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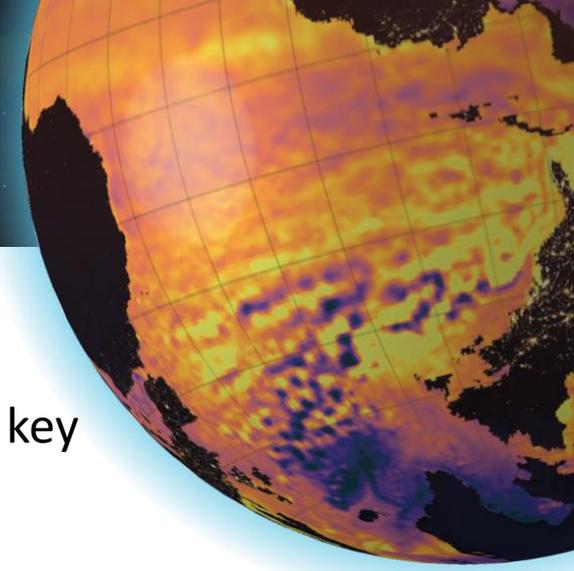


Sea Level Rise Projections for the Tamil Nadu Coast: An Analysis of Present and Future Trends

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SURAT | GUJARAT

Older projections suggested that sea level rise of even a couple of metres would shift the tidal zone towards the diamond and textiles hub. The latest projection shows that a vast chunk of the city, home to about 5 million people, faces the risk of annual floods



KOLKATA | WEST BENGAL

Hundreds of towns along the Hooghly river and its tributaries are at risk of annual flooding by 2050. That includes Kolkata and its surrounding areas, which have a growing population that currently stands at 1.5 crore



MUMBAI | MAHARASHTRA

Home to about 18 million people, Mumbai is at risk of being virtually swept away by coastal flooding. The city stands on low-lying land reclaimed from the sea and it has been suggested that even if the target of limiting global warming to below 2 degrees celsius above pre-industrial levels is achieved, tropical floods will continue to pose a big threat



ODISHA

Communities all along the Odisha coast fall within the risk zone with more than half a million people especially vulnerable to coastal flooding



KERALA

Floods last year in Kerala displaced about 1.4 million people. The new model shows that by 2050 large swathes of two districts – Alappuzha and Kottayam – could be in the annual coastal flood risk zone



CHENNAI | TN

Districts along the state's northern coast, including Chennai, Thiruvallur and Kanchipuram, are among Tamil Nadu's most vulnerable regions. Chennai alone is home to at least 70 lakh people

