Preface

Today´s models of past sea-level change are complex. Although knowledge has increased enormously over the last forty years, many problems concerning the concepts of sea-level change still exist or have been detected recently. Substantial progress in this field of study is closely associated with four very successful IGCP sea-level projects, beginning with IGCP 61, and followed by IGCP 200, 274, and 367. However, this does not imply that research concerning terraces and problems of Pleistocene sea-level history in coastal geomorphology and geochronology, has lost its importance.

The 4th annual meeting of IGCP project 437 *Coastal Environmental Change During Sea Level Highstands: A Global Synthesis with Implications for Management of Future Coastal Change* (IGCP 437, President Colin Murray-Wallace, University of Wollongong, Australia) was held together with the International Conference "Barbados 2000: Quaternary Sea-level Change" (organizers Ulrich Radtke and Gerhard Schellmann) on Barbados from October 26th to November 2nd, 2002. During this conference, more than 70 scientists were introduced to key localities and issues of Quaternary sea-level research on Barbados during three days of field trips.

Barbados has been the Mecca for sea-level research since MESOLELLA's benchmark studies published in 1968. Numerous subsequent publications on the sea-level history of Barbados followed and make it difficult to keep up with newest developments in this field of research. During the conference, the organizers presented a *Field Guide,* which promised to offer more than a regular guidebook. It illustrated the history of sea-level research on Barbados and presented new geomorphic and geochronologic investigations of Barbados' fossil coral reef terraces, which have been conducted by a research group led by Prof. Ulrich Radtke (University of Cologne, Germany) and Prof. Gerhard Schellmann (University of Bamberg, Germany) since 1990. This research was initiated by advances in Electron Spin Resonance (ESR) dating of fossil coral, advances in the resolution of aerial photographs and their interpretation, and the dearth of detailed geomorphic maps depicting preserved fossil beach formations and reef terraces. This new research, based largely in the southern part of the island, has required the revision of previously published morpho- and chronostratigraphies for Barbados.

This textbook, published by „Kölner Geographische Schriften" in 2004, largely mirrors the *Field Guide,* which was accessible to conference attendees only. It comprises six chapters, ranging from a general overview to detailed morphostratigraphic descriptions. Chapter 1 provides some background information to those readers who have never been to the Caribbean or are unfamiliar with this region, its climate, tectonic setting, and the Caribbean coral reefs. Chapter 2 focuses on the geology and physical geography of Barbados and provides an overview of the hydrology, karst formations, soils, and vegetation. Chapter 3 reviews previous sea-level research carried out on Barbados and pays particular attention to the famous geological traverses across the coral deposits of South Barbados (Clermont Nose and Christchurch). This review is additionally important because many coral samples collected in the 1960's and 70´s were redated as part of the current research program. Chapter 4 resents the main research findings of our research. It includes extensive new data on the geomorphology, geology, and geochronology of southern Barbados, and details estimates of Pleistocene palaeo sea-level changes. Chapter 5 considers other localities beyond the main research area on southern Barbados, including central Barbados with its older terraces, and areas at the west, north, and southeast coast. Chapter 6 summarizes the results presented in this book and outlines perspectives of future research related to the reconstruction of palaeo sea levels on Barbados, and global aspects of Quaternary sea-level reconstruction.

We recognize that the research detailed here is incomplete in that its emphasis is mainly on the southern part of Barbados. A complete synopsis of the Quaternary of Barbados is clearly desirable, but the comprehensive chronostratigraphic mapping of all reef terraces on Barbados would require another research project of more than 10 years, and this is beyond our current remit. In addition, we note that at present the chronological framework of our work is limited to the last 600,000 years, which is the upper limit of existing dating techniques for fossil corals. Despite these limitations, we believe that this textbook provides a comprehensive coverage of the important concepts and principles of geomorphic, geochronologic, and sea-

level research on Barbados. As such, the research provides a sound basis for the discussion of coral reef stratifications and tectonics of Barbados, and palaeo sea level changes in the Caribbean more widey.

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We hope that this textbook on "The marine Quaternary of Barbados" will inspire new discussions about the classical Barbados model of sea-level change and help stimulate further advances in this field of research.

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