core projects include two modelling projects: *Modelling Global Biogeochemical Cycles* and *Geosphere-Biosphere Models* [2]. The biogeochemical modelling is introduced as a guide to the more complicated geosphere-biosphere modelling and because the carbon cycle in particular will 'be the core element of any truly global geosphere-biosphere model' [2].