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Comparative analysis of the role of labelled benchmark datasets for automatic flood mapping using SAR data

Dibakar Kamalini Ritushree[1], Mahdi Motagh[1,2], Shagun Garg[1,3], and Binayak Ghosh[1,4]

[1]German Research Centre for Geosciences, Geodesy, Potsdam, Germany (dibakar@gfz-potsdam.de)
[2]Institute for Photogrammetry and Geo-Information, Leibniz University, Hannover,Germany(motagh@gfz-potsdam.de)
[3]Future Infrastructure and Built Environment (FIBE), Department of Engineering, University of Cambridge, Cambridge,UK(shagun@gfz-potsdam.de)
[4]Department of Computer Science, Technical University of Berlin, Germany(bghosh@gfz-potsdam.de)

The current scenario of the world has witnessed extreme events of floods irrespective of the heterogeneity in the geographical context. The necessity for accurately mapping such events is more of the essence for disaster relief and recovery efforts. The role of satellite imageries from both optical and radar sensors could have immensely benefited the process due to its easier interpretability and high resolution. However, the use of optical sensors for flood extent extraction is limited by weather conditions and the presence of clouds. In contrast, SAR sensors have proved to be one of the most powerful tools for flood monitoring due to their potential to observe in all-weather/day-night conditions. The exploitation of SAR in conjunction with optical datasets has shown exemplary results in flood monitoring applications.

With the onset of deep learning and big data, the application of data driven approaches on training models has shown great potential in automatic flood mapping. In order to improve the efficiency of deep learning algorithms at a global scale, publicly available labelled benchmark datasets have been introduced. One of such datasets is Sen1Floods11, that includes raw Sentinel-1 imagery and classified permanent water and flood water, covering 11 flood events. The flood events had coverage from Sentinel-1 and Sentinel-2 imagery on the same day or within 2 days of the Sentinel-1 image from Aug'2016 to May'2019. The other one is WorldFloods that consists of Sentinel-2 data acquired during 119 flood events from Nov'2015 to March'2019. In this study, we make a comparative analysis to investigate the efficiency of these labelled benchmark datasets for automatic flood mapping using SAR data. Various types of flooding in different geographic locations in Europe, Australia, India and Iran are selected and the segmentation networks are evaluated on existing Sentinel-1 images covering these events.