TROPICAL CYCLONES IMPACT ON SEALEVEL RISE IN NORTHERN COASTAL BELTS OF SRI LANKA

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1. Introduction

- Tropical cyclones are climate extreme events hazardous to lives and billion-dollar property damages around the worlds coastal regions.
- Coastal populations in the northern Indian Ocean facing major challenges from storm variability, sea level rise and shoreline changes.
- Sri Lanka was affected by storm surges in several historical tropical cyclones. In 2020 the passages of cyclones Nivar, and Burevi in the Northern Indian ocean, sea flooding affected several low-lying areas along the coast of Sri Lanka.

2. Objective

The objective of the study is to appraise the consecutive tropical cyclonic storms **Nivar** and **Burevi** impact tropical storm surge during landfall.

3. Data and Methods

- The coastal belt of Jaffna (Northern part of the country) is estimated to be 160km and total land mass is span over 1000 Km^2.
- The cyclone trajectories, wave height and wind speed during the storm event were accessed from the NOAA and Copernicus Marine Services respectively further Python packages were used to map the data.

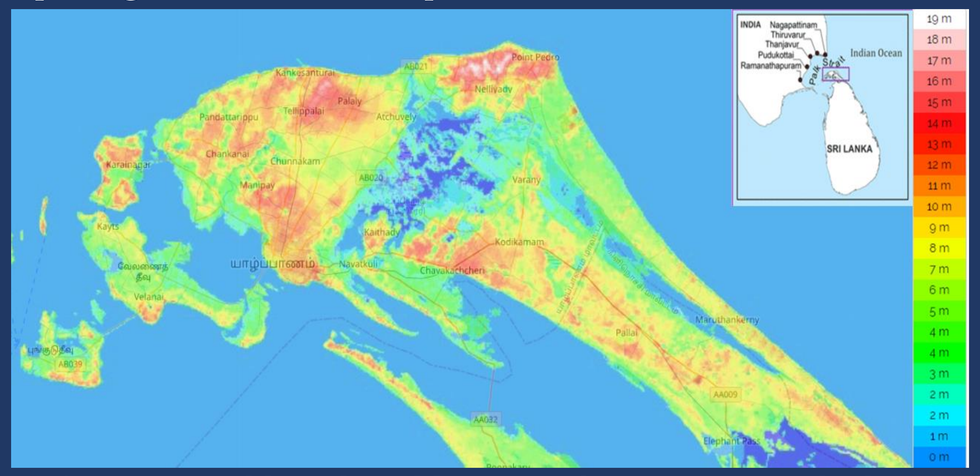
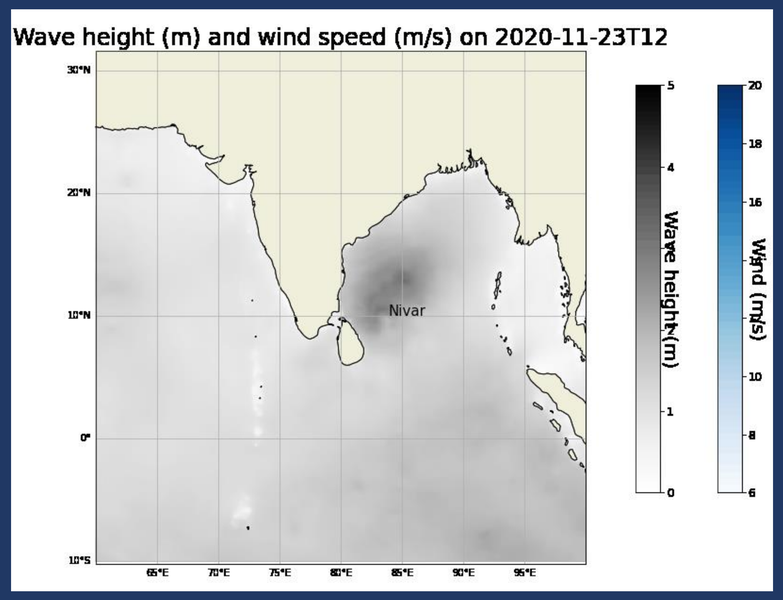


Figure 1. Highly vulnerable region for SLR crisis which accounts for nearly 30 % of the land area under the 1-3 m altitude (Topography.com)

