Flood Inundation Mapping and Management using RISAT-1 derived flood inundation areas, Cartosat-1 DEM and a river flow model

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The frequent occurrence of repeated flood events in many regions of the world causing damage to human life and property has augmented the need for effective flood risk management. Microwave satellite data is becoming an indispensable asset for monitoring of many environmental and climatic applications as numerous space-borne synthetic aperture radar (SAR) sensors are offering the data with high spatial resolutions and multi-polarization capabilities. The implementation and execution of Flood mapping, monitoring and management applications has become easier with the availability of SAR data which has obvious advantages over optical data due to its all weather, day and night capabilities. In this study, the exploitation of the SAR dataset for hydraulic modelling and disaster management has been highlighted using feature extraction techniques for water area identification and water level extraction within the floodplain. The availability of high precision digital elevation model generated from the Cartosat-1 stereo pairs has enhanced the capability of retrieving the water depth maps by incorporating the SAR derived flood extent maps. This paper illustrates the flood event on June 2013 in Yamuna River, Haryana, India. The water surface profile computed by combining the topographic data with the RISAT-1 data accurately reflects the true water line. Water levels that were computed by carrying out the modelling using hydraulic model in HECRAS also suggest that the water surface profiles provided by the combined use of topographic data and SAR accurately reflect the true water line. The proposed approach has also been found better in extraction of inundation within vegetated areas.

Keywords: Remote Sensing, SAR, Flood mapping, Disaster management

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