

Detection and mapping of May 2021 flood in Beaufort, Sabah using Sentinel-1 SAR and Sentinel-2 multispectral in Google Earth Engine

ABSTRACT

Recurring floods severely impacted the livelihood and socio-economic. It causes disruption of clean water, electricity, communications, properties damages and sometimes loss of life. Information on flooded areas is crucial for effective emergency responses support. In this study we used Sentinel 1 (S-1) C-band and Sentinel 2 (S-2) Multispectral satellite imageries where wider area covered in 12 days repeat satellite pass. The flood event on the 26 May 2021 was identified and we retrieved the S-1 GRD SAR imagery and S-2 level-2A BOA in GEE environment. We analysed the S-1 VV, VH, VV/VH imagery by pixels clustering using object based SNIC classification and Machine Learning (ML) algorithm for extraction of waterbody. Meanwhile for the S-2 we used MNDWI and extracted the waterbody area using thresholding value. We obtained the final flooded area of S-1 and S-2 by subtraction with permanent waterbody. The S-2 flood estimation results were better than S-1. However, S-2 limited to cloud free and less cloudy coverage while S-1 lacking of ability to identify flood in detailed was influenced by slope shadow area. This study provides the basis of detection and mapping floods using S-1 and S-2 imageries through Machine Learning techniques in GEE for local scope of Sabah, Borneo region and Malaysia