

# A MULTI-SENSOR MACHINE LEARNING METHOD TO MAP FLOODING AFTER CYCLONE EVENTS

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A case study for the Ba River Catchment, Fiji

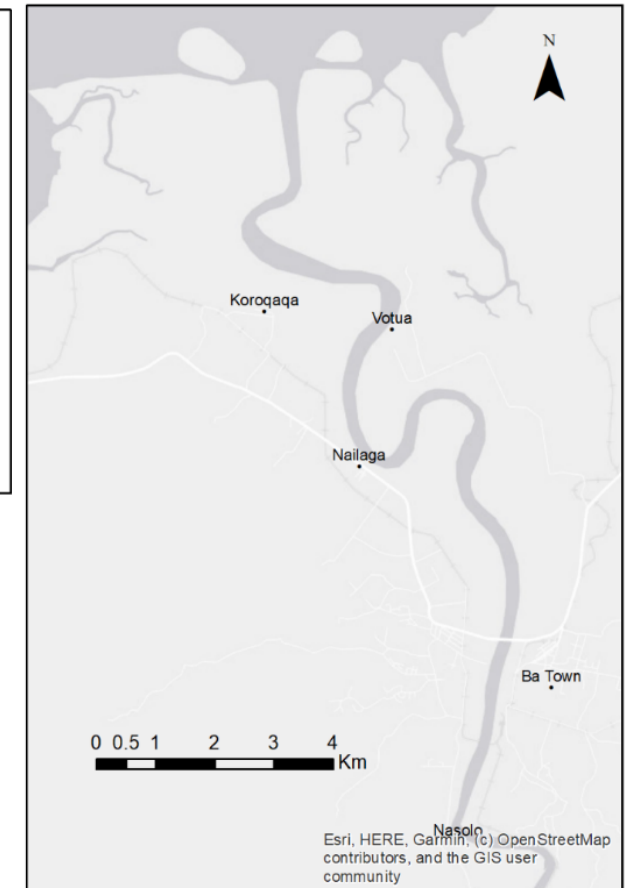
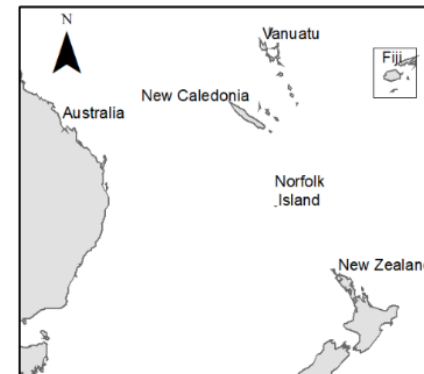
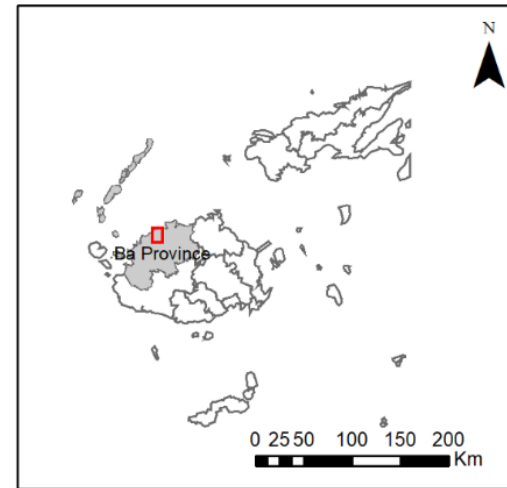
Rocio Peyronnet  
John Duncan  
Bryan Boruff



Flooded farms and roads in Ba, Fiji during TC Josie 2018 (Source: The Fiji Times)

