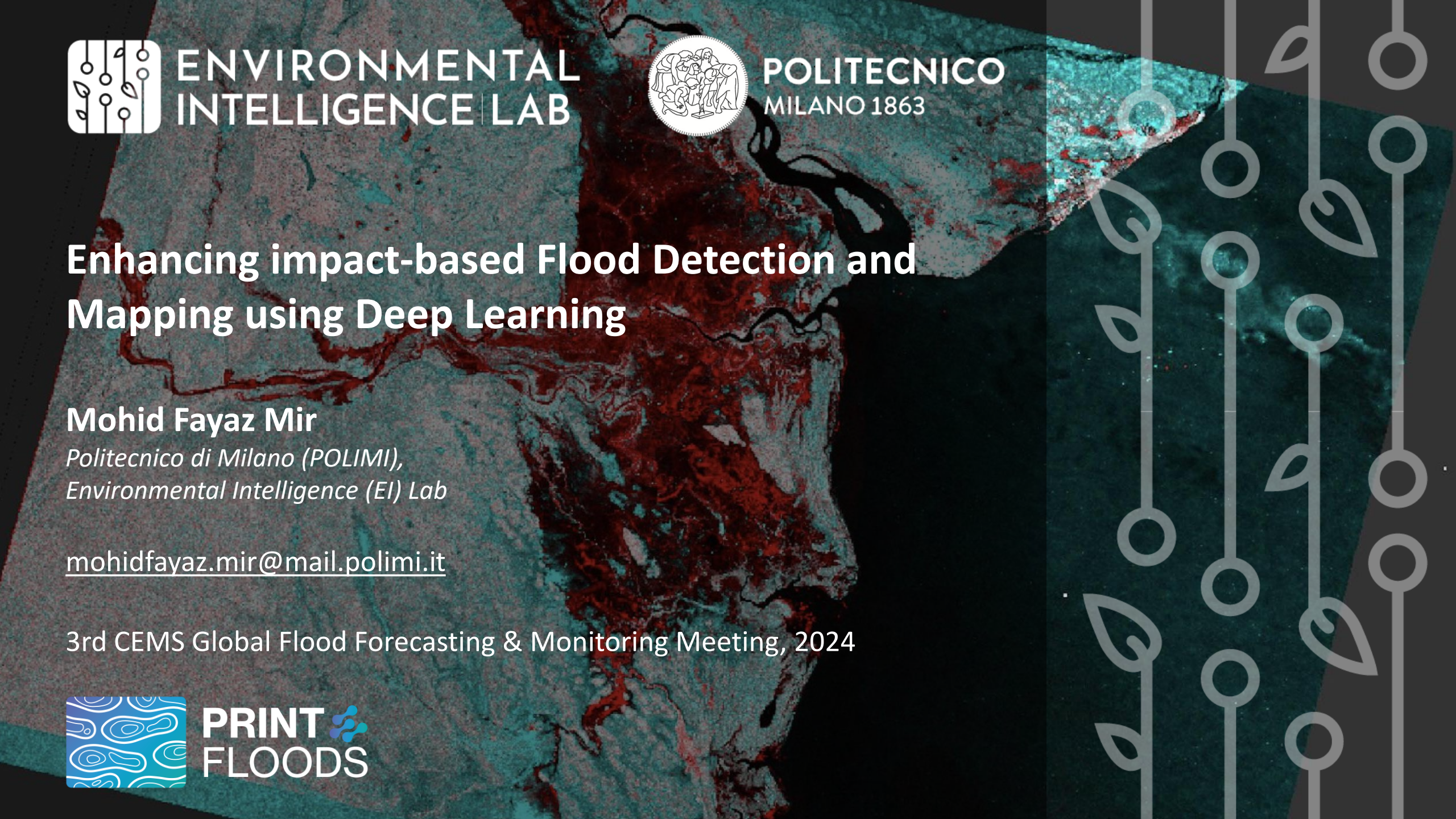

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Enhancing impact-based Flood Detection and Mapping using Deep Learning

