

SenForFlood: A Global Dataset for Flood Mapping

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The Problem

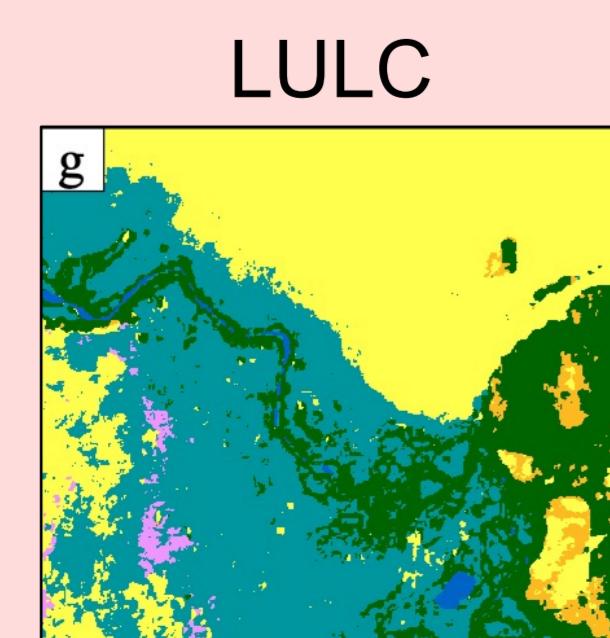
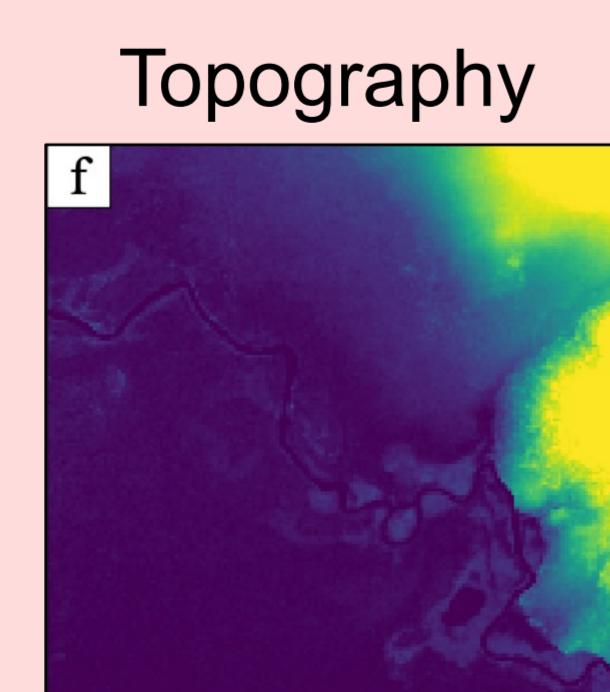
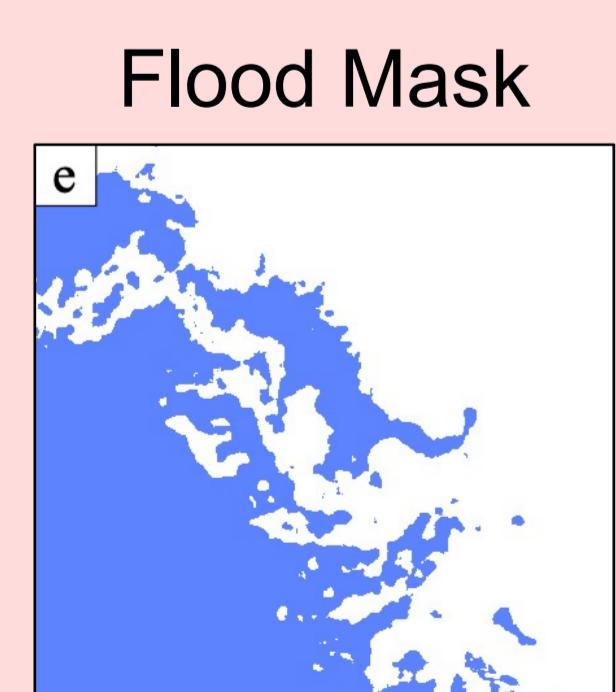
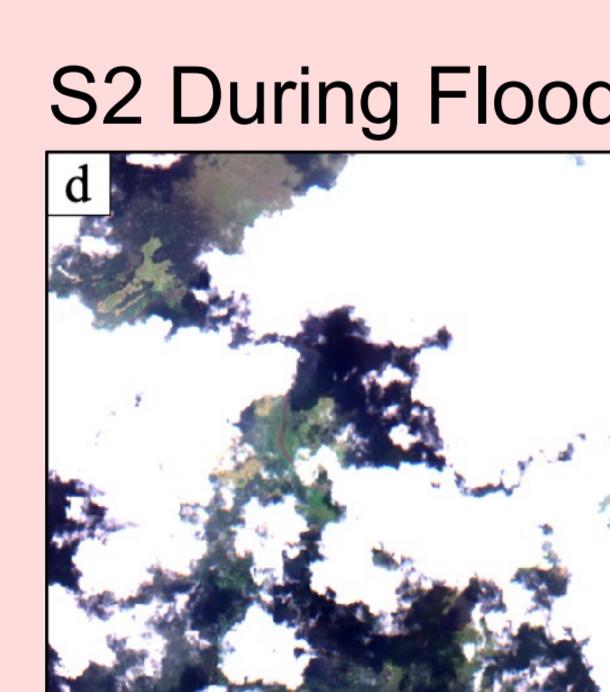
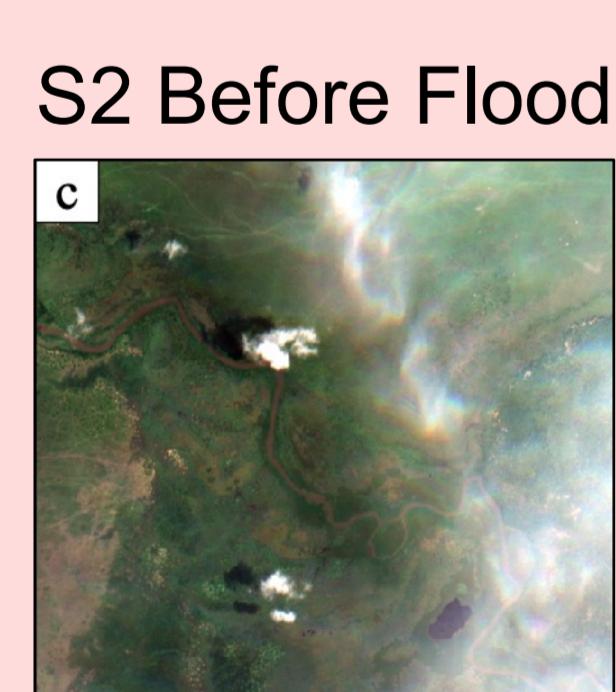
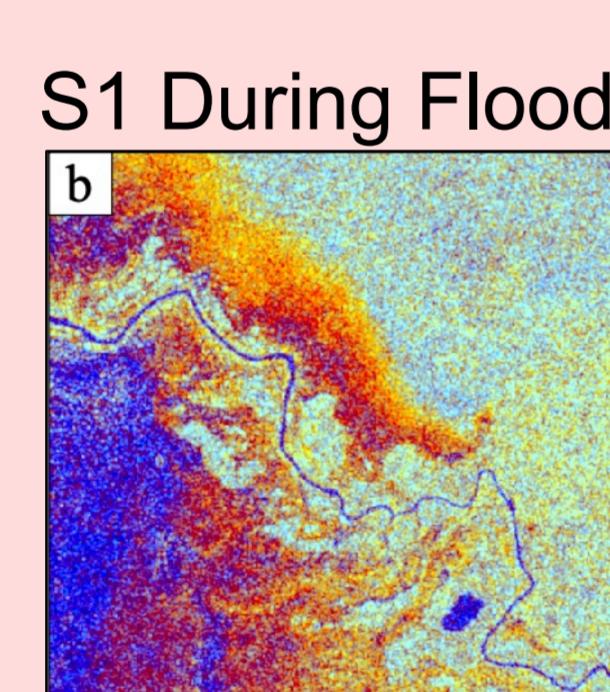
