

# Preface

This book aims to serve as an effective source of information, as well as a valuable basis for setting priorities and making further technical, financial, and political decisions regarding flood hazard assessment. In general, the main aim of this research was to develop and apply methods to identify and evaluate the response of flood events to land use and climate change. Flood hazard assessment was analyzed by computing a set of crisis scenarios (e.g. dyke failure), which are important information for civil protection purposes. Subsets of these scenarios were analyzed with distinct return periods as inputs into the hydraulic (1D) and hydrologic (1D–2D) models. Moreover, two severe flood events’ characteristics (1957 and 2008) occurred in the study area were compared, and then flood propagation using hydrodynamic models (one dimensional (1D) HEC-RAS model and one-two dimensional (1D–2D) SOBEK model) were estimated, with respect to a variety of cross sections, river morphology, and different hydrographs. Additionally, this research gives a comparative overview of the major challenges faced with, like climate change and land use change, when dealing with flood hazards. Hydrodynamic simulation, together with trend detection climate change focusing on the analysis of climatological and hydrological parameters in a time series coupled with land use change estimation, led to the conception of a modern structure for flood hazard assessment. This research aimed to establish such a system, using a case study catchment to test and demonstrate its ability to perform under the typical conditions of mountainous catchments in France. The results of this research represent important fundamental information for policymaking, decision support, and flood hazard planning in any region, but are indeed particularly relevant for the Barcelonnette area. The results of this research have been presented at several international conferences, seminars, and workshops. Additionally, some articles are also already prepared (as listed in this book) and ready to submit in international journals. This research has been one of the most significant academic challenges I have ever faced. The University of Vienna, especially Prof. Thomas Glade, provided an intriguing foundation for me to work on physical aspects of the earth, focusing on hydrodynamic simulation (1D–2D modeling),

climate change, and land use change. I am delighted and honored to have been able to work with Prof. Thomas Glade! From a scientific perspective, he taught me tremendously and is an amazing scientist with very strong knowledge in different aspects of science. Apart from this, he is a wonderful team-project manager and I believe that I have gained an immense amount of valuable experience from him that will be useful in my future. “Thank you Thomas”.

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