Development of a rationalized hydrometeorological network for an urban catchment under resource-constrained scenario

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Background

- Mumbai City, faces incessant precipitation events owing to erratic monsoon and urban heat island effect.
- Attempt to evaluate the existing Automatic Weather Station (AWS) network over Mumbai using multivariate statistical techniques
- Based on data consistency and continuity, data recorded from 35 common significant Automatic Weather Stations for the years 2015-2018 have been considered (Rainfall, Relative Humidity)

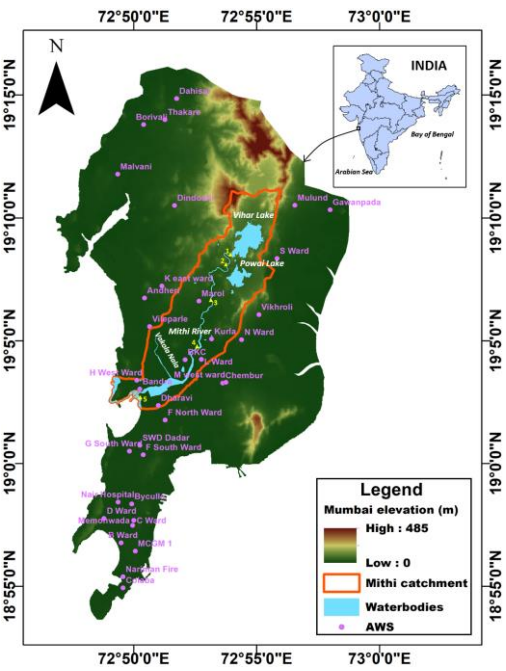

Fig : Location of study area and Autmatic Weather Stations

Framework for rationalization of AWS

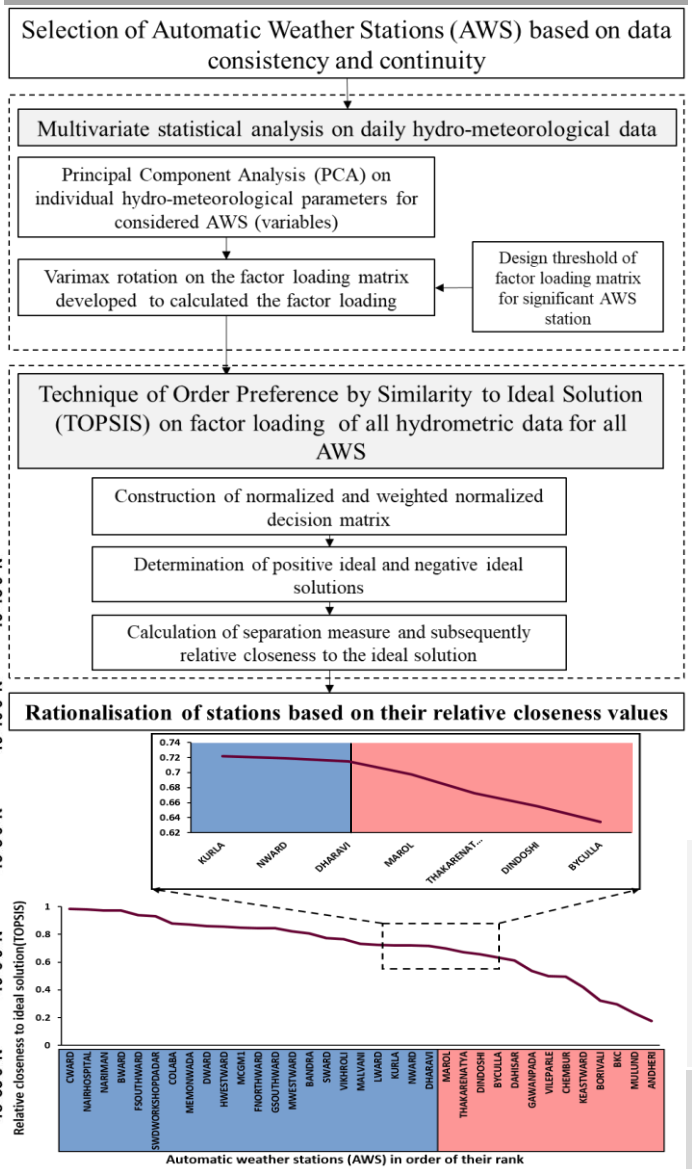

Fig: Ranking of AWS as per their ability to capture spatio-temporal variability of rainfall & relative humidity

Verification of the framework

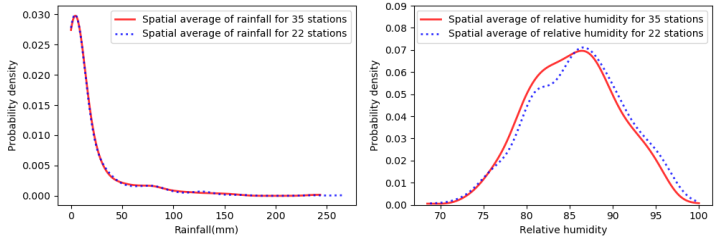

Fig: Comparison of PDFs for spatially averaged (a) rainfall and (b) relative humidity for all 35 AWS stations and TOPSIS ranked first 22 AWS stations.

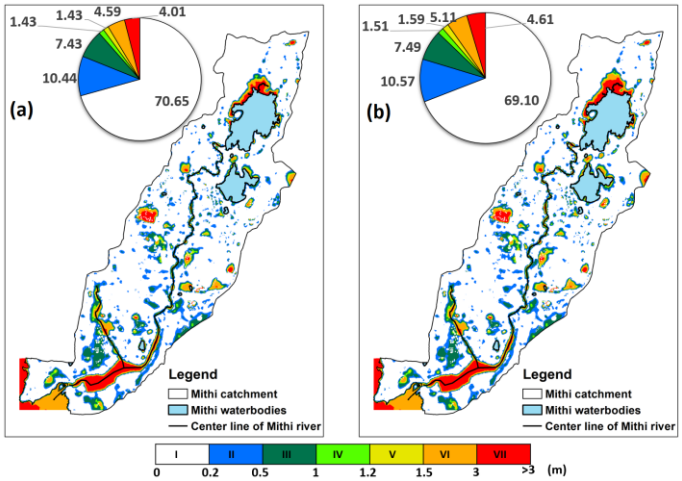

Fig: Comparison between flood inundation maps for rainfall of (a) all AWS stations within Mithi Catchment and (b) rationalized AWS stations within Mithi Catchment

- It can be deduced that the ***rainfall plays an influential role*** amongst other parameter in determining the overall temporal variability during monsoons.
- It is found that the temporal variability of rainfall and relative humidity are captured reasonably well at 22 stations
- This framework is generic and can be applied over other areas to rationalize the stations based on greater number of hydro-meteorological parameters

For more details reefer "Ghosh, M., Singh, J., Sekharan, S., Karmakar, S., Ghosh, S., Zope. 2021. Rationalization of the automatic weather stations over a coastal urban catchment: A multivariate approach, *Atmospheric Research*, Elsevier Publishing, 254, 105511."

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