

Preface

This publication on „Climatic Change and Water Resources in the Middle East and North Africa“ is dedicated to high-priority topics related to the impact of climate change on water resources in a water scarce region. Many aspects of climate change and its impact on the global hydrological cycle have been investigated, presented and published. However, the quantification of this influence is still very uncertain due to lack of understanding the complex system and the detailed interactions. Hence, process-oriented interdisciplinary research is necessary to overcome this problem.

The German-Arab Scientific Forum for Environmental Studies organizes every second year a scientific forum as a platform for the exchange of information and presentation of research findings. As a result of this scientific forum, many scientists have taken the opportunity to contribute to this book giving an overview about their research regarding this topic. Naturally this book is divided into three chapters:

Global climate change- sources and impacts on the water cycle.

Impact of climate change on water resources.

Water resources and water management.

Global climate change due to greenhouse gases in the atmosphere is influencing the world water cycle resulting in changes in precipitation patterns, temporally and regionally. In the first chapter several authors present their research results dealing with this relationship.

First of all an overview about the dynamics of the climate systems in scope of the earth history is given and the influence of the temperature rise on the atmospheric circulation and thus on the global water cycle is discussed. However, for the prediction of the future development, observations of the regional precipitation trends are important. Hence, the regional climate trends in the Middle East and North Africa have been investigated either by applying climate models or statistical analysis.

The effects of climate changes on water resources in chapter two are also related to regions of the Middle East and North Africa. This chapter begins with a focus on climate changes and the resulting discharge conditions in the Arabian Peninsula in Quaternary, complimented by the paleo-climate for Holocen and Neolithicum. The impact of climate change on water resources in the region is discussed and a short term hydrologic drought in Lebanon is proposed as a superposition of climate and anthropogenic effects. It is assumed that changes in precipitation average and events will cause a higher number of floods in the future and require new management options for sustainable ground water exploitation.

The influence of the climate change on the world water cycle is distressed by increasing water demands due to population growth and urbanization. Thus, integrated water resources management has become an eminent steering mechanism in the optimization of solutions to this problem.

Chapter three of this book comprises 14 contributions related to this topic. New concepts in water management, in technologies of water exploitation or details of water resources management including water protection are presented and discussed. Other contributions focus on linked eco-hydrological processes in Lake Kinnereth, ecological effects in soils, the relevance of groundwater during droughts, groundwater degradation by sea water intrusion in the coast of greater Beirut, Lebanon, the desiccation of the Dead Sea and the interaction between population dynamics and water supply systems.

All topics of this book are complimentary and contribute to a comprehensive understanding of the interactions between global climate change, world water cycle and water resources. New and innovative water management concepts are necessary to overcome some of the problems that might arise within this development.

All over, a valuable and meaningful interdisciplinary mixture of topics has been combined in this book and is of great interest to many scientists.

In this context, I wish this publication a friendly and successful acceptance in the scientific world.

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