



Up To Date Hydrological Modeling in Arid and Semi-Arid Catchment, the Case of Faria Catchment, West Bank, Palestine

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Abstract

Understanding runoff generation mechanisms is the most basic challenge to hydrologists to enhance the evaluation and quantification of water resources in arid and semi-arid catchments. Faria catchment, located in the northeastern part of the West Bank, Palestine, is one of these arid to semi-arid catchments where diminutive work has been carried out concerning hydrological modeling. This paper deals with the modeling of rainfall-runoff processes in the Faria catchment under limited hydro-meteorological and spatial data. The goal has been to obtain reliable estimates of naturally available surface water resources. For this purpose, an up to date process-oriented and physically-based distributed rainfall-runoff model (coupled TRAIN-ZIN) has been applied. Three years of monitoring rainfall and runoff combined with thorough field campaigns (e.g. measuring infiltration rates) are considered to be the cornerstones for the success of this study. The coupled TRAIN-ZIN model is calibrated and validated using single rainstorm events. After successful calibration and validation continuous simulations of the entire rainy seasons 2004/05, 2005/06 and 2006/07 from October to April were achieved. This facilitated accurate assessments of seasonal water balances in the entire Faria catchment. Despite of difficulties, limitations and uncertainties associated with obtaining observations and measured parameters; this study ended-up with optimistic results for the simulation of single events and entire seasons in con-

tinuous mode.. The obtained results are good enough to assume the applicability of the coupled TRAIN-ZIN model to arid and semi-arid catchments. This gives confidence towards applying this model to the other catchments in the West Bank in order to evaluate the naturally available surface water. Such evaluation can be utilized in the development of best management practices to be adopted to manage the scarce water resources in the region, under current and future global changes conditions.

Keywords: Runoff generation mechanisms; arid and semi-arid regions; Faria catchment; TRAIN-ZIN model.