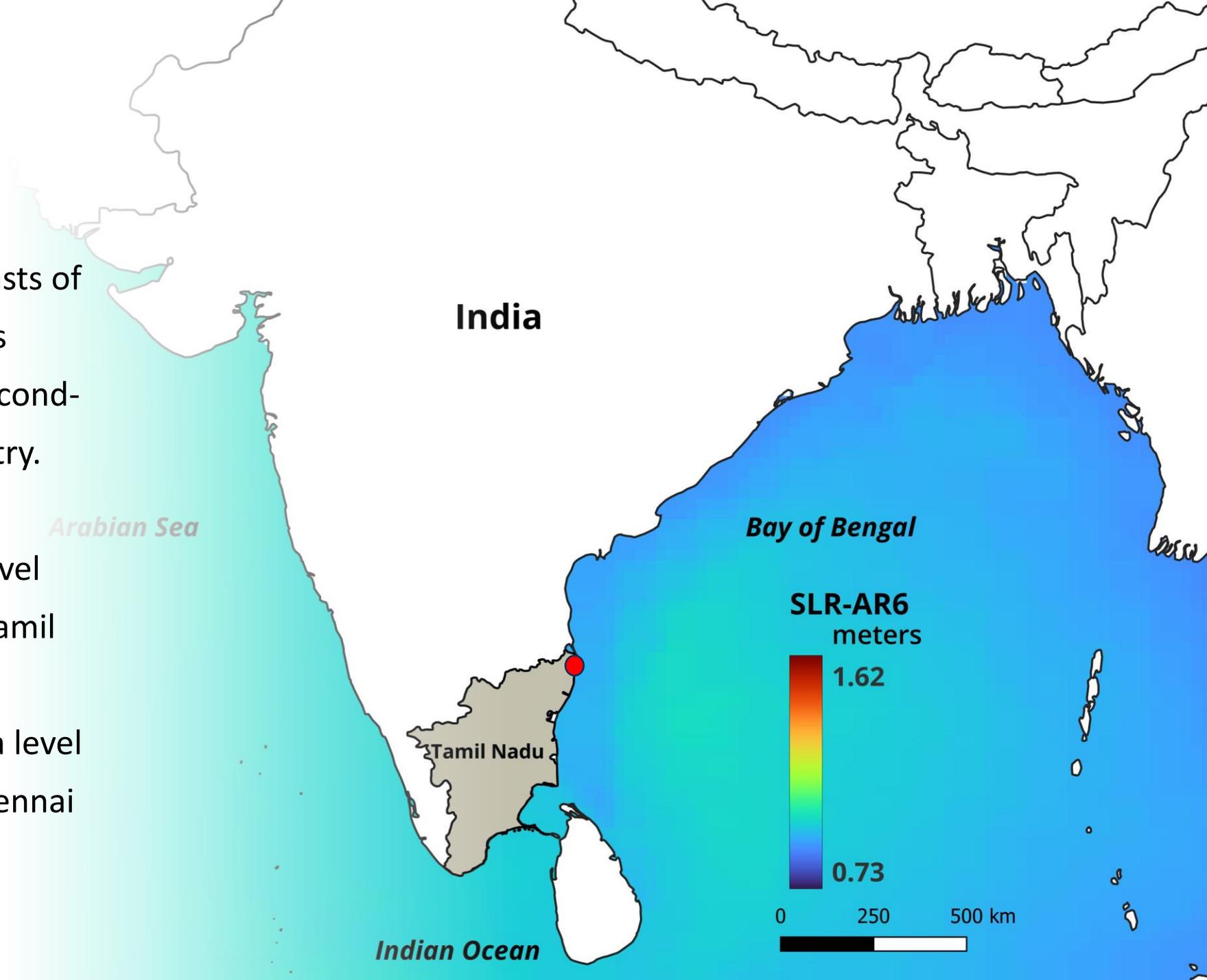


Introduction

- Variations in global mean sea level are a key indicator of global climate change.
- Measuring sea level provides critical information on its impact on coastal populations and land use.
- Satellite-based measurements are essential for determining if sea levels are rising and for assessing the vulnerability of coastlines to this increase.
- Altimeter measurements, available globally, enable the identification of sea level trends in specific regions.

Study Area and Objectives

- This study focuses on the coasts of Tamil Nadu (TN) which covers about 1,076 km and is the second-longest coastline in the country.
- **Objectives of this study:**
 - To analyze current sea level rise patterns along the Tamil Nadu coast
 - To understand future sea level rise scenarios for the Chennai



