

Remote sensing and GIS techniques in Flood forecasting and management in combination with snowmelt runoff model in upper catchment of river Indus by special analysis of Water Indices

Abstract:

2010 flood in Pakistan inundated the one-third land of Pakistan and recorded the loss of thousands of precious lives and valuable infrastructure. In this study first time HJ-1A/B data has been used for the delineation of upper river catchment of Indus River in Northern Pakistan in the Himalaya-Karakoram region. For this purpose Modified Normalized Difference Water Index (MNDWI) has been used along with the NDVI-NDWI for assessing catchment areas. Shuttle Radar Topographic Mission (SRTM) DEM is used in this study to get the flood hazard map. Different methods were utilized to calculate snowmelt runoff in this complex topography. Climatology of this highest mountainous region was also utilized to understand the factors which control the water flow in the catchment area. Results show that these vegetation indices are very useful in analyzing the landcover change related to water flow and if properly harnessed then flood hazard warning may be issued in prior to any disaster to avoid both human and infrastructure losses.