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3rd CEMS Global Flood Forecasting & Monitoring Meeting, 2024

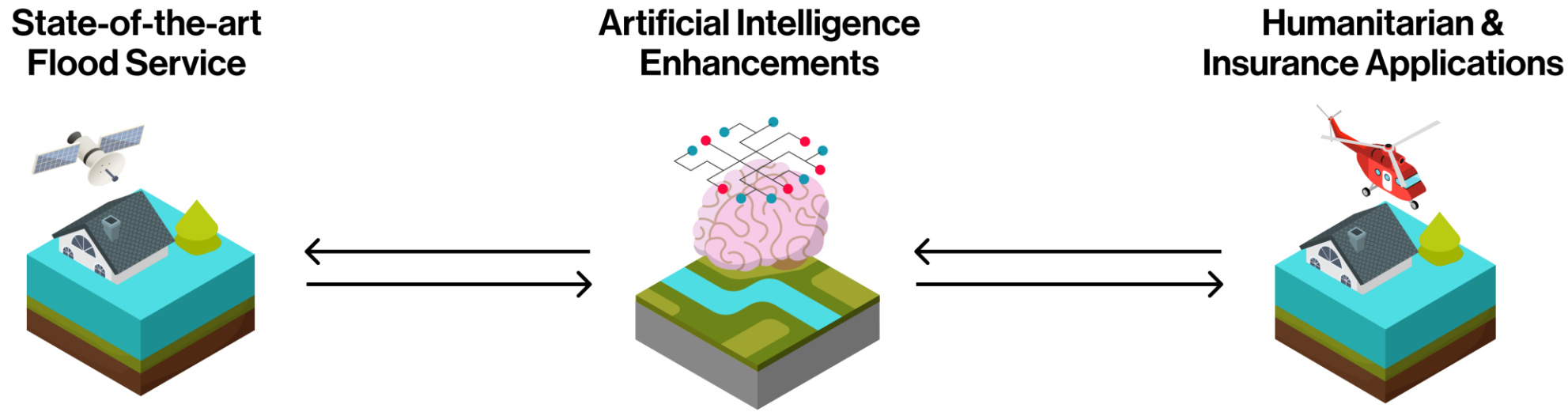
PRINT FLOODS

INTRODUCTION: THE PRINTFLOODS PROJECT

- **Flood predictions and simulations** (reanalyses and projections) **can help plan and manage initiatives to adapt and reduce flood impacts**, e.g. Forecast-based Financing, parametric insurance, etc.

- However, state-of-the-art flood models still have important limitations, e.g., levels of accuracy, resolution, skilful lead times, etc. *(e.g., Ward et al., 2015; Jafarzadegan et al., 2023)*

- In this **MSc thesis research** (part of the PRINTFLOODS project), **we aim to enhance flood hazard maps** (from GloFAS reanalysis and forecasts) by leveraging on **Deep Learning algorithms**, satellite and impact data



www.printfloods.eu

Ward et al. (2015). Nature Clim Change; Jafarzadegan et al. (2023). Reviews of Geophysics.