Data

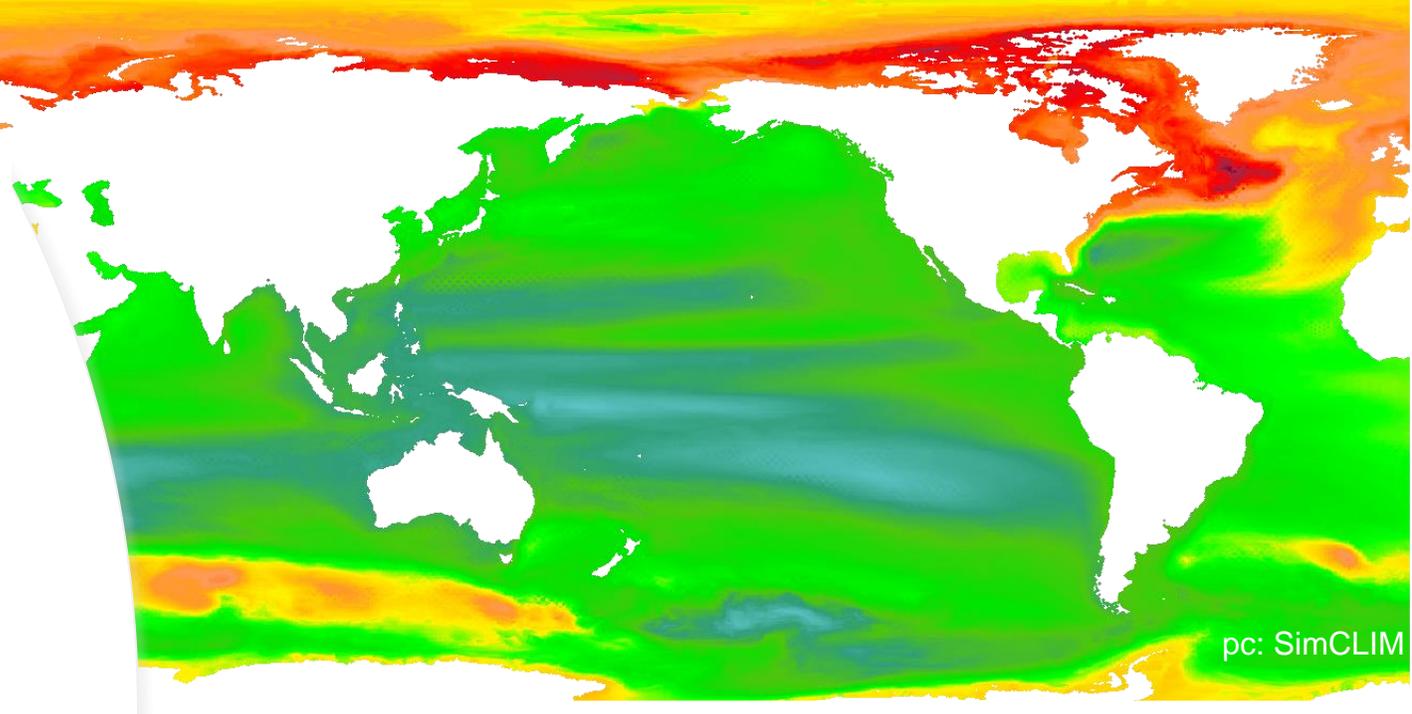
1. Altimeter Data

- *TOPEX/ POSEDION* (1st January 1993 TO 23rd April 2002)
- *JASON-1* (24th April 2002 TO 18th October 2008)
- *OSTM/JASON-2* (July 2008 TO October 2018)

