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A NATIONAL LEVEL COLLABORATIVE INDIAN MAPPING EVENTS IITB-ISRO-AICTE MAPATHON

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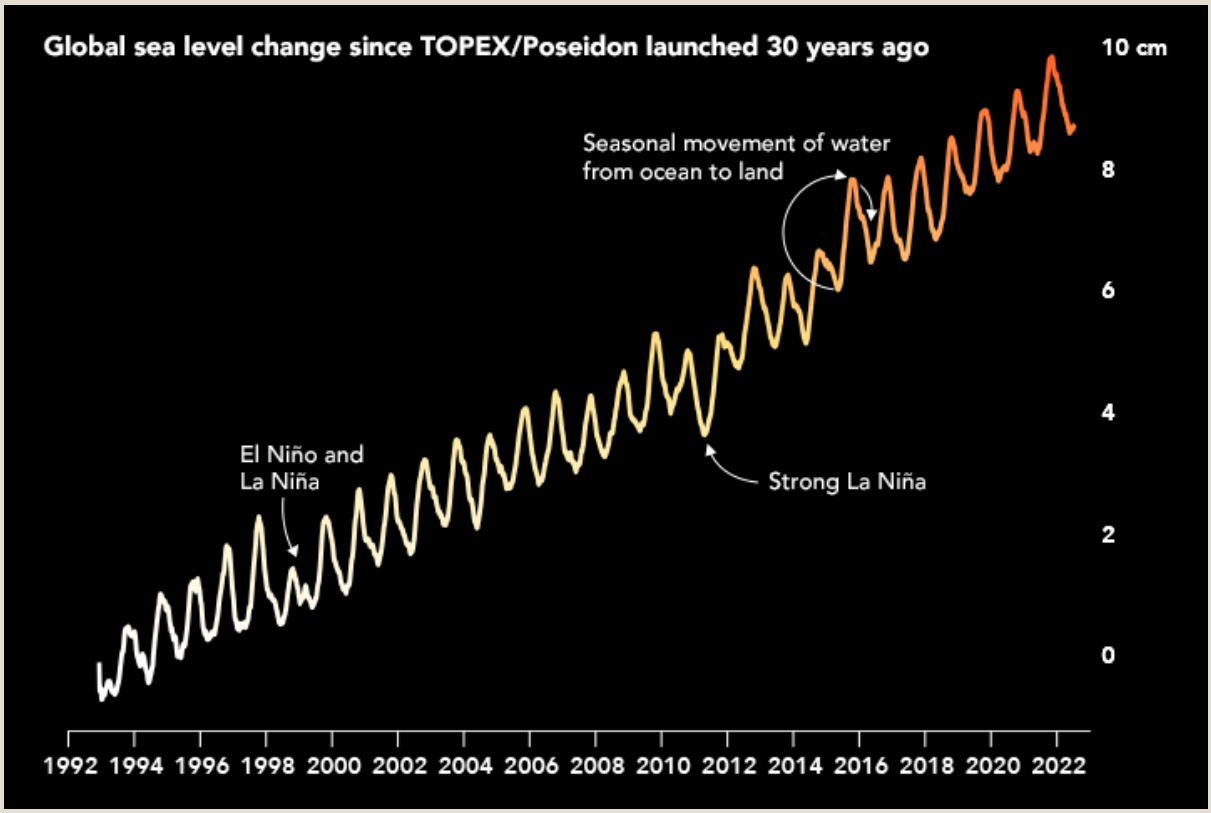
ABSTRACT