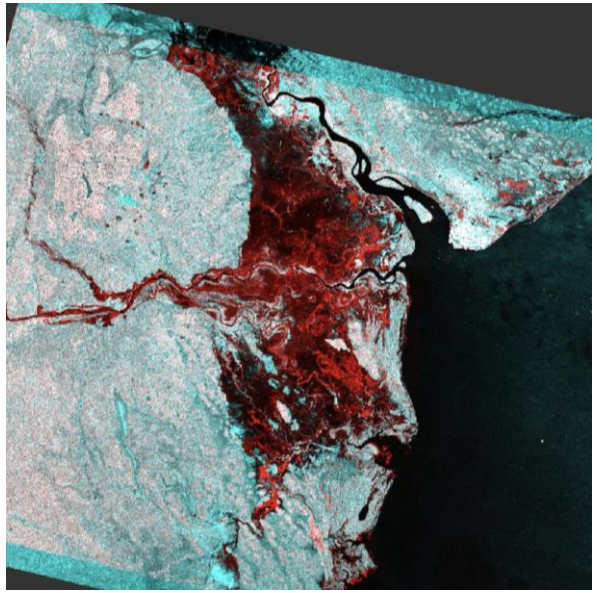
CASE STUDY: ZAMBEZI BASIN & MOZAMBIQUE

- We selected the **Zambezi River Basin and other coastal basins of Mozambique** as case study
- This is one of the most flood-prone regions in the world, with high vulnerability and exposure: floods are often driven by Tropical Cyclones, causing fatalities, destroyed homes, crops losses and epidemics outbreaks, as seen for example after Cyclone Idai *(e.g., Emerton et al. 2020)*

Flooding in the aftermath of Tropical Cyclone Idai, 2019

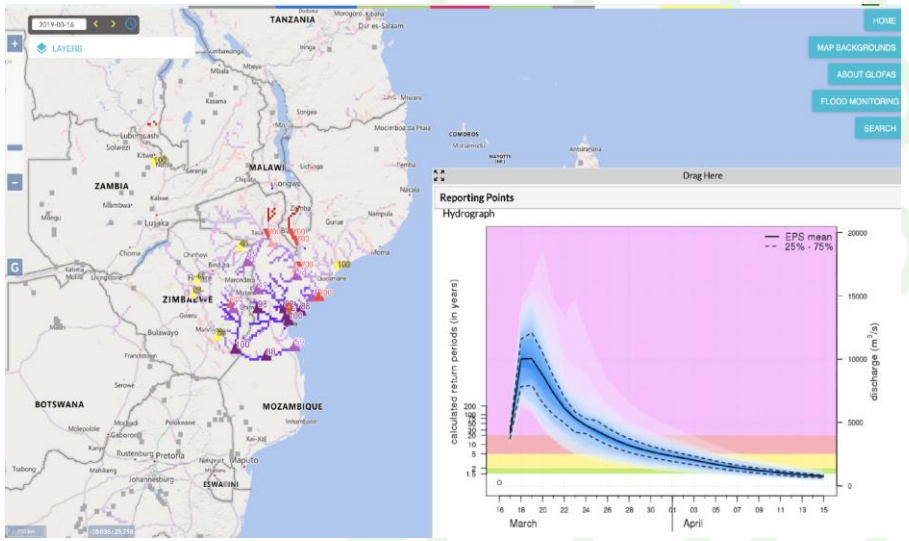
Credits: Denis Onyodi, IFRC/DRK/RCCC

Flood extent in Mozambique after Cyclone Idai, 20 March 2019



Credits: Julia Janicki (based on Sentinel-1 data)

GloFAS interface, Copernicus-EMS – Forecasts for March 2019 in Central Mozambique



Emerton, et al. (2020). International Journal of Disaster Risk Reduction.