2. Tide gauge data from the Permanent Service for Mean Sea Level (PSMSL)

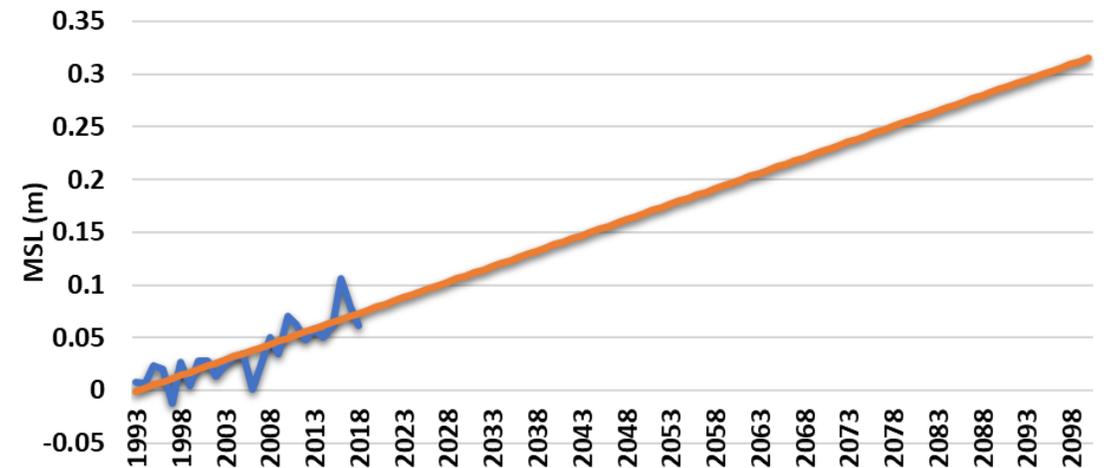
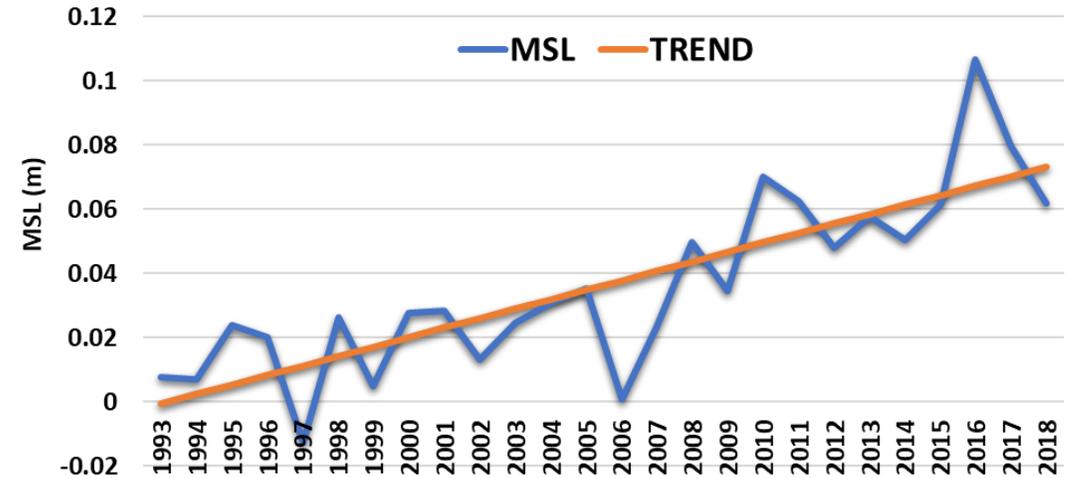
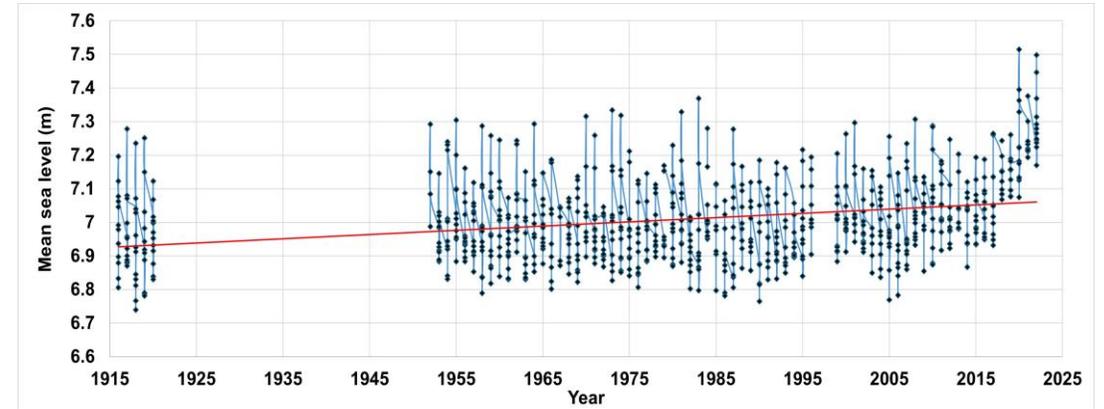
3. Projected Data