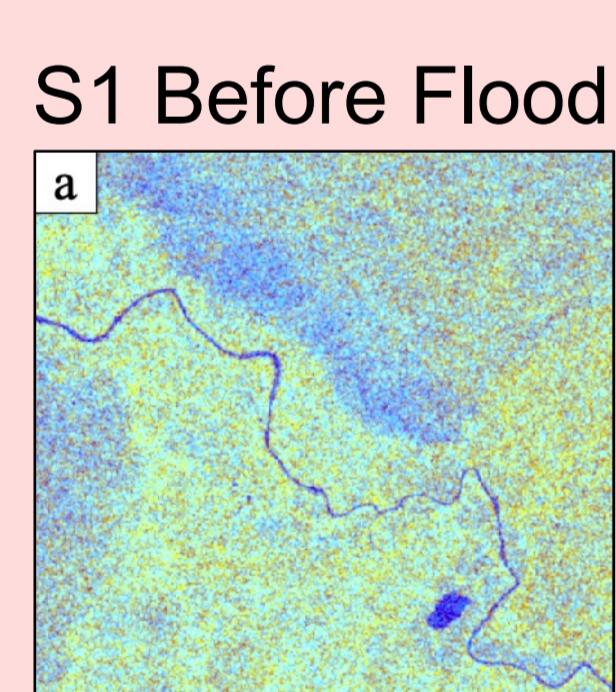
In the context of flood extent mapping, due to the nature of hazards, extensive datasets with high quality labels are not easily available and the ones that exist are limited to specific regions. So, most flood models perform well for where there are samples available, but present poor transferability to never seen regions.

