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EARLY WARNING SYSTEM FOR FLOODS (EWSF) : BUILDING A PROCESS REPOSITORY TO LEVERAGE OPEN-SOURCE EARTH OBSERVATION DATA FOR FLOOD WARNING ACROSS DIFFERENT STAKEHOLDERS IN PAKISTAN

Abstract

The 2022 floods in Pakistan displaced 33 million people with almost one third of human habitats under water. With economic damages in order of billions, the national stakeholders and disaster management authorities completely overlooked in providing an early warning for the floods. Despite the availability of open-source Earth Observation data, the academic and research community was unable to run any projections of excess water in the rivers due to glacier melting and excessive rainfall. Even after the initial flooding, there was no insight on the extent of flood water that was incumbent in other areas. This paper is a humble effort in creating a process repository by leveraging open-source EO data for flood risk assessment. This assessment is based on topological features, landcover changes, hydrological patterns, rainfall data, temperature changes, and rate of glacier melting. The data is used to capture dynamic spatial information crucial for identifying vulnerable areas prone to flooding, with a particular focus on the diverse terrain of Pakistan. Building on the process repository, the paper outlines the prospective design and deployment of an Early Warning System for Floods (EWSF). The system integrates near real-time EO data streams, weather forecasts, and hydrological models to provide timely and accurate flood alerts. In building the process repository, the paper also analyses the role of different stakeholders in the country including but not limited to National Disaster Management Authority (NDMA), Ministry of Climate Change and Environmental Coordination (MOCC), Pakistan Meteorological Department (PMD), and National Lab for GIS and Space Applications (NCGSA). The process repository focusses on its specific utility at the different stakeholders to synergize the early warning process.