



SEAS CONTINUE THEIR RISE

Although the search for solutions continues, ocean surface levels keep accelerating to new heights.

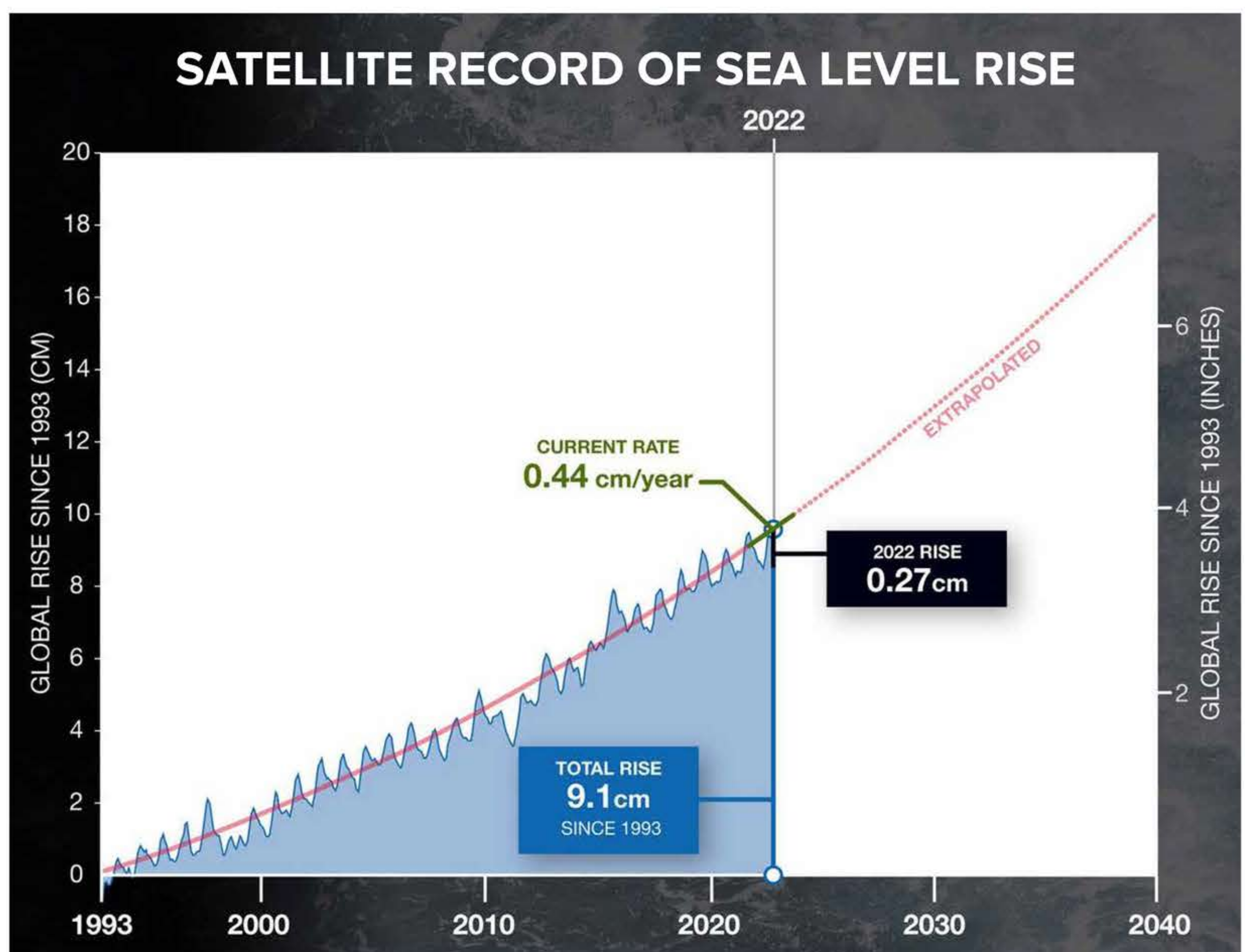
BY LOUISE POIRIER

Over the last 30 years, satellites have been tracking the surface height of the world's oceans, thanks to the U.S.-French TOPEX/Poseidon mission that ran from 1992 to 2006 to monitor ocean altimetry data.

Using this information, NASA scientists have found that the average global sea level rose by 0.11 inches (0.27 cm) from 2021 to 2022, compared to an increase in average global sea level by 3.6 inches (9.1 cm) in the 40 years since researchers first began tracking the data in 1993.

But that's not all. NASA scientists have marked a jump in the estimated annual sea level rise rate. Back in 1993 it was just 0.08 inches (0.20 cm) per year, but in 2022, that more than quintupled to 0.17 inches (0.44 cm) per year. According to long-term satellite measurements, NASA's Sea Level Change science team expects the rate of sea level rise to reach 0.26 inches (0.66 cm) per year by 2050.

The costs will be staggering if these trends continue. The Organization for Economic Cooperation and Development (OECD) noted in its most recent sea level rise report published in 2019 that under a high-end sea-level rise scenario, residual damage costs in this century alone could be anywhere from \$1.7 trillion and \$5.5 trillion.



Rising sea levels from data recorded by a series of five satellites from 1993 to present is shown in blue, while the solid red line shows the trajectory of rise from 1993 to 2022.

