# Leveraging EO Data Assimilation for Improved Flood Inundation Forecasts

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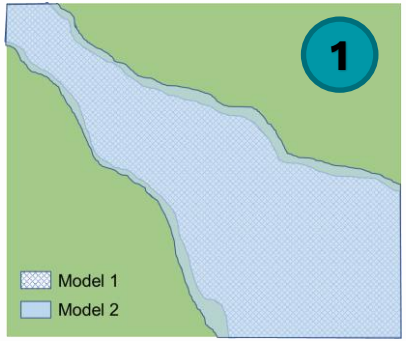
## A New Method to Combine Flood Maps with Models




### Main Challenge

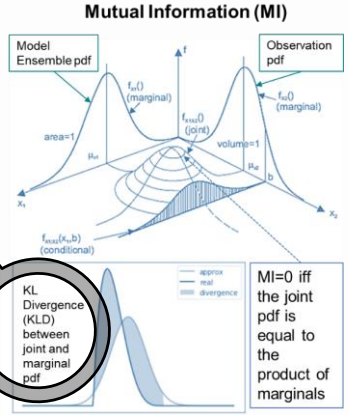
Likelihood sensitivity towards slightly varying extents

### Proposed Solution

2

An information theoretic approach to model likelihoods in SIS particle filter

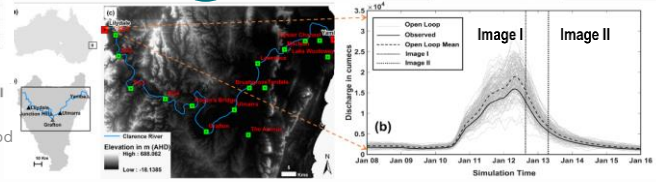
Zoom in with rescaling factor to enhance sensitivity



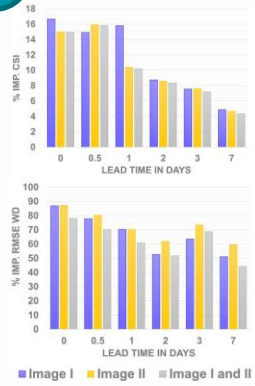

### Test Case

Clarence Catchment, NSW, Australia, 2011 Flood Event

3



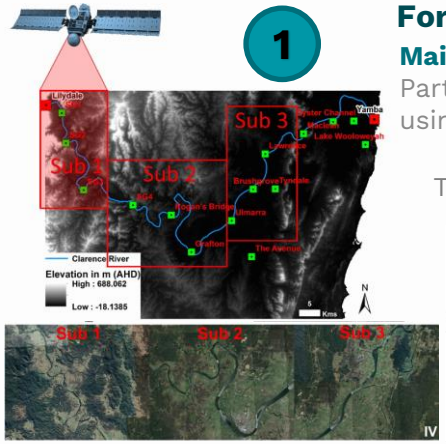

## 4 Key Results




**Based on:** Dasgupta et al., 2021. A mutual information-based likelihood function for particle filter flood extent assimilation. (*WRR*)

## Finding the Best Flood Observations to Correct Flood Forecasts

1



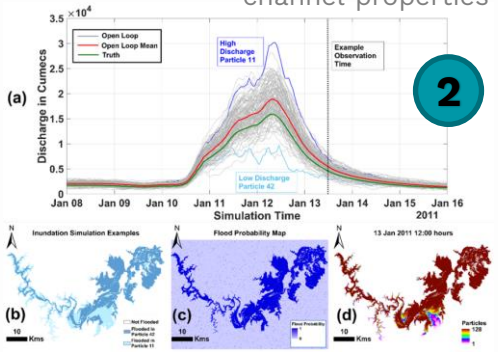

### Main Challenge

Partial coverage for large catchments using high-res satellites

### Proposed Solution

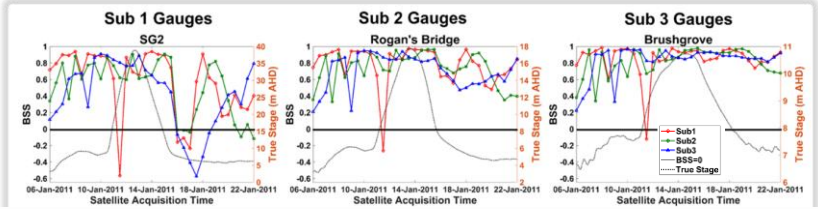
Targeted observation design based on channel properties

2




## 3 Key Results

Brier Skill Scores (BSS) for single image assimilation, points on each curve represent satellite observations and the corresponding BSS from the acquisition time to the end of the forecast.




BSS (errors in assimilated forecast vs. open loop) = 1 means 100% improvement!!!

**Based on:** Dasgupta et al., 2021. On the impacts of observation location, timing and frequency on flood extent assimilation performance. (WRR)