Objective

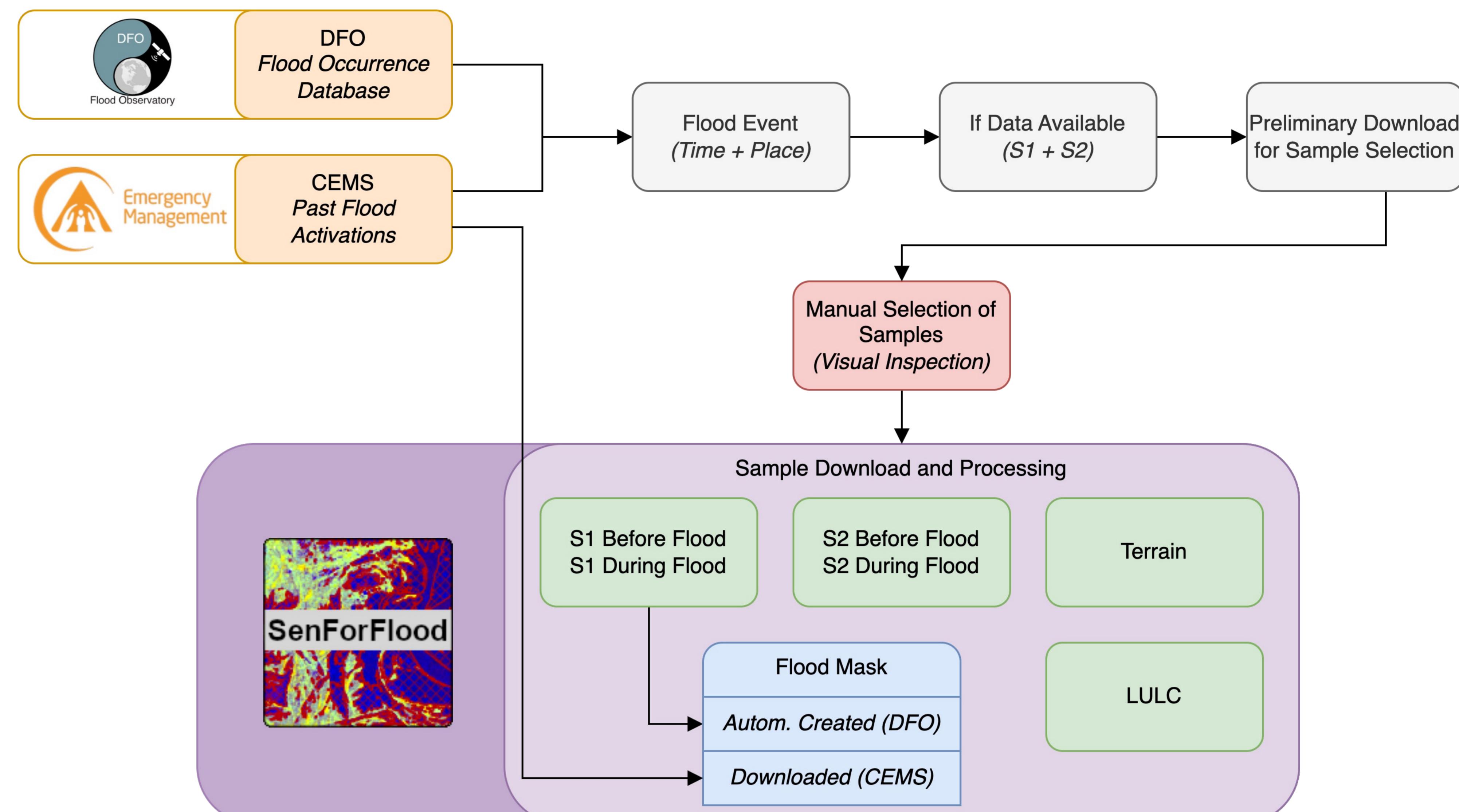
Create a global dataset for mapping flood extent (SenForFlood), including images before and during floods from Sentinel-1 and -2, terrain elevation and slope, Land Use and Land Cover (LULC), and flood masks.

