

Estimation of water levels from Radar satellite imagery on flood plains in Cambodia



A flooded street (1m53) in Phnom Penh after a heavy rain on July 4 2023. source : The Phnom Penh Post

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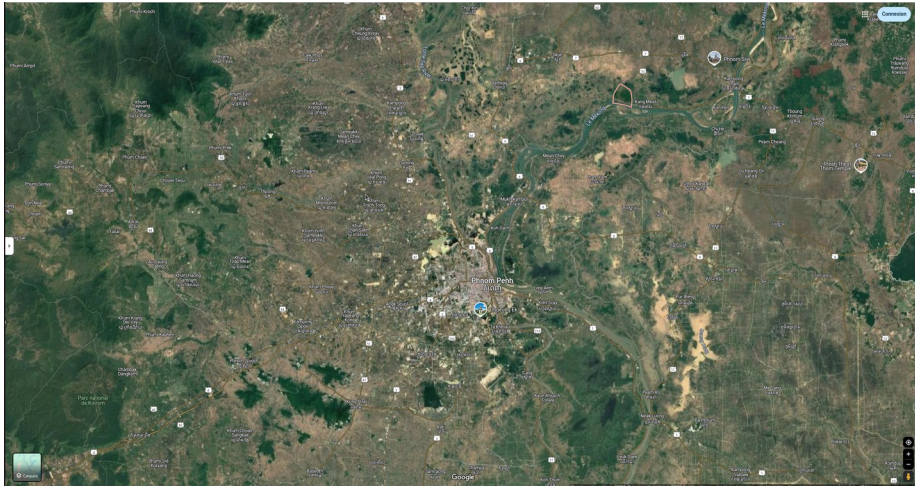
Obj : → be able to estimate from Sky images the water level to monitor and understand past event

Problem : What numerical model should we use to evaluate as precisely and accurately as possible the water height during flood events ?

Area of study : Phnom Penh and surroundings



Why ? → This region is very subject to inundation
→ possibility to make measurements
→ university partnership

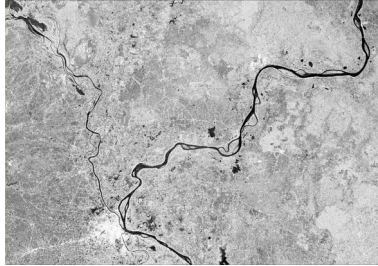
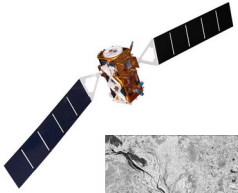


View of the sky from Google Maps of Phnom Penh and around



Photo of houses on the side of Mekong river in the village Angkor Ban, Cambodia.

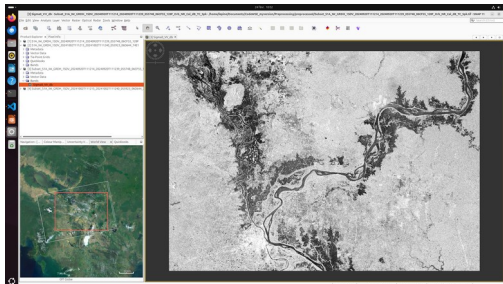
Methods



One polarisation of Sentinel-1 Image



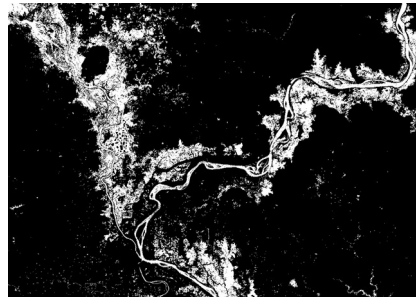
Preprocessing with SNAP



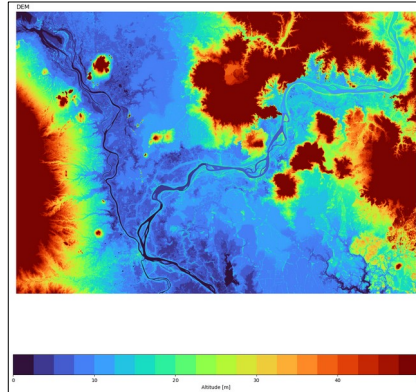
Overview of the image after preprocessing (thermal noise removal, conversion in dB, subset...)



Watermapping with CASCADE model



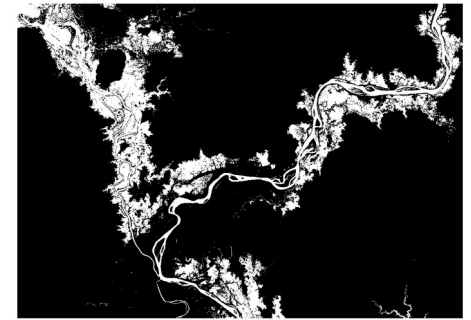
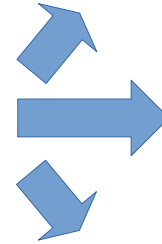
One polarisation of Sentinel-1 Image



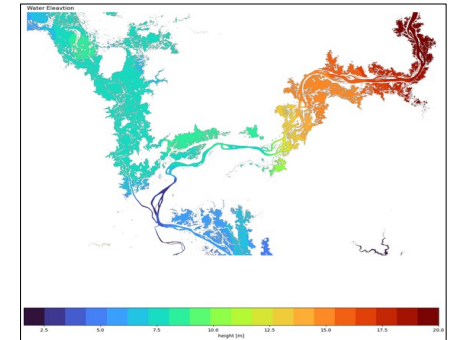
Digital Elevation Model Copernicus 30m



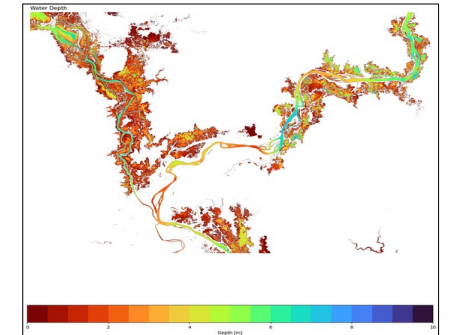
Water Surface Elevation model



Water Map corrected with topological constraints



Water Surface Elevation (above the sealevel)



Water depth

Results and conclusion

- A temporal serie on year 2018
- Sensitivity analysis to several DEM
- Optimisation of the code
- To come : evaluation with SWOT datas