4. Results and Discussion



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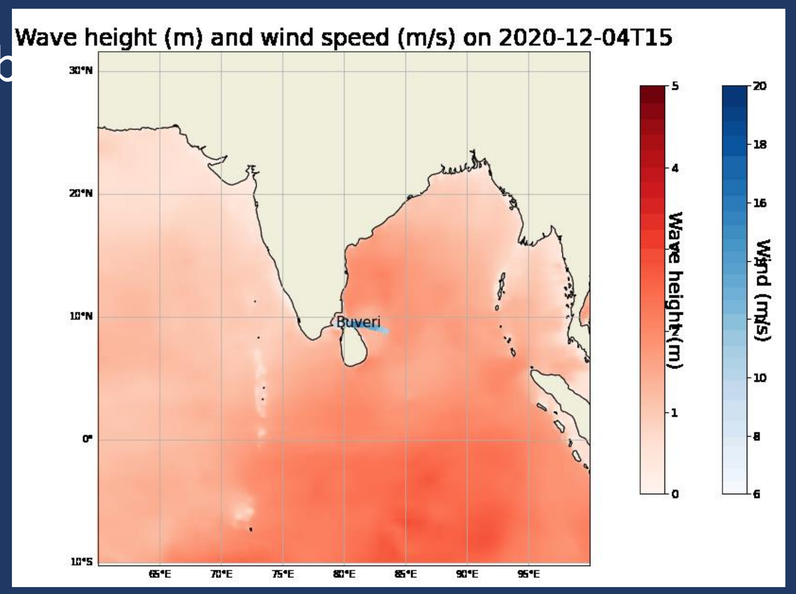

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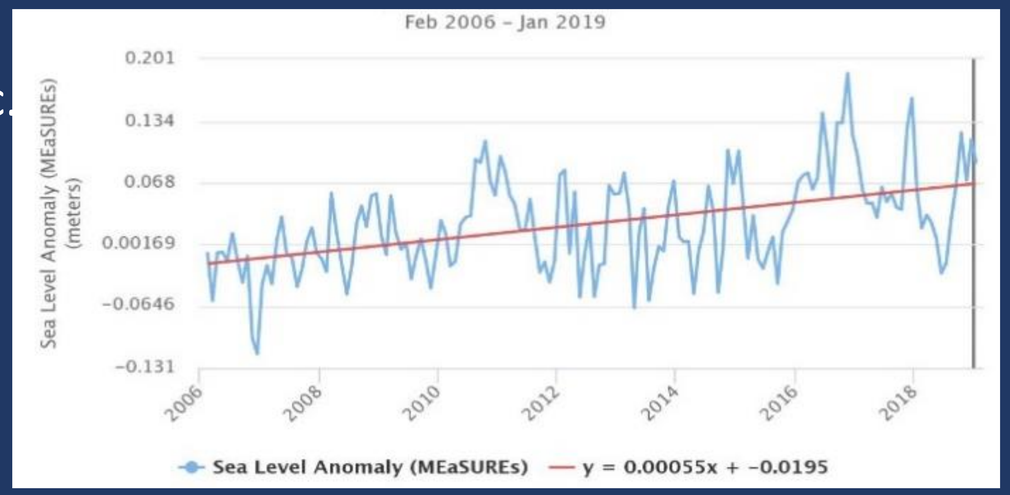

Figure 2. Wave height and wind speed for cyclones. a.**Nivar** b.**Burevi;** c.**Sea Level** rising trend at a rate of 5.5 mm/year.

The results figure 2 a and b indicate high tide waves surpassing 10 m heights and wind speed of 15 ms^{-1} in the coastal belts of Northern and Eastern Sri Lanka.

- Annual SLR = 5.5 $mmyr^{-1}$ > Annual average global SLR of 3.4 $mmyr^{-1}$

5. Conclusion

The low lying lands in the northern part (Jaffna Lagoon) is account for nearly 40 % of the region is vulnerable to regional sea level rise due to frequent tropical storm surges.

6. References

Woodruff, J.D., Irish, J.L. and Camargo, S.J., 2013. Coastal flooding by tropical cyclones and sea-level rise. *Nature*, *504*(7478), pp.44-52.