

Analysis of Climate Variability

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Analysis of Climate Variability

Applications of Statistical Techniques

Proceedings of an Autumn School
organized by the Commission
of the European Community
on Elba from October 30 to November 6, 1993

With 89 Figures



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FOREWORD

EUROPEAN SCHOOL OF CLIMATOLOGY AND NATURAL HAZARDS

The training of scientific and technical personnel and the development of highly qualified scientists are, and have always been, among the important concerns of the European Commission. Advanced training is an important requirement for the implementation of a common EU policy in science and technology.

The European School of Climatology and Natural Hazards was started as a part of the training and education activities of the European Programme on Climatology and Natural Hazards (EPOCH), and is continued under the subsequent research programme (ENVIRONMENT 1990–1994).

The school consists of annual courses on specialised subjects within research in climatology and natural hazards, and is open to graduating, graduate and post graduate students in these fields.

Each of the courses is organized in cooperation with a European Institution involved in the current research programme, and is aimed at giving to the students formal lectures and participation in informal discussions with leading researchers.

The present volume is based on the lectures given at the course held on the island of Elba from the 30th October to the 6th of November 1993 on Statistical Analysis of Climate Variability. It features selected and extended presentations, and represents an important contribution to advanced studies in climate statistical analysis, supplementing more traditional texts.

I trust that all those involved in research related to climate change and climate variability will appreciate this work and will benefit from the comprehensive and state-of-the-art information it provides.

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PREFACE

This book demonstrates applications of statistical thinking in climate (atmospheric, oceanographic) research. It aims at students in general, taking first and second year courses at the graduate level.

The volume has grown from the lectures given during the Autumn School on Elba. We have included here the arguments which referred explicitly to *applications* of statistical techniques in climate science, since we felt that general descriptions of statistical methods, both at the introductory and at advanced level, are already available. We tried to stress the application side, discussing many examples dealing with the analysis of observed data and with the evaluation of model results (Parts I and II). Some effort is also devoted to the treatment of various techniques of pattern analysis (Part III). Methods like teleconnections, EOF, SSA, CCA and POP are becoming routine tools for the climate researcher and it is probably important for graduate students to be exposed to them early in their academic career in a hopefully clear and concise way.

A short subject index is included at the end of the volume to assist the reader in the search of selected topics. Rather than attempting to reference every possible occurrence of some topic we have preferred to indicate the page where that topic is more extensively discussed.

It would not have been possible to complete this book without the enthusiastic support of many people who collaborated at various stages of preparation. We thank Ib Troen, of the EEC Commission, for his undemanding effort to get things done and to put up with all these crazy scientists for two weeks in Elba. Many thanks also go to Antonella Sapere and Marina Vereertbrugghen for their organizational support in Elba and to Marion Grunert and Jörg Wegner for their essential help for preparing and adapting the diagrams.

The Editors

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