Dataset Layers

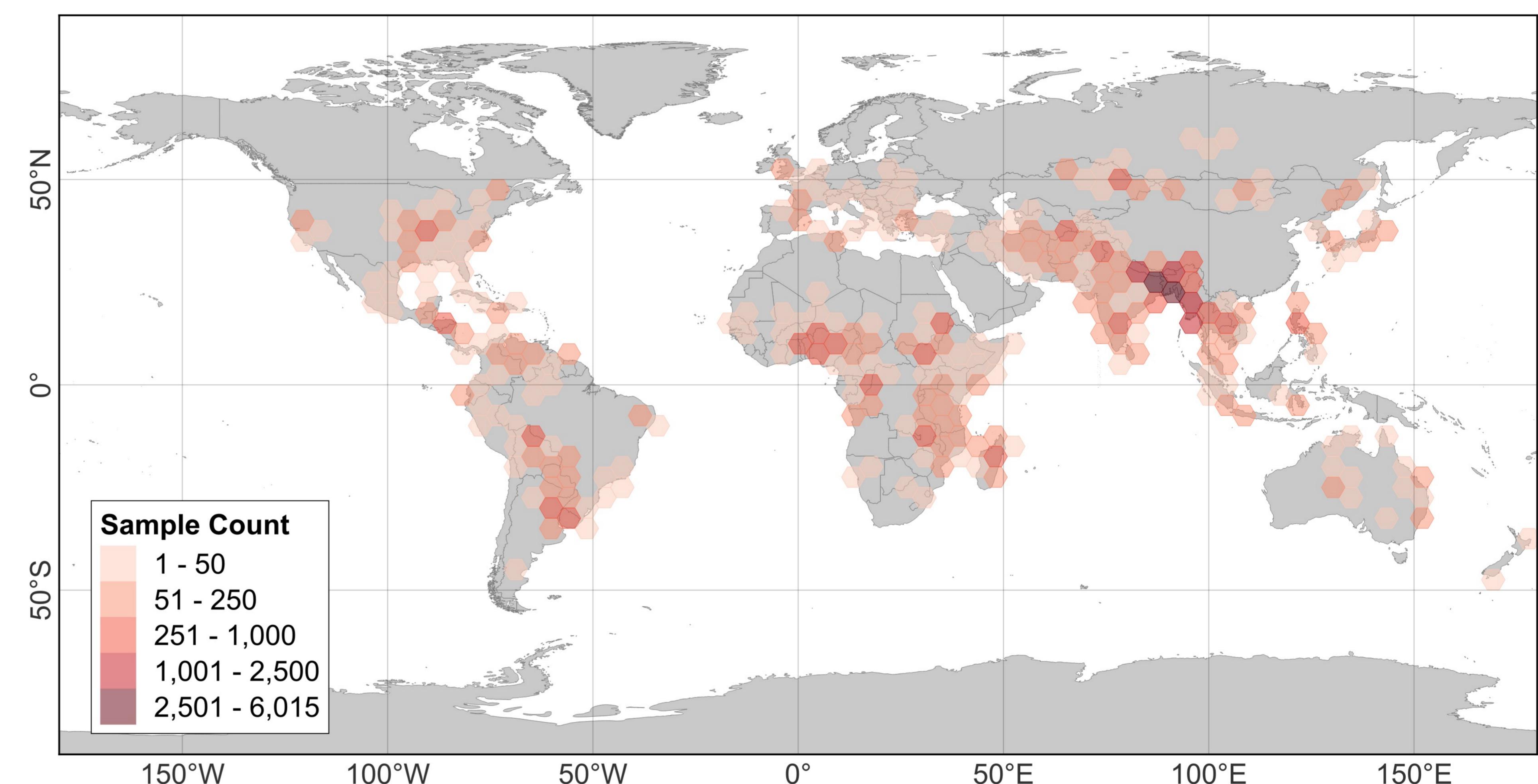
Type	Reference Time	Bands
Sentinel-1	Before Flood	VV VH
Sentinel-1	During Flood	VV/VH Pixel Date
Sentinel-2	Before Flood	Band 2 Band 3 Band 4 Band 8
Sentinel-2	During Flood	Band 11 Band 12 Cloud Score+ Pixel Date
Flood Mask	During Flood	Computed/ CEMS
COP-DEM	2010-2015	Elevation Slope
ESA World Cover V200	2021	LULC



Methods



Dataset Global Distribution



Dataset Statistics

- 40,770 Samples (512x512 pixels)
- Up to 10m spatial resolution
- 285,390 GeoTiff files
- More than 370 flood events covered
- Data from 2016 to 2025
- Covering all continents (Except Antarctica)

Conclusions

- Dataset facilitates using models based on change detection
- The distinct types of data included (SAR, optical, terrain, LULC, and flood mask) make viable training transferable multi-modal models
- Future works
 - Use the dataset to benchmark different models
 - Research the utilization of this dataset for fine tuning foundation models for flood mapping downstream tasks

Dataset GitHub repository. Full description, download and utilization instructions, and complementary scripts.