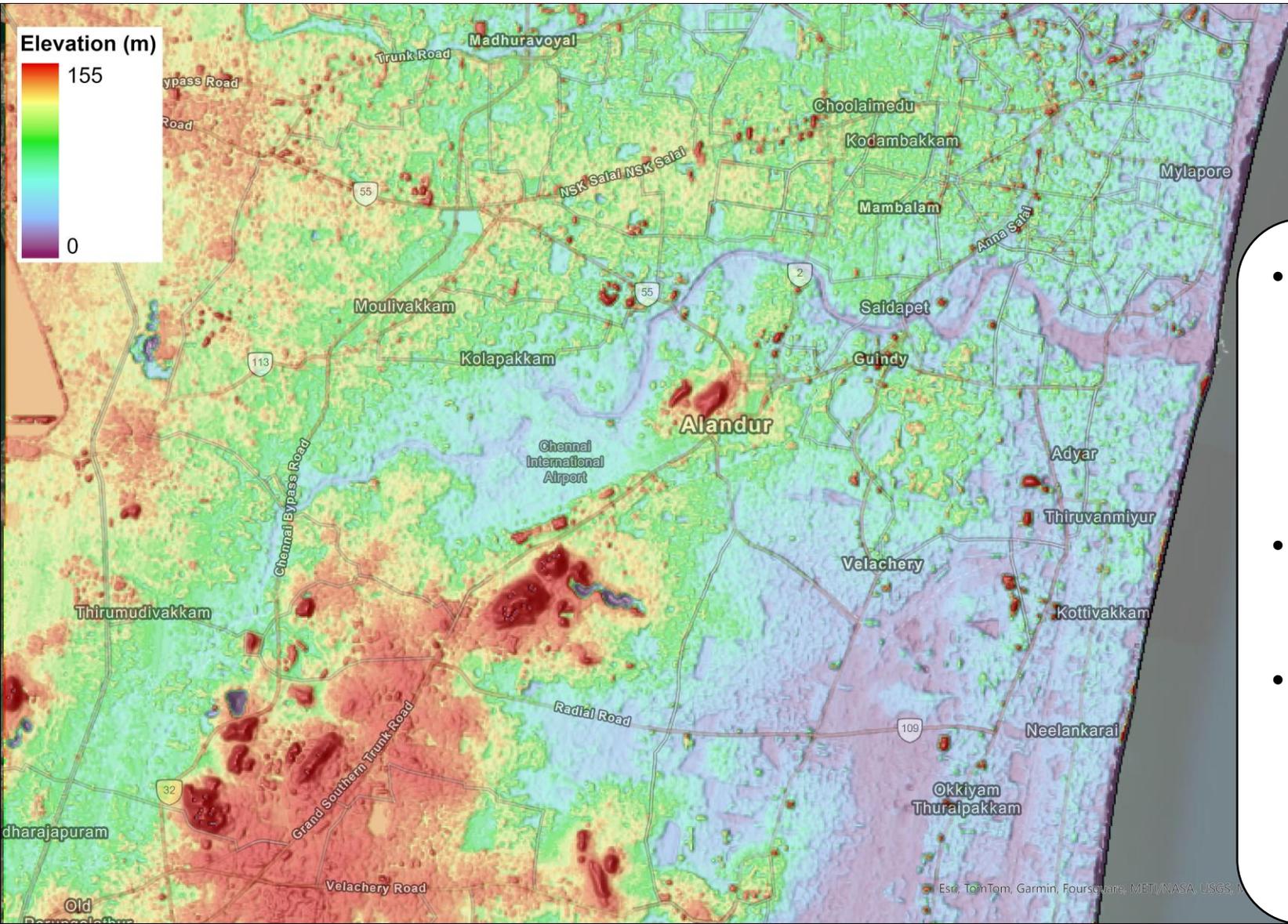
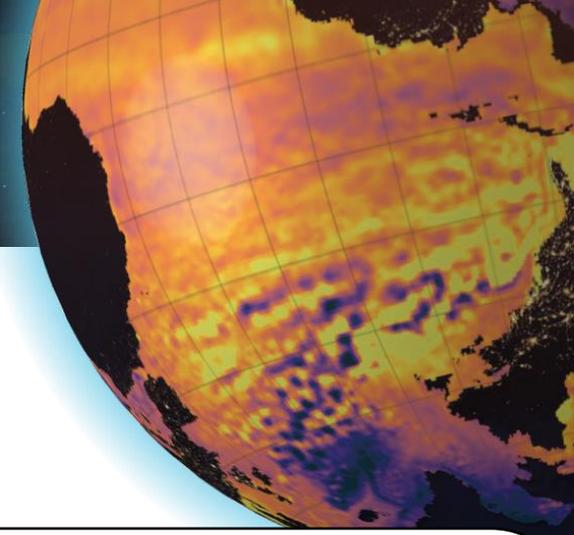
- **SimClim AR6** is a stand-alone modelling system that can be customised to examine risks from, and adaptations to current climate variables and future climate change.
- SLR Site specific scenario generator for SSP2-4.5 & 5-8.5.