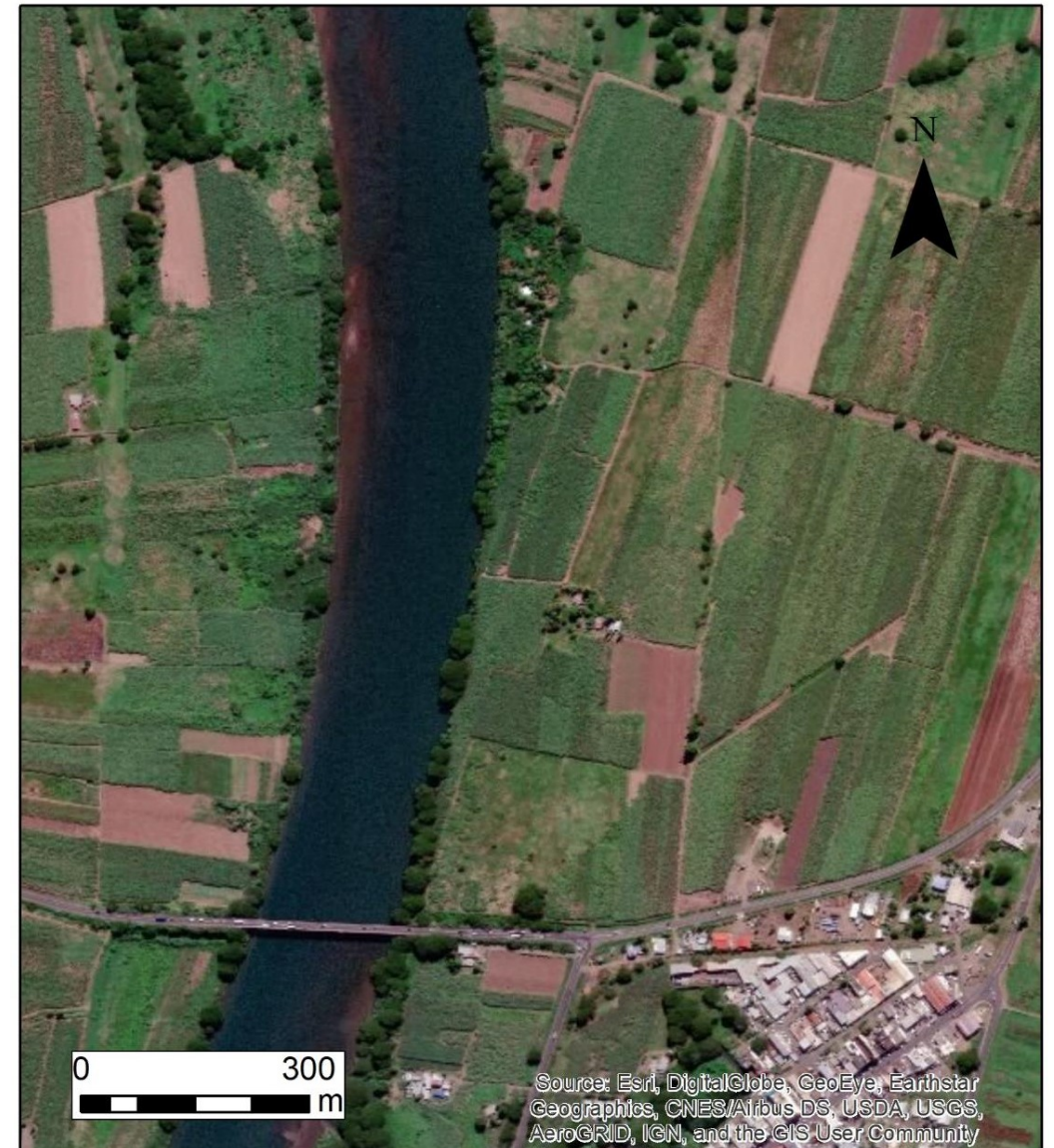
# FIJI: PRONE TO CYCLONE INDUCED FLOOD

- Flood-prone areas adjacent to the Ba River, representing a heterogeneous mix of urban environments, smallholder farms, and coastal villages.
- 46000 people living along its banks affected
- TC Josie and TC Harold
- Monitoring with satellites
  - Assist disaster response activities
  - Assess population and infrastructure exposure