PRELIMINARY ANALYSIS OF GLOFAS

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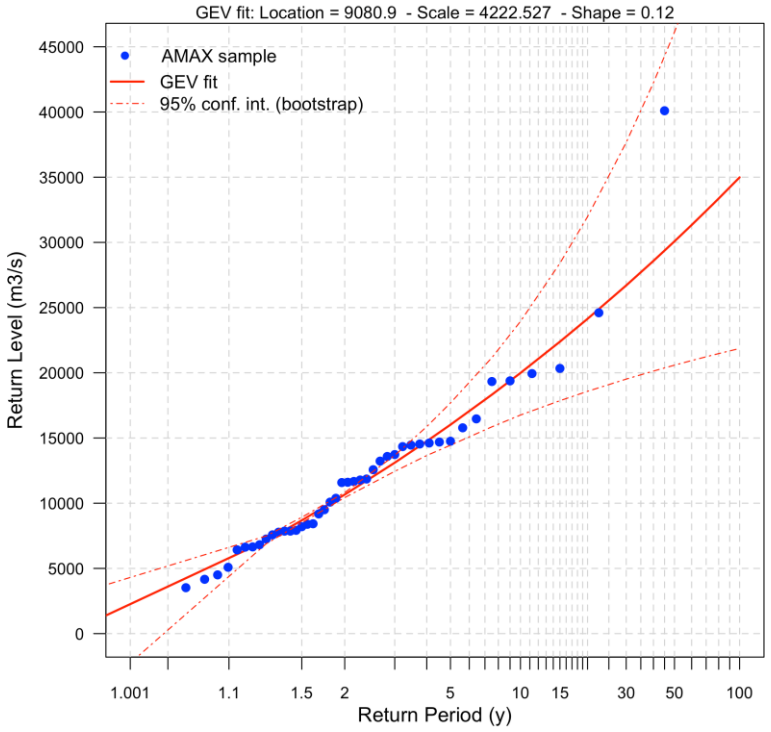
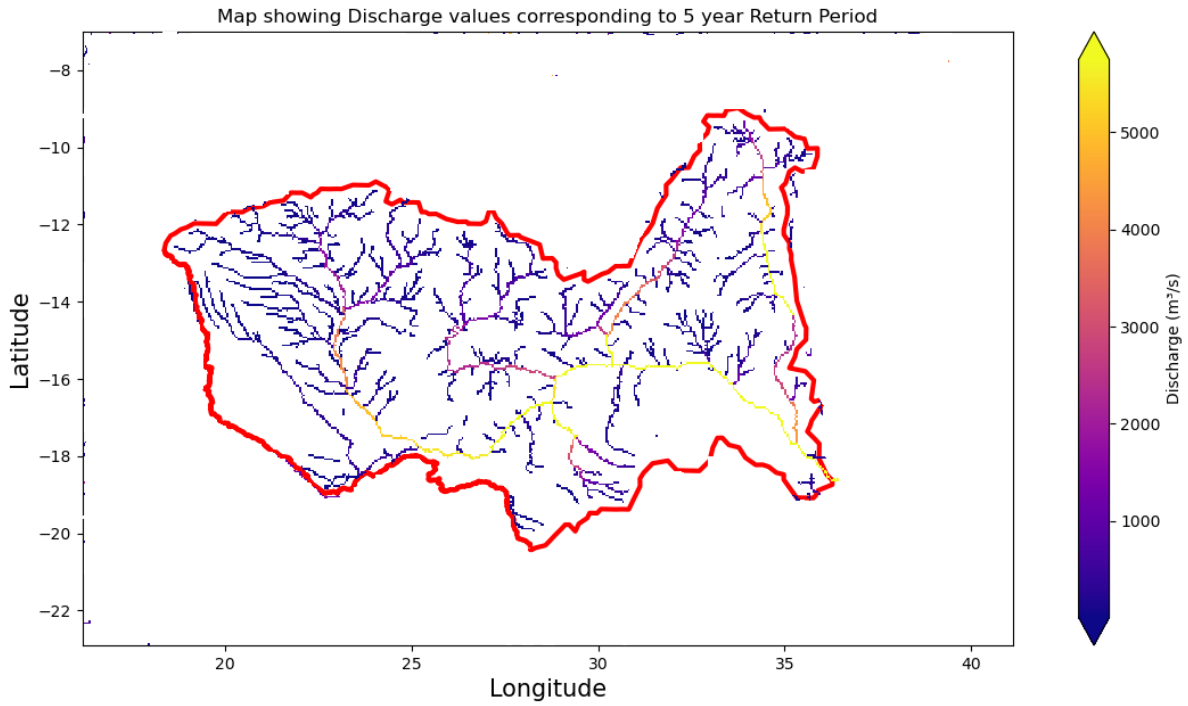
- Our preliminary analysis of the **Copernicus-EMS Global Flood Awareness System (GloFAS) v.4.0 reanalysis** has focused on flood frequency, to compute Return Periods (RPs) and build a catalogue of events
- For these events, we are now conducting an evaluation of GloFAS and we will train a Deep Learning post-processing algorithm, using satellite and impact data as reference

