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FLOOD MAPPING FROM SYNTHETIC APERTURE RADAR (SAR) DATA USING SNAP AND ARCGIS

Abstract

Natural disasters are extraordinary occasions that are considered as an important force in shaping Earth's ecosystem. Different disasters such as flooding, and earthquakes are happening around the world regularly and will continue as long as Earth exists. These disasters have a substantial effect on the public health and well-being of populations, in addition to the economic burden. Thus, mapping their extension is very vital in order to assess the damages and for relief organizations. Flood is one of the most frequent disasters and mapping it is known as defining coastal areas which are at risk of flooding. Furthermore, mapping floods is of a vital concern due to its benefits in several aspects, such as land use: floodplain regulations, insurance, property value, emergency services, etc. The major aim of flood mapping is to reduce the impact of coastal flooding, whereas to benefit from the maps and analyze it to be integrated to other procedures such as emergency response planning. The best tool to study natural disasters is remote sensing, where multi-temporal spatial data required for such studies. Based on previous investigations, Synthetic Aperture Radar (SAR) data has the potential to detect floods. In this study, Synthetic Aperture Radar (SAR) data from Sentinel-1 were used due to data availability and easy access. Sentinel-1 is operating at a center frequency of 5.405GHz (C-band), and has four operational modes. The data were initially pre-processed in SNAP 6.0 software, then the flooded areas were mapped using threshold and binary image technique in the same software. Finally, the result was validated using ArcGIS. This type of analysis can be very crucial to various organizations such as International Disaster Charter, and different government entities in charge of environment.