# THE MODEL

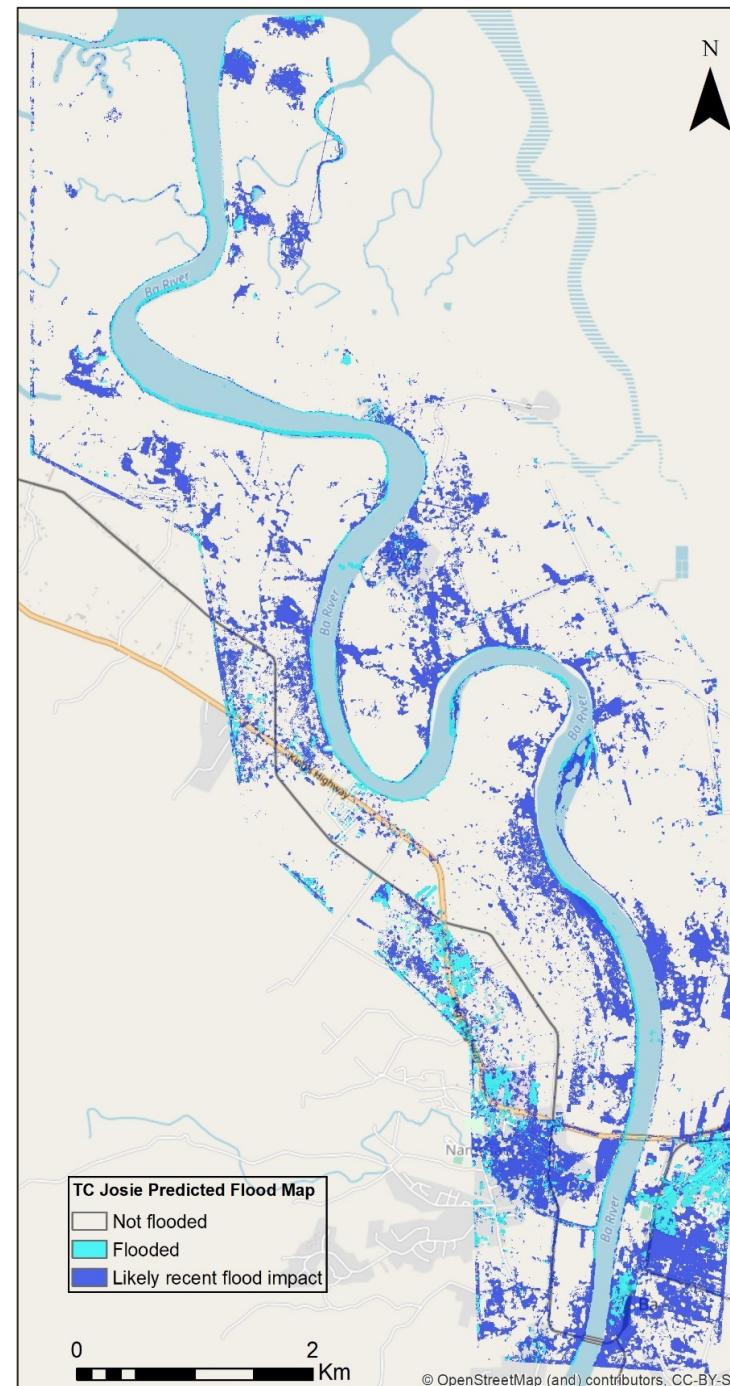
- Multi-sensor dataset in a machine learning approach to deal with cloud cover/ coarse spatial and temporal resolutions
- Open source data: Sentinel 1 and Sentinel 2
- Ancillary data: Planet, DEM



