

Flood inundation forecasting coupled with in-situ water level and satellite data

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With extreme weather events, catastrophic floods occur as one of the major disasters in the world. With the development of spaceborne optical and SAR (synthetic aperture radar) sensors, flood detection algorithms should be progressively developed to produce more accurate flood maps

Despite very limited satellite-based data, this study introduces good examples of snapshot flood detection and flood inundation forecasting focusing on short-term flood extent change using a new index-based flood algorithm with a synchronized floodwater index (SfWI²). MODIS (MODerate resolution Imaging Spectroradiometer, NASA-USGS) time series data were mainly employed to detect the annual and potential flood extent of 2017. The pilot study was selected in the mega deltas over vast low-lying areas of Bangladesh and India (i.e., the 2017 flood in the basins of the Ganges, Brahmaputra and Magna rivers) As preliminary results, the resultant maps represented the dynamics of flood extent and flood propagation process. This approach shows a methodological possibility for instant and comprehensive flood mapping at the international river-basin level. For application to a global flood mapping, reliable satellite-derived flood maps will contribute flood risk management. In order to improve the accuracy of rapid flood mapping, we should solve many ambiguities in particular, surface complexity, i.e., urbanized mega-delta floodplains.

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