Thirty years ago, scientists and engineers launched a new satellite to study the rising and falling of seas over time, a task that once could only be done from the coast. TOPEX/Poseidon rocketed into space on August 10, 1992, and started a 30-year record of ocean surface height around the world. The observations have confirmed on a global scale what scientists previously saw from the shoreline: the seas are rising, and the pace is quickening. Scientists have found that global mean sea level—shown in the line plot above and below—has risen 10.1 centimetres (3.98 inches) since 1992. Over the past 140 years, satellites and tide gauges together show that global sea level has risen 21 to 24 centimetres (8 to 9 inches). Starting with TOPEX/Poseidon, NASA and partner space agencies have flown a continuous series of satellites that use radar altimeters to monitor ocean surface topography—essentially, the vertical shape and height of the ocean. Radar altimeters continually send out pulses of radio waves (microwaves) that reflect off the ocean surface back toward the satellite. The instruments calculate the time it takes for the signal to return, while also tracking the precise location of the satellite in space. From this, scientists derive the height of the sea surface directly underneath the satellite.

INTRODUCTION

Since 1992, five missions with similar altimeters have repeated the same orbit every 10 days: TOPEX/Poseidon (1992 to 2006), Jason-1 (2001 to 2013), the Ocean Surface Topography Mission/Jason-2 (2008 to 2019), Jason-3 (2016 to present), and Sentinel-6 Michael Freilich (2020 to present). The missions were built through various partnerships between NASA, France's Centre National d'Etudes Spatiales (CNES), the European Organisation for the Exploitation of Meteorological Satellites (EUMETSAT), the European Space Agency (ESA), and the U.S. National Oceanic and Atmospheric Administration (NOAA). Together, the mission teams have assembled a unified, standardized ocean topography record that is equivalent to the work of a half-million tide gauges. The scientists accumulated and corroborated a data record that is now long enough and sensitive enough to detect global and regional sea level changes beyond the seasonal, yearly, and decadal cycles that naturally occur. With 30 years of data, we can finally see what a huge impact we have on the Earth's climate," said Josh Willis, an oceanographer at the Jet Propulsion Laboratory and NASA's project scientist for Sentinel-6 Michael Freilich. "The rise of sea level caused by human interference with the climate now dwarfs the natural cycles. And it is happening faster and faster every decade.



SEA LEVEL RISE GRAPH

The graph above shows global trends in sea level as observed from 1993 to 2022 by TOPEX/Poseidon, the three Jason missions, and Sentinel-6 Michael Freilich. Note the spatial variations in the rate of sea level rise, with some parts of the ocean rising faster (depicted in red and deep orange) than the global rate. Many of the anomalies reflect long-term shifts in

ocean currents and heat distribution. The altimetry data also show that the rate of sea level rise is accelerating. Over the course of the 20th century, global mean sea level rose at about 1.5 millimetres per year. By the early 1990s, it was about 2.5 mm per year. Over the past decade, the rate has increased to 3.9 mm (0.15 inches) per year. In the line plot, the highs and lows each year are caused by the exchange of water between the land and sea. “Winter rain and snowfall in the northern hemisphere shifts water from ocean to land, and it takes some time for this to runoff back into the oceans,” Willis noted. “This effect usually causes about 1 centimetre of rise and fall each year, with a bit more or less during El Niño and La Niña years. It’s literally like the heartbeat of the planet.”

While a few millimetres of sea level rise per year may seem small, scientists estimate that every 2.5 centimetres (1 inch) of sea level rise translates into 2.5 meters (8.5 feet) of beachfront lost along the average coast. It also means that high tides and storm surges can rise even higher, bringing more coastal flooding, even on sunny days. In a report issued in February 2022, U.S. scientists concluded that by 2050 sea level along U.S. coastlines could rise between 25 to 30 centimetres (10 to 12 inches) above today’s levels. “What stands out from the satellite altimetry record is that the rise over 30 years is about ten times bigger than the natural exchange of water between ocean and land in a year,” Willis said. “In other words, the human-caused rise in global sea level is now ten times bigger than the natural cycles.”

GLOBAL WARMING

Global warming is the long-term heating of Earth’s surface observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth’s atmosphere. This term is not interchangeable with the term "climate change."

