

Brief overview of

Flood Detection and Monitoring with EO Data Tools and Systems

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In: Schumann G.J.P. (Ed.), Earth Observation for Flood Applications.

Elsevier, pp. 195-215, 2021.

<http://dx.doi.org/10.1016/B978-0-12-819412-6.00009-2>

A timely identification and monitoring of flood events by means of Earth Observation (EO) data is, nowadays, increasingly feasible thanks to recent advances achieved in remote sensing and hydrological process simulations.

Despite the notable progress in these fields, a considerable effort will still be required to reduce the intrinsic inaccuracies of these types of approaches. The coarse spatial and temporal resolution of satellite measurements (compared to the one that characterizes in-situ instruments), in fact, continues to require a local-scale validation.

Taking into account pros and cons of the approaches based on remotely-sensed data, this chapter reviews some of the most relevant open-access techniques, products, and services that research and academic institutes are currently providing for the detection and the near real-time monitoring of extreme hydrometeorological events.

The chapter is structured as follow.

Section 1 provides a brief introduction of the main pros of a satellite-based flood monitoring.

Section 2 reviews the main EO data for flood detection, monitoring and assessment, as satellite-based rainfall measurement datasets, satellite optical and radar imageries and digital elevation models.

Section 3 reviews EO-based systems developed for the monitoring of precipitation events. The services described here are:

- the Data Portal developed by the Center for Hydrometeorology and Remote Sensing (CHRS) at the University of California, Irvine (UCI), a data portal for the visualization of PERSIANN data that give also access to iRain, an integrated system for global real-time precipitation observation;
- ITHACA Extreme Rainfall Detection System (ERDS).

Section 4 contains a review of some of the most relevant systems and hydrological models for flood monitoring, as:

- the Dartmouth Flood Observatory (DFO) River and Reservoir Watch project;
- NASA's near real-time Global Flood Mapping product;
- the Global Disaster Alert Coordination System (GDACS);
- University of Maryland's Global Flood Monitoring System (GFMS).

Section 5 concludes the chapter.