PREFACE

Rainfall-runoff models are extensively used to support flood and water resource design and management and, increasingly, in broader environmental management applications, including water quality and hydro-ecological modelling. There are many reasons why we need to model the rainfall-runoff processes of hydrology. The main reason is a result of the limitations of hydrological measurements techniques. We are not able to measure everything we would like to know about the hydrological system. We have, in fact, only a limited range of measurement techniques in space and time. Rainfall-runoff modelling can be carried out within a purly analytical framework based on observations of the inputs to and outputs from a catchment area. The development and applications of the mathematical models in rainfall-runoff modelling have increased during the last three decades, particularly with the rapid developments in the computer technology. The mathematical functions or conceptual elements employed to simulate the rainfall-runoff processes are subjected to the limitations of the present state of knowledge of physical behaviour, mathematical constraints, data availability and user requirements. The empirical (black box) hydrological models are of interest as single event based models or sub-components of more complicated models. The lumped conceptual models are especially suited to simulation of rainfall-runoff processes when long term hydrological time series for model calibration exist. The components of the hydrologic cycle are being affected because the hydrological processes are no longer stationary due to point and non-point changes taking place in the river basins. For complicated problems, particularly those involving natural and man-made changes in land use, physically based-distributed modeling approach becomes necessary. As the hydrological processes are continuous and complex, accurate assessment of quantities of water s is a difficult task. The rainfall-runoff modes are required to be developed for optimal and sustainable planning, development and management of water resources as well as for bridging the gaps between the advance technologies and their field applications.

This specialized training course on, "Rainfall-Runoff Modelling" is to familiarize the in-service engineers with the basic concepts of modeling, various techniques, tools and software. This course material has been prepared based on a wide range of experience in rainfall-runoff modelling. This course introduces rainfall-runoff modelling concepts and methods, with hands-on experience, including state-of-the-art tools for model-building and performance analysis. This course material would not only be useful for the participants but also serve as a reference for practicing hydrologists and engineers. It is expected that the training imparted during the course would be useful for carrying out the hydrological modelling and would also provide background for planning and designing the water resources projects.

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