Since the pre-industrial period, human activities are estimated to have increased Earth’s global average temperature by about 1 degree Celsius (1.8 degrees Fahrenheit), a number that is currently increasing by more than 0.2 degrees Celsius (0.36 degrees Fahrenheit) per decade. The current warming trend is unequivocally the result of human activity since the 1950s and is proceeding at an unprecedented rate over millennia.

Now climate scientists have concluded that we must limit global warming to 1.5 degrees Celsius by 2040 if we are to avoid a future in which everyday life around the world is marked by its worst, most devastating effects: the extreme droughts, wildfires, floods, tropical storms, and other disasters that we refer to collectively as climate change. These effects are felt by all people in one way or another but are experienced most acutely by the underprivileged, the economically marginalized, and people of colour, for whom climate change is often a key driver of poverty, displacement, hunger, and social unrest.

CAUSES

Global warming occurs when carbon dioxide (CO2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth’s surface. Normally this radiation would escape into space, but these pollutants, which can last for years to centuries in the atmosphere, trap the heat and cause the planet to get hotter. These heat-trapping pollutants—specifically carbon dioxide, methane, nitrous oxide, water vapor, and synthetic fluorinated gases—are known as greenhouse gases, and their impact is called the greenhouse effect.

Though natural cycles and fluctuations have caused the earth's climate to change several times over the last 800,000 years, our current era of global warming is directly attributable to human activity—specifically to our burning of fossil fuels such as coal, oil, gasoline, and natural gas, which results in the greenhouse effect. In the United States, the largest source of greenhouse gases is transportation (29 percent), followed closely by electricity production (28 percent) and industrial activity (22 percent). Learn about the natural and human causes of climate change.

Curbing dangerous climate change requires very deep cuts in emissions, as well as the use of alternatives to fossil fuels worldwide. The good news is that countries around the globe have formally committed—as part of the 2015 Paris Climate Agreement—to lower their emissions by setting new standards and crafting new policies to meet or even exceed those standards. The not-so-good news is that we're not working fast enough. To avoid the worst impacts of climate change, scientists tell us that we need to reduce global carbon emissions by as much as 40 percent by 2030. For that to happen, the global community must take immediate, concrete steps: to decarbonize electricity generation by equitably transitioning from fossil fuel–based production to renewable energy sources like wind and solar; to electrify our cars and trucks; and to maximize energy efficiency in our buildings, appliances, and industries.

Each year scientists learn more about the consequences of global warming, and each year we also gain new evidence of its devastating impact on people and the planet. As the heat waves, droughts, and floods associated with climate change become more frequent and more intense, communities suffer and death tolls rise. If we're unable to reduce our emissions, scientists believe that climate change could lead to the deaths of more than 250,000 people around the globe every year and force 100 million people into poverty by 2030

EFFECTS

RISE IN TEMPERATURE

Global warming has led to an incredible increase in earth's temperature. Since 1880, the earth's temperature has increased by ~1 degrees. This has resulted in an increase in the melting of glaciers, which have led to an increase in the sea level. This could have devastating effects on coastal regions.

THREATS TO ECOSYSTEM

Global warming has affected the coral reefs that can lead to the loss of plant and animal lives. Increase in global temperatures has made the fragility of coral reefs even worse.

CLIMATE CHANGE

Global warming has led to a change in climatic conditions. There are droughts at some places and floods at some. This climatic imbalance is the result of global warming.

SPREAD OF DISEASES

Global warming leads to a change in the patterns of heat and humidity. This has led to the movement of mosquitoes that carry and spread diseases.

LOSS OF NATURAL HABITAT

A global shift in the climate leads to the loss of habitats of several plants and animals. In this case, the animals need to migrate from their natural habitat and many of them even become extinct. This is yet another major impact of global warming on biodiversity.

