

FOREWORD

Scope of the lecture Hydrology of catchments, Rivers and Deltas

This set of lecture notes supports the lecture Hydrology of Catchments, Rivers and Deltas. The lecture deals with advanced subjects of hydrology, including: Hydrology and water resources; Flood occurrence and analysis; Rainfall-runoff analysis; Reservoir and channel routing; and the Hydrology of coastal areas. Throughout the lecture the hydrology is approached from a global perspective, giving due attention to hydrological processes in tropical and sub-tropical regions, which generally experience a higher variability. Knowledge of more extreme circumstances than are generally experienced in a temperate climate is very useful, not only to the hydrologist who considers working in tropical environments, but also to the professional who chooses to work in a less dynamic climate and who is concerned with an environments where extremes become more and more dominant, be it as a result of climate change or as a result of human interference in our environment.

The domain of Hydrology and Water Resources

The field of Hydrology is broad and with the increasing societal attention for water, it is broadening even further. Therefore, it is useful to distinguish three major fields of Hydrology:

- Hydrology as an Earth Science
- Hydrology and Water Resources (Water Resources Research)
- Engineering Hydrology (Water Resources Engineering)

The first field encompasses the description and analysis of hydrological processes of the hydrological cycle. Distinctions can be made between atmospheric processes, surficial processes, river processes (hydraulics), soil processes, groundwater processes, and hydro-ecological processes, at different spatial and temporal scales. The most interesting, however, is the interconnection between these processes and the existence of feedback mechanisms.

In contrast of the first field, the second field is anthropocentric. It has to do with the use that Man makes of water, be it consumptive or non- consumptive. Water resources research is the study that looks into the most beneficial and sustainable use that Man can make of water. It is an important component of Water Resources Management. It is a science that primarily supports water policies and the formulation of strategies. It builds, of course, on hydrology as an earth science. It is a rapidly developing field.

The last field is closest to the Civil Engineer. It deals with hydrological research required for human interventions. It is hydrology that supports Water Resources Development. As a results, it is often more technology then science. It goes beyond saying that it should have a firm foundation in hydrological sciences, though. The lecture note that lies in front of you addresses primarily the second and third field. It aims at providing the tools and concepts that the modern engineer requires both in the Netherlands and abroad.

This lecture note, which first appeared in May 2000, has been revised and updated.

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Dr. Hubert H.G. Savenije