Example of Extreme Value Analysis outputs for the Zambezi River Basin





ONGOING WORK AND NEXT STEPS

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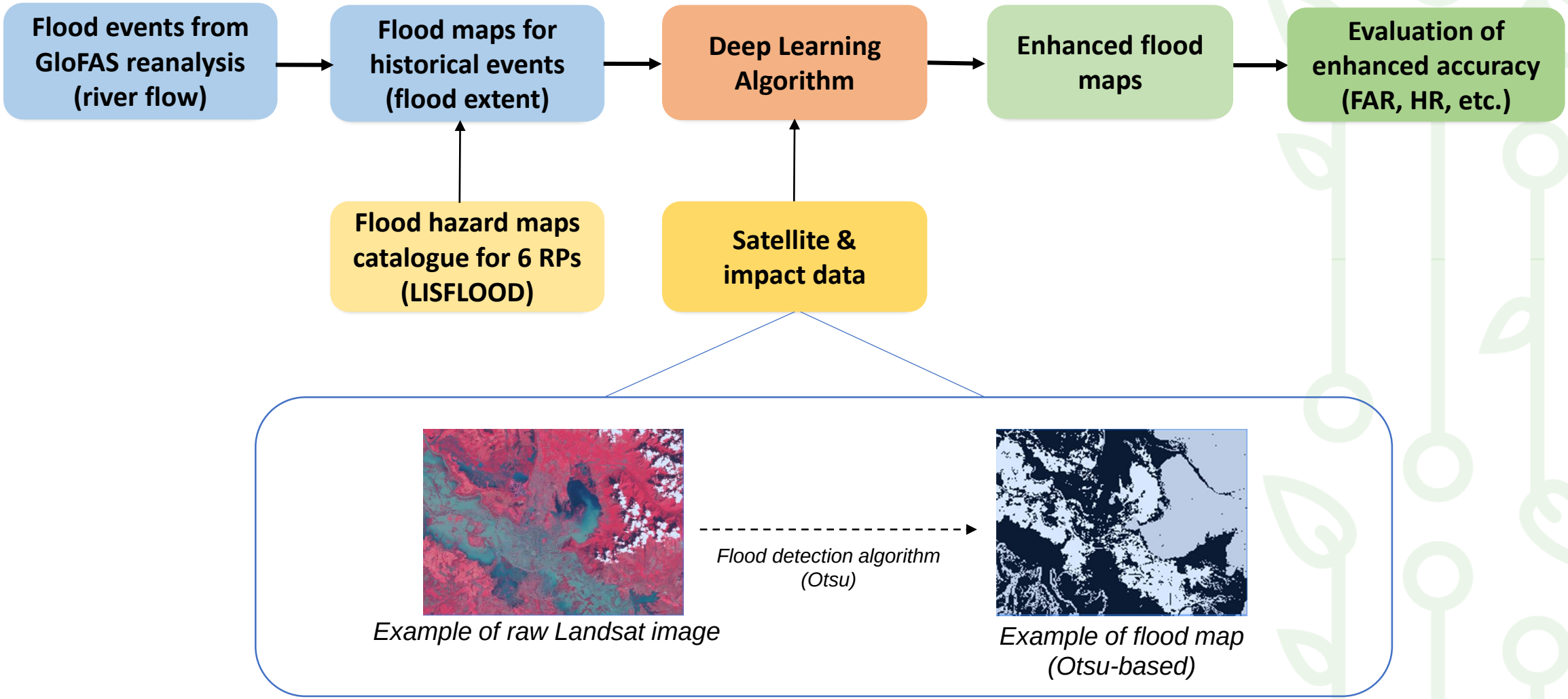

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