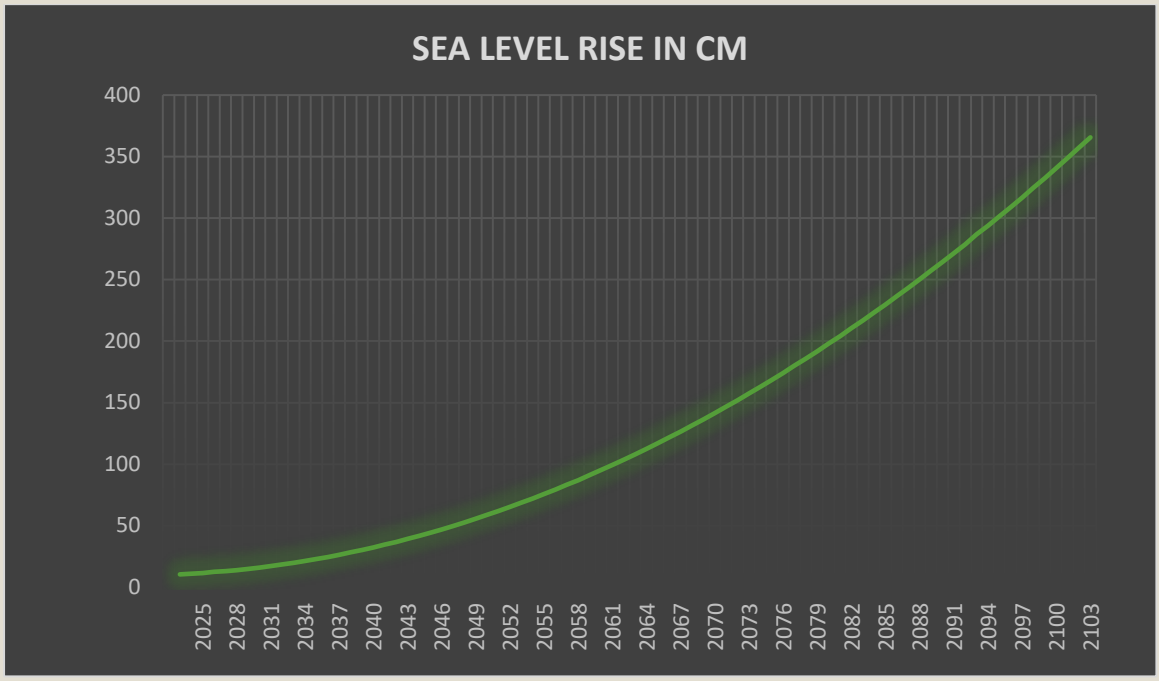
WHAT WE HAD DONE IN THIS PROJECT

The above-mentioned contents are research made by the NASA in last three decades with these data we did a calculation that shows rise of the sea level in every year afte2022.The data we calculated are mentioned below in table.

YEAR	SEA LEVEL RISE IN CM
2023	10.39
2024	10.88
2025	11.47
2026	12.47
2027	12.95
2028	13.84
2029	14.83
2030	15.92
2031	17.11
2032	18.40
2033	19.79
2034	21.28
2035	22.87
2036	24.56
2037	26.35
2038	28.24
2039	30.23
2040	32.32
2041	34.51
2042	36.80
2043	39.19
2044	41.68
2045	44.27
2046	46.96
2047	49.75
2048	52.64
2049	55.63
2050	58.72
2051	61.91
2052	65.2
2053	68.59
2054	72.08
2055	75.67
2056	79.36

