Geologie en Mijnbouw **77:** 207–208, 1999.

Climate change and coastal evolution in Europe

Research papers derived from a project funded by the Commission of the European Communities

Preface

It can never be stressed enough that 'half the world's population dwells in coastal regions which are already under great demographic pressure, and exposed to pollution, flooding, land subsidence and compaction, and to the effects of upland water diversion. A rise in sea level would have its most severe effects in low-lying coastal regions, beaches and wetlands' (UNEP 1990). The concerns about a global warming and its expected impacts on coastal communities, e.g. increased storm frequencies and magnitude, a rising sea-level, or the increasing incidence of major single events (Houghton et al. 1990, 1992, 1996; see also UNCED 1993), have given rise to a large number of research projects, in particular within the European Community.

This Special Issue of Geologie en Mijnbouw covers the results of a two-year international research project named 'Climate Change and Coastal Evolution in Europe' that was concluded in August 1996, and funded by the Commission of the European Communities. The project was co-ordinated by the Geological Survey of the Netherlands[1]. It brought together a consortium of ten different institutions which were already involved for several years in research on the impacts of sea-level changes and extreme events on western European coasts, within both a geological and a climatological context (Figure 1). For most members of the consortium, this project was a continuation of several other projects, all concerned, one way or another, with the impacts of changing sea-levels and storminess. The interim report of the project (June 1995) has been made available on the internet under URL: http://www.nitg.tno.nl/cccee/.

The primary aim of the project was to determine the relationships between: a) climate-induced process changes in the geosphere, e.g. relative sea-level changes, variations in storminess patterns, and the occurrence of extreme flooding events, and b) the response of coastal systems to these changes, as recorded, not only in the sedimentary record over the last 2000 to 3000 years, but also in historical records of the last 100 to 150 years, e.g. maps, tide gauge records, and meteorological data. Three objectives of investigation were defined using a pre-established general time scale (Table 1):

1) To identify the relative effects of short-term, micro- to mesoscale sea-level changes, patterns of storminess, and extreme flooding events on coastal processes, notably on rates of coastal changes and especially coastal erosion, in selected areas of the Atlantic and North Sea seaboards.
2) To identify the impacts of changes in relative sea-level and in patterns of storminess upon the sediment delivery to the coastal system, focusing in particular on the mesoscale.
3) To investigate the links and relationships between the mesoscale and the macro- and/or megascale rates of coastal processes, by generating and testing new analytical methods that may validate forecasting on the century scale of the range and magnitude of sea-level and coastal changes.

Besides improving the exchange and integration of scientific and technological data, the project participants also defined a series of recommendations for coastal zone managers (De Groot this issue), thus answering a final objective of the project concerning the definition of the necessary tools for local or national coastal management.

The papers in this Special Issue address a wide range of subjects dealing with the objectives defined above and, in a number of cases, presenting a larger scope. As such, they address topics of interest to all researchers active in the coastal zone who are dealing with the problems concerning sea-level changes, changing storm frequencies, catastrophic events, and climatic shifting. The papers are arranged according to the timescale terminology used (Table 1):

- Mega- to macroscale studies: Zazo et al., Dawson et al., Granja, Shennan et al., Dabrio et al.,
- Macro- to mesoscale studies: Freitas et al., Wheeler et al.,

[1] Since January 1st, 1997: Netherlands Institute of Applied Geoscience TNO – *National Geological Survey*

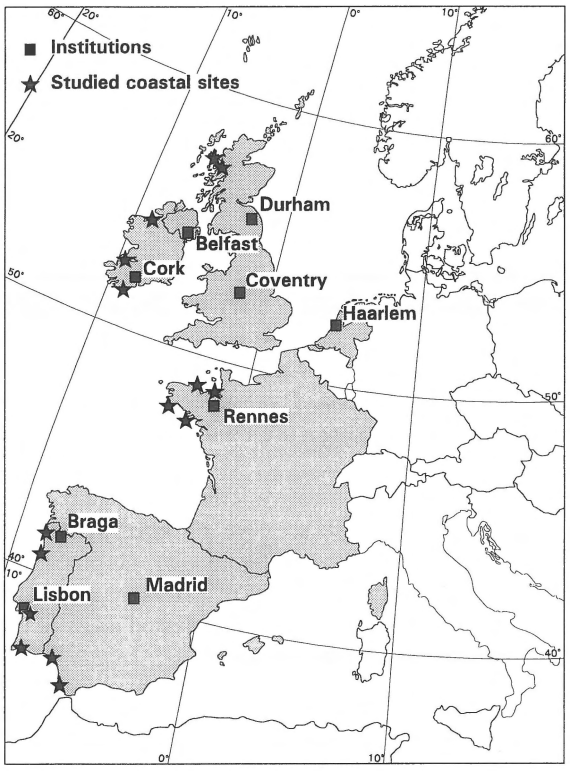

Figure 1. Location map showing the participating countries (shaded) and institutions, and the coastal sites along the western edge of the European Union studied in this issue.

Table 1. Timescale terminology (in years) proposed in this issue (after Orford & Carter 1995).

Microscale	Mesoscale			Macroscale	Megascale
	Interannual	Sub-decadal	Decadal		
<1	1	1–10	10–100	100–1000	>1000

- Meso- to microscale studies: Hindson et al., Regnauld et al., Duffy & Devoy,
- Afterword on coastal zone management: De Groot.

Acknowledgements

The work presented in this Special Issue was made possible by the special funding of the Directorate General for Science, Research and Development (DG-XII) of the Commission of the European Communities, Environment Programme (1991–1994), under Contract EV5V-CT94–0445. We thank the Commission of the European Communities by way of its scientific officer, D. Peter, who supervised the project. Our thanks are also extended to the many reviewers who contributed to the improvement of the submitted manuscripts in a variety of ways: C. Bristow (UK), P. Cleveringa (Netherlands), R. Devoy (Ireland), R. Donselaar (Netherlands), D. Forbes (Canada), P. French (UK), B. Funnell (UK), R. Gehrels (UK), P. Hoekstra (Netherlands), S. Jennings (UK), A. Long (UK), R. Paskoff (France), K. Pye (UK), T. Roep (Netherlands, deceased September 15th, 1997), J. Shaw (Canada), I. Shennan (UK), D. Smith (UK), A. van der Spek (Netherlands), H. Streif (Germany) and J. Terwindt (Netherlands). Last but not least, we acknowledge the invaluable editorial assistance and encouragement of D.A.J. Batjes, C. de Jong, H.N.A. Priem and H.E. Rondeel.

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March 1999

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