World Academy of Science, Engineering and Technology
International Journal of Environmental and Ecological Engineering
Vol:13, No:11, 2019

Wildfire-Related Debris-Flow and Flooding Using 2-D Hydrologic Model

Authors : Cheong Hyeon Oh, Dongho Nam, Byungsik Kim

Abstract : Due to the recent climate change, flood damage caused by local floods and typhoons has frequently occurred, the incidence rate and intensity of wildfires are greatly increased due to increased temperatures and changes in precipitation patterns. Wildfires cause primary damage, such as loss of forest resources, as well as secondary disasters, such as landslides, floods, and debris flow. In many countries around the world, damage and economic losses from secondary damage are occurring as well as the direct effects of forest fires. Therefore, in this study, the Rainfall-Runoff model(S-RAT) was used for the wildfire affected areas in Gangneung and Goseong, which occurred on April 2019, when the stability of vegetation and soil were destroyed by wildfires. Rainfall data from Typhoon Rusa were used in the S-RAT model, and flood discharge was calculated according to changes in land cover before and after wildfire damage. The results of the calculation showed that flood discharge increased significantly due to changes in land cover, as the increase in flood discharge increases the possibility of the occurrence of the debris flow and the extent of the damage, the debris flow height and range were calculated before and after forest fire using RAMMS. The analysis results showed that the height and extent of damage increased after wildfire, but the result value was underestimated due to the characteristics that using DEM and maximum flood discharge of the RAMMS model. This research was supported by a grant(2017-MOIS31-004) from Fundamental Technology Development Program for Extreme Disaster Response funded by Korean Ministry of Interior and Safety (MOIS). This paper work (or document) was financially supported by Ministry of the Interior and Safety as 'Human resoure development Project in Disaster management'.
Keywords : wildfire, debris flow, land cover, rainfall-runoff meodel S-RAT, RAMMS, height
Conference Title : ICNHST 2019 : International Conference on Natural Hazard Science and Technology
Conference Location : Dubai, United Arab Emirates
Conference Dates : November 07-08, 2019