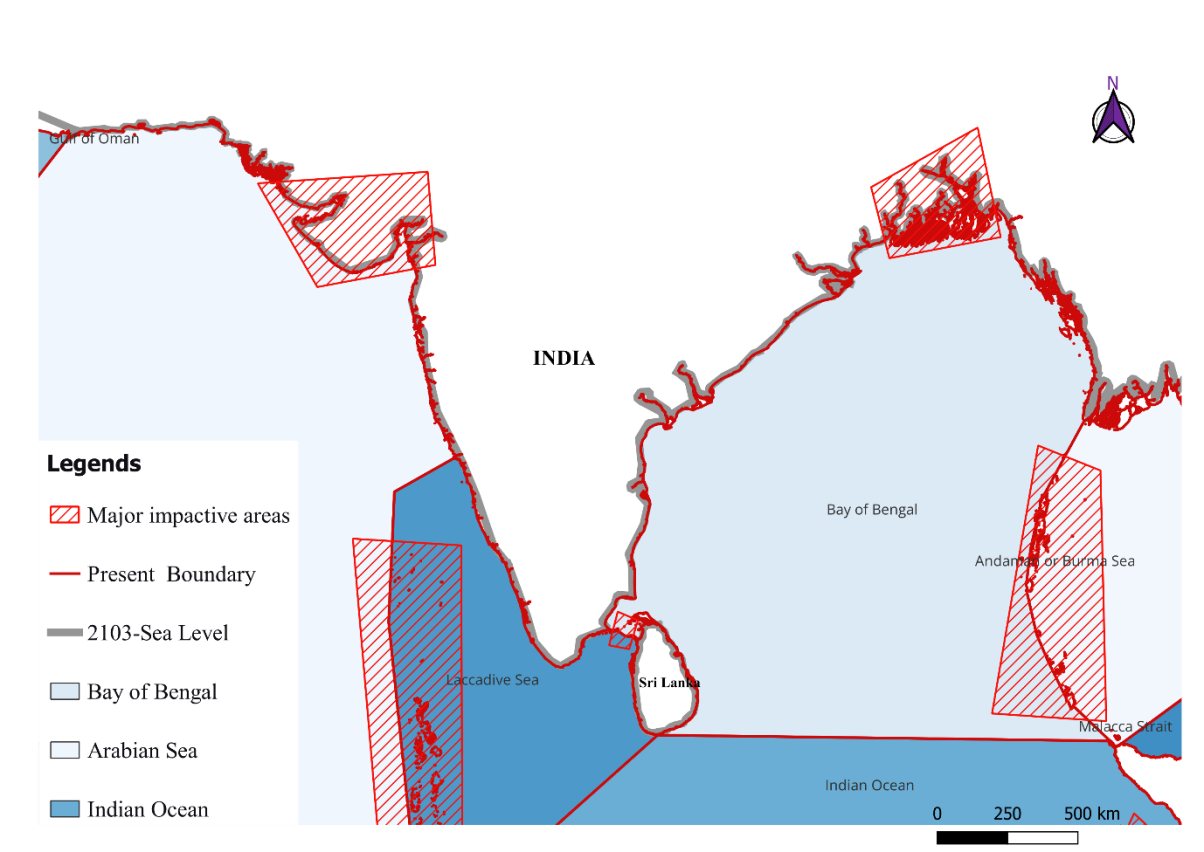
2057	83.15
2058	87.04
2059	91.03
2060	95.12
2061	99.31
2062	103.60
2063	107.99
2064	112.48
2065	117.07
2066	121.76
2067	126.55
2068	131.44
2069	136.43
2070	141.52
2071	146.71
2072	152.00
2073	157.39
2074	162.88
2075	168.47
2076	174.16
2077	179.95
2078	185.84
2079	191.83
2080	197.92
2081	204.11
2082	210.40
2083	216.79
2084	223.28
2085	229.87
2086	236.56
2087	243.35
2088	250.24
2089	257.23
2090	264.32
2091	271.51
2092	278.80
2093	286.80
2094	293.68
2095	301.27
2096	308.96
2097	316.75
2098	324.64
2099	332.63
2100	340.72
2101	348.91
2102	357.20
2103	365.59

LINE GRAPH



SEA LEVEL RISE MAP

Using the above data, the map was made, this indicates the Sea level rise in India and its surrounding countries.



CALCULATION

DATA

Scientists estimate that every 2.5 centimetres (1 inch) of sea level rise translates into 2.5 meters (8.5 feet) of beachfront lost along the average coast.

