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FLOOD HAZARD ASSESSMENT FOR ALIBEYKÖY WATERSHED IN ISTANBUL WITH MIKE NAM AND MIKE 21

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Abstract

Increase in flood events due to uncontrolled urbanization, global warming and climate change affects the economy of the countries and causes loss of life and property. Especially, floodplain boundaries have to be defined clearly to prevent new developments in regions under high flood risk. Thus, flood hazard maps play an important role in flood control and urban planning. Alibeyköy Watershed plays a critical role due to the new extensive infrastructure planning in Istanbul, Turkey. Thus, this area is vulnerable to the population growth and urbanization, and needs attention and precaution. In this study, flood hazard map for Alibeyköy Watershed is developed. For this purpose, first, a hydrological model for Alibeyköy Watershed is generated using MIKE Nedbor Afrstromnings Model (NAM). The hydrological model is calibrated by using rainfall, evaporation and flowrate data measured at the field side. Then, the calibrated hydrological model is used to simulate 50 and 100-year flood hydrographs which are used as inputs of the hydraulic models developed for Pirinçci Stream by using MIKE 11 and MIKE 21. Finally, flood depth and flood extent map for 50 and 100-year return periods are obtained with both one-dimensional and two-dimensional hydraulic model simulations under unsteady flow conditions. In addition, capabilities of MIKE 11 and MIKE 21 on flood modelling are also revealed. Results show that particularly Arnavutköy district located along the mid-section of Pirinçci Stream is under high flood risk. Therefore, precautions need to be taken in this region in order to decrease the impacts of possible floods in the future.

Key words: Alibeyköy Watershed, flood hazard map, hydrologic-hydraulic model, MIKE NAM, MIKE 11, MIKE 21

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