Observations...

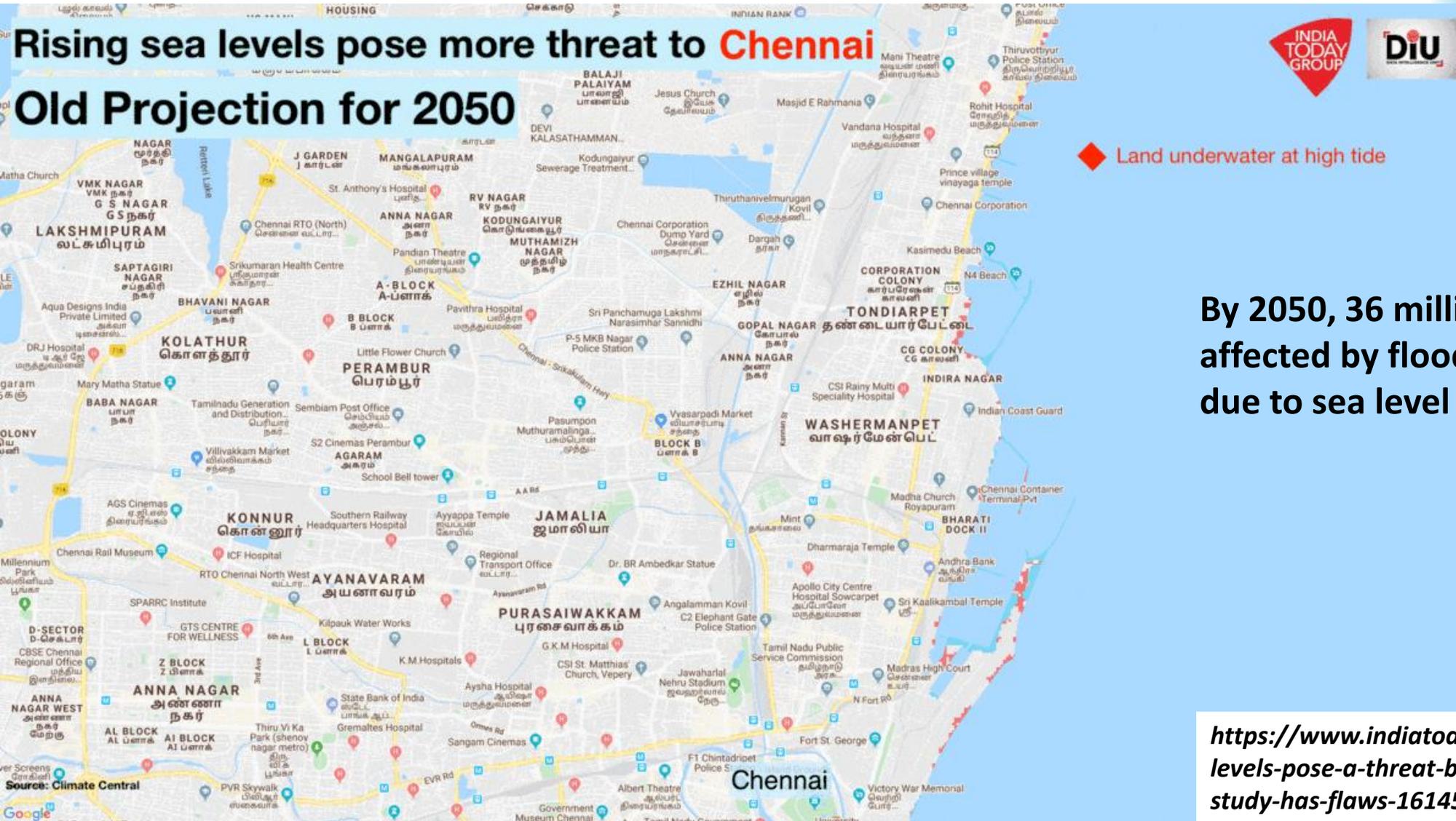
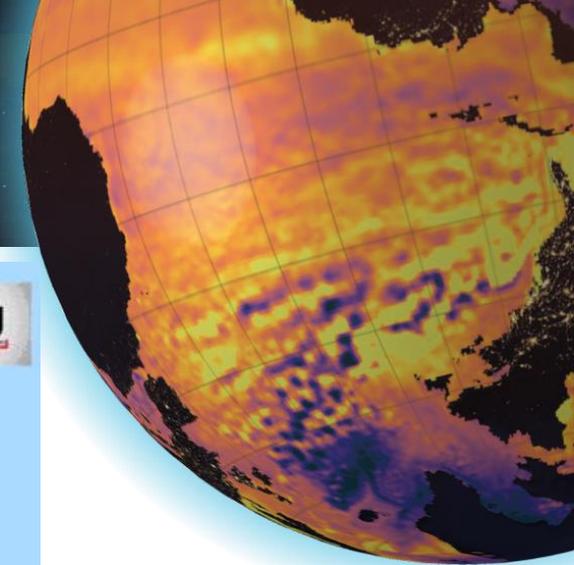
- **NOAA tides & currents** - it indicates a relative sea level rise trend of **0.55 mm per year** with a 95% confidence interval of ± 0.34 mm/yr based on PSMSL data obtained for Chennai tide gauge (1916-2015)
- Based on altimeter data, we found that sea level had risen by **0.07m up to 2018** along TN coast.
- Future projections estimate that mean sea level along the Tamil Nadu coast will rise by **0.15 m by 2050** and by **0.3m by 2100**.