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

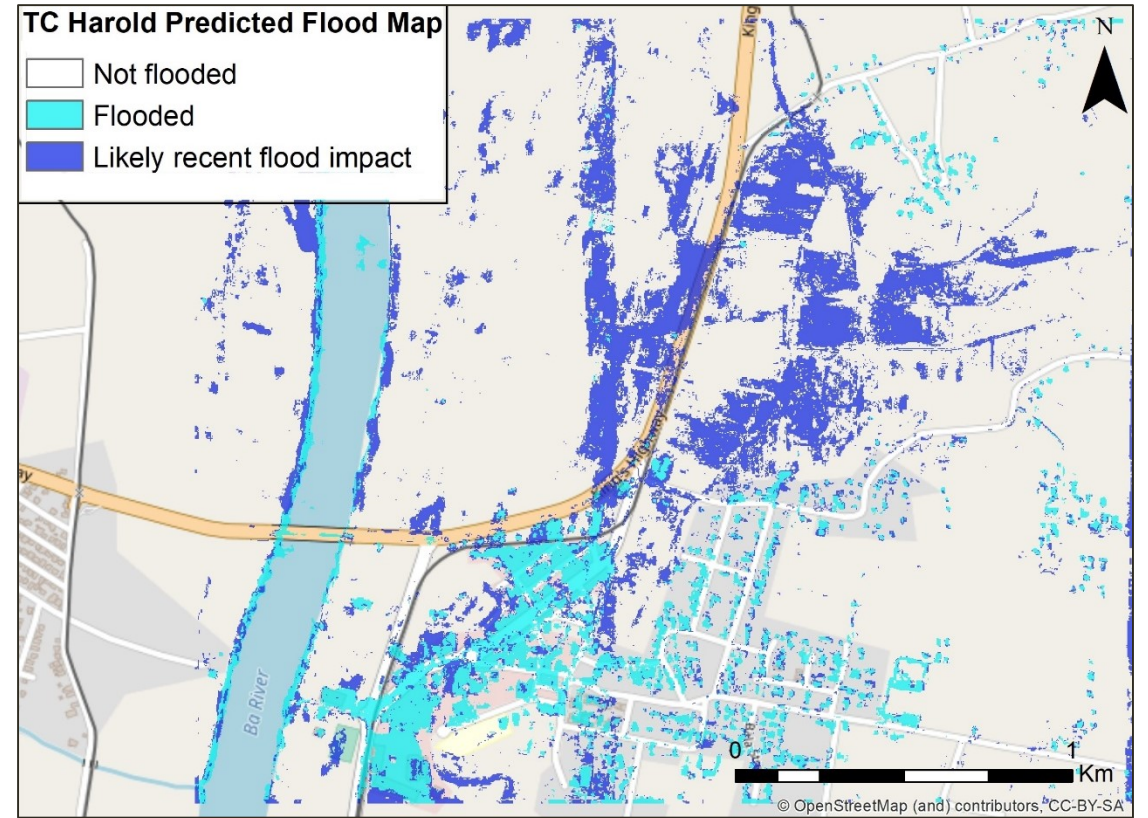
# RESULTS: TC JOSIE 2018

- Overall accuracy 76%





# RESULTS: TC HAROLD 2020

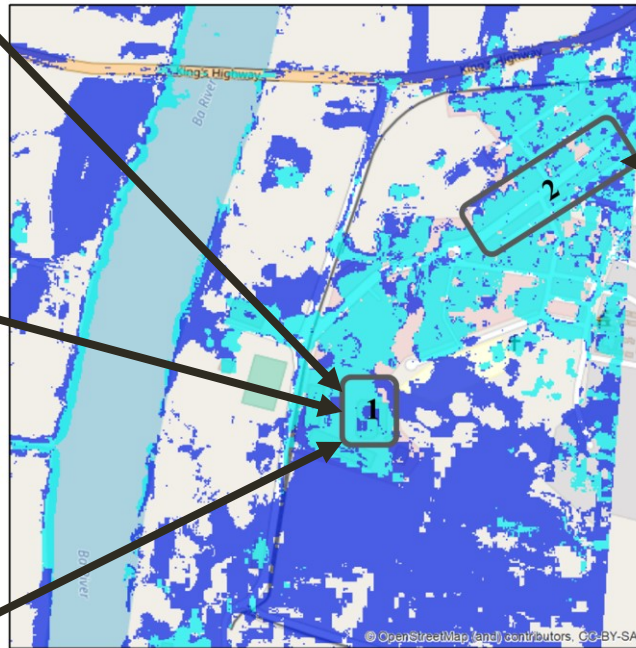


62% of flooding detected by the model

# VALIDATION: SOCIAL MEDIA – TC JOSIE



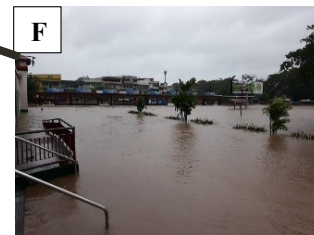
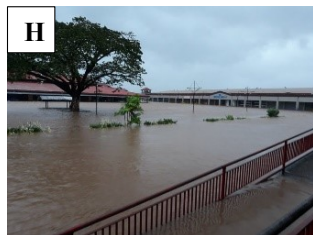
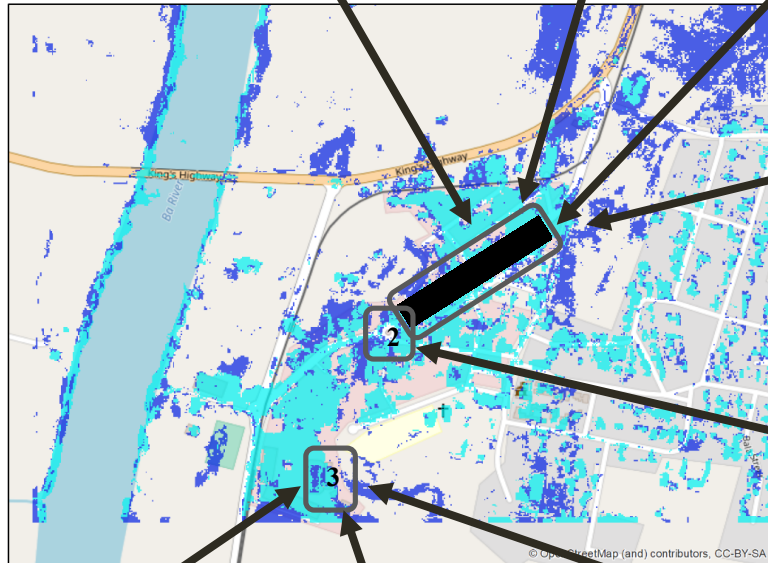
Ba Market



Ba Town main street



# VALIDATION: SOCIAL MEDIA – TC HAROLD



Ba Town main street

Main street roundabout

Ba Market

# CONCLUSION

Optical and SAR data (+ ancillary datasets) combination in a machine learning approach addressed cloud cover issues, allowing to monitor cyclone induced flood extent throughout the heterogeneous landscape of the Ba catchment.