The sea level in the year 2103 = 365.91

=365 ÷ 2.5

=142 (Times the sea level increased 8.5 feet every time)

Beachfront lost along the average coast since 1992 = 142 x 8.5

=1207feet

Feet to kilometre conversion

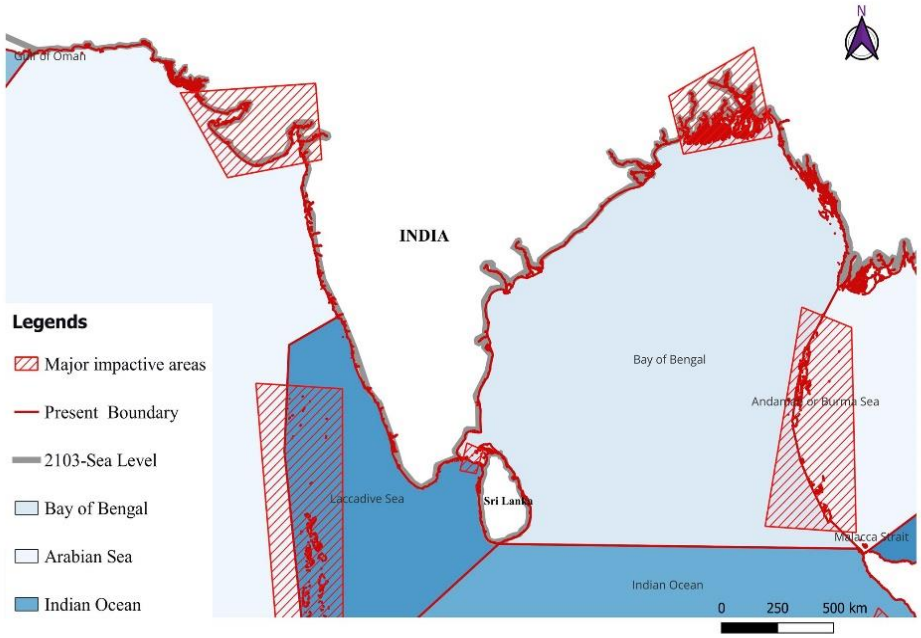
1207 feet = 0.3678936 kilometre

We will lose about 0.3678936 kilometre of costal beachfront in the year of 2103.If the global warming is continued at this rate.

CONCLUSION

Global warming is not something to take lightly. The oceans are warming, the polar ice caps are melting, and greenhouse gas levels are at an all-time high. These are just some of the things that the claims-makers for the global warming cause have said. The science has proven them right. So, the ultimate claim is that humans are a large factor in the increased rate of global warming. There are claims-makers of all kinds fighting about whether that is true or not. The solutions proposed deal with a cleaner world, while the deniers will opt to do nothing. This issue has turned political, and it seems like nothing gets done until someone who believes in global warming is in charge. Right now, that is not the case. This issue will continue to get worse until there is no turning back. Hopefully, society can come to a consensus to try and inhibit global warming. This is the only way to keep the place we live healthy.

Title: Sea level rise detection in India and its surrounding countries



Map description and analysis

ABSTRACT:
This map shows sea level rise in India and its surrounding countries due global warming and climate change .It also shows the areas where it affects the most

INTRODUCTION:
Over the course of the 20th century, global mean sea level rose at about 1.5 millimetres per year. By the early 1990s, it was about 2.5 mm per year. Over the past decade, the rate has increased to 3.9 mm (0.15 inches) per year. In the line plot, the highs and lows each year are caused by the exchange of water between the land and sea.

Global warming and climate change:
Global warming is the long-term heating of Earth's surface observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, which increases heat-trapping greenhouse gas levels in Earth's atmosphere. This term is not interchangeable with the term "climate change."

CAUSES:
Global warming occurs when carbon dioxide (CO_2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the earth's surface.

NOTE:
The above-mentioned contents are research made by the NASA in last three decades .With these data we did a calculation that shows rise of the sea level from the year of 2022 to 2103.All the calculation we are done based on the research done by NASA . Other details and calculations are mentioned in the documentation.

DECODERS

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This is the final map with its description.