Chennai

- Situated on a flat coastal plain known as the Eastern Coastal Plains. Its average elevation is approximately 6.7 meters (22 feet) above sea level.
- Rapid population and urbanization growth.
- This low elevation, combined with its proximity to the coast, makes Chennai particularly vulnerable to sea level rise and flooding



Rising sea levels pose more threat to **Chennai**

Old Projection for 2050



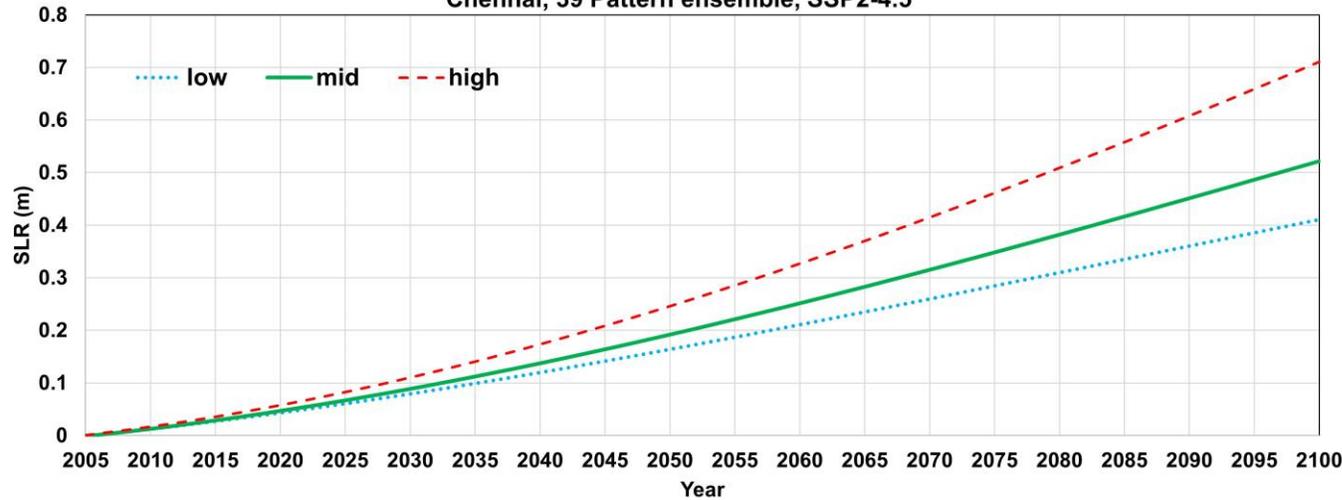
◆ Land underwater at high tide

By 2050, 36 million Indians may be at affected by flooding and inundation due to sea level rise.

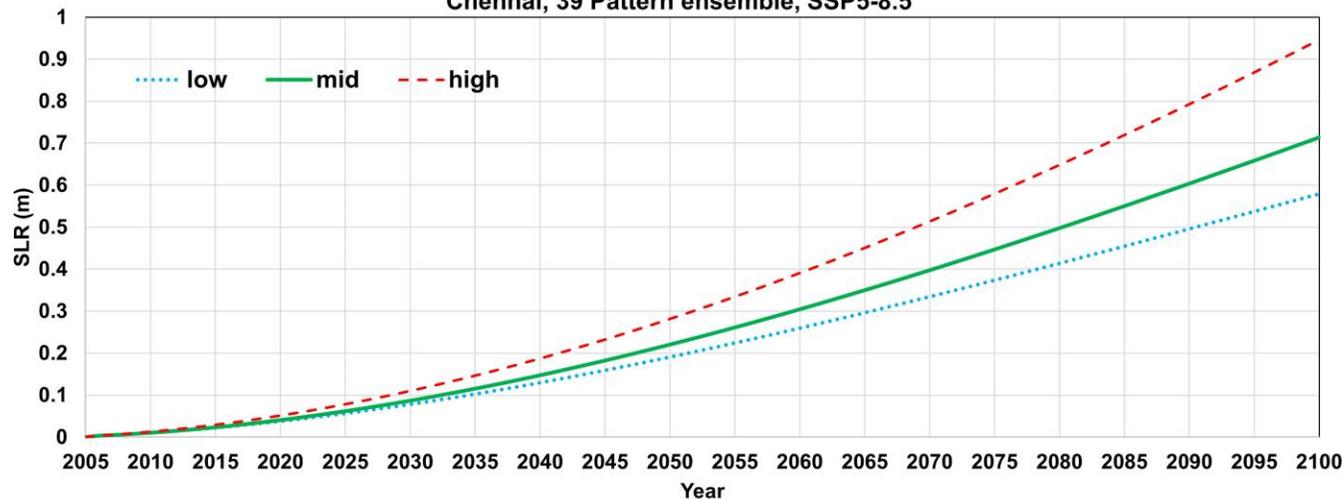
<https://www.indiatoday.in/diu/story/rising-sea-levels-pose-a-threat-but-indian-scientist-says-the-study-has-flaws-1614544-2019-10-31>