Credit: NASA/JPL-Caltech

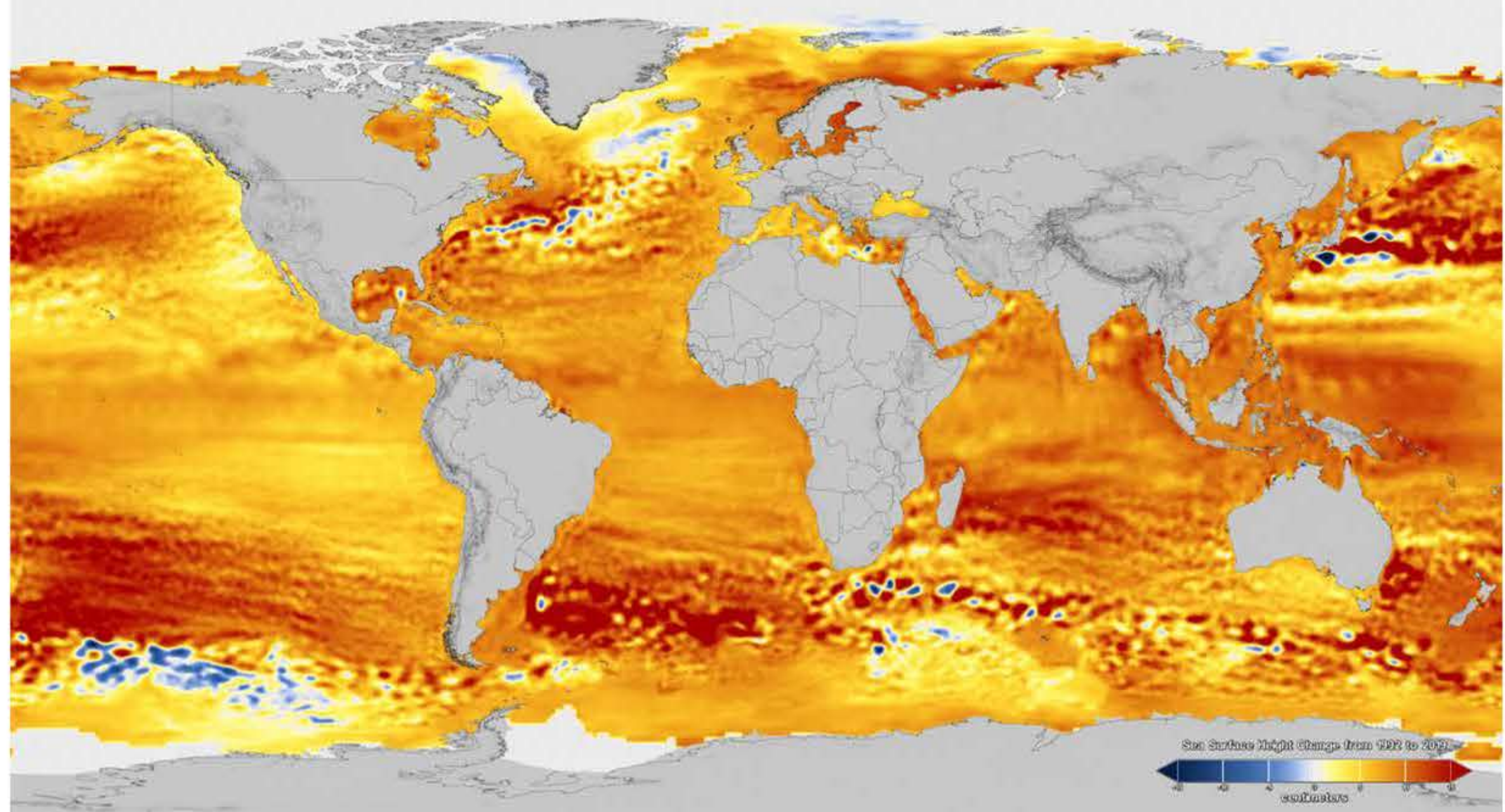
ESTIMATED GLOBAL MEAN SEA LEVEL RISE

Total Sea Level				
PERIOD	ESTIMATE (MM/YR)	UNCERTAINTY (+/- MM/YR)	REFERENCE	MEASUREMENT / FORECAST MODEL
1993 - 2020	3.34	0.40	Beckley et al. (2017)	Satellite Altimetry
1993 - 2018	3.35	0.47	Frederikse et al. (2020)	Tide Gauges
1900 - 2018	1.56	0.30	Frederikse et al. (2020)	Tide Gauges
Steric* Sea Level				
PERIOD	ESTIMATE (MM/YR)	UNCERTAINTY (+/- MM/YR)	REFERENCE	MEASUREMENT / FORECAST MODEL
2005 - 2019	1.10	0.20	Watkins et al. (2015)	GRACE/GRACE-FO
1900 - 2018	0.52	0.30	Frederikse et al. (2020)	Synthesis of Satellite and In Situ Observations

* When water warms, its volume expands, known as thermosteric changes. Sea levels are also affected by changes in salinity due to melting glaciers, called halosteric changes. Collectively, these are referred to as steric sea level rise.

Source: NASA.gov

SEA SURFACE HEIGHT OF THE WORLD'S OCEANS



Since 1993, satellite altimeters have measured the sea surface height of the world's oceans. This image shows the change in sea surface height across the globe from 1993 to 2019.

Credit: NASA