Future Sea level rise for Chennai

Chennai, 39 Pattern ensemble, SSP2-4.5



Chennai, 39 Pattern ensemble, SSP5-8.5

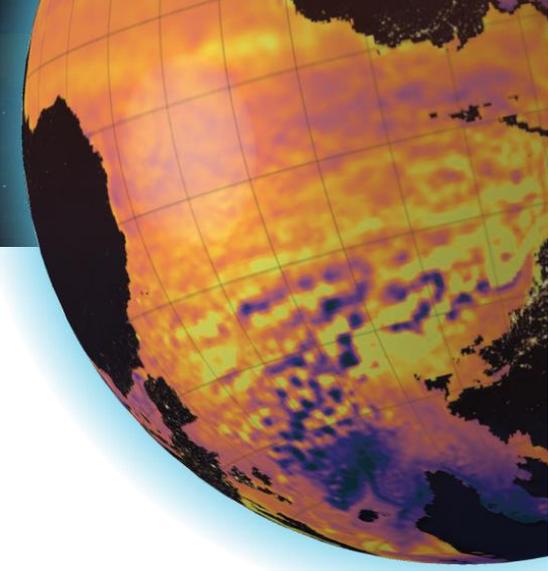


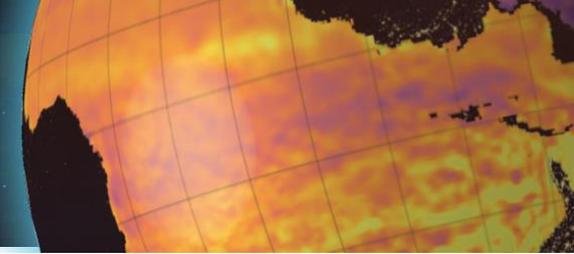
Year	2050			2100		
Scenario	low	mid	high	low	mid	high
SSP2-4.5	0.16	0.19	0.24	0.19	0.22	0.28
SSP5-8.5	0.41	0.52	0.71	0.57	0.71	0.94

in meters

- Sea level rise projections were derived using SimCLIM AR6 data, incorporating a vertical land movement rate of **2.250 mm/year** to account for local subsidence effects in Chennai. <https://slr-cities.climsystems.com/#13.10,80.33>
- **Under SSP2-4.5 scenario**, projected sea level rise for Chennai ranges from 0.16 m to 0.24 m by 2050, and from 0.19 m to 0.28 m by 2100, showing moderate increases.
- While, **Under SSP5-8.5 scenario**, sea level rise could reach up to 0.71 m by 2050 and 0.94 m by 2100, highlighting the risks associated with high-emission pathways.

What should be the next step.....





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Select IPCC Pathways and Climate Parameters

Select IPCC Scenario

SSP245

Choose a climate parameter

Annual Maximum Temperature ...

Select statistic type

- mean
- max
- min

[Learn more about the dataset](#)

Climate Projections for Indian Districts (2021-2040)

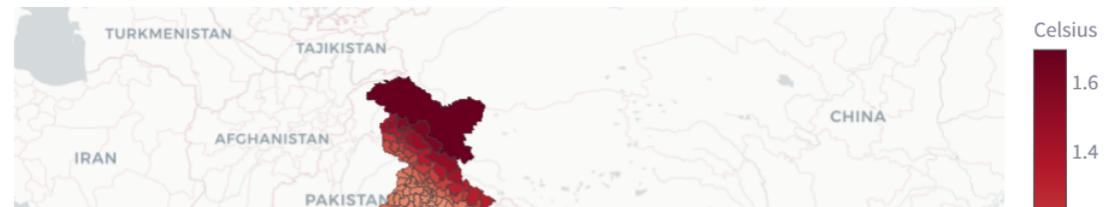
w.r.t. 1960s as baseline

Explore the Climate Parameters across Indian Districts and States

National Level Scenario

Download Map as PNG

Average Annual Maximum Temperature Change



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Nature is neither created by nor dependent on human beings, so it can survive even without the existence of human beings. Nature has its own universe and governed by its own laws and also self-sustains itself by its own well-ordered process.

- K.S.



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Thank you!

