

PACIFIC ISLANDS CLIMATE OUTLOOK FORUM - 13

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Session 3: Looking Back Long-Term: Status of key variables



Sea Level



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Global Mean Sea Level (GMSL) Observed

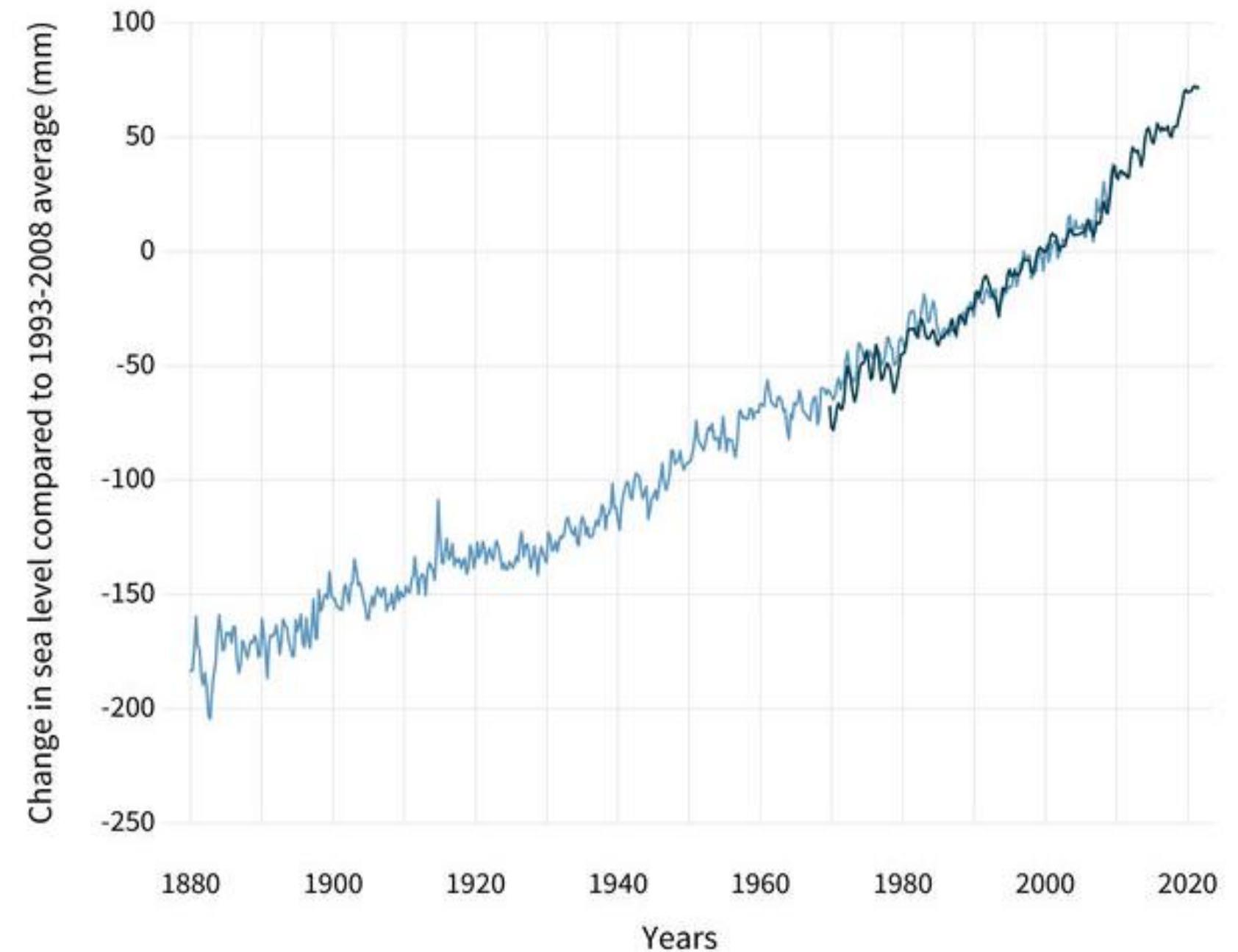
Global Mean Sea Level has risen 9.1 cm (3.6 inches) since 1993.

GMSL has risen about 21-24 cm (8-9 inches) since 1880.

This rise in GMSL is attributable to an increase in the volume of water in the ocean is primarily due to:

- Heating of the ocean, which causes the water to expand; and
- Melting of glaciers and ice sheets, which transfers water mass from the land to the ocean.

The average rate of GMSL rise, since 1993 is 3.3 mm (0.13 in) per year, and it is accelerating.



Seasonal (3-month) sea level estimates from tide gauges (light blue) and satellites (dark blue).
Change in sea level in millimeters compared to the 1993-2008 average. NOAA Climate.gov image based on analysis and data from Philip Thompson, University of Hawaii Sea Level Center. from 1993-2020.

Source PICC Monitor:2021

Regional/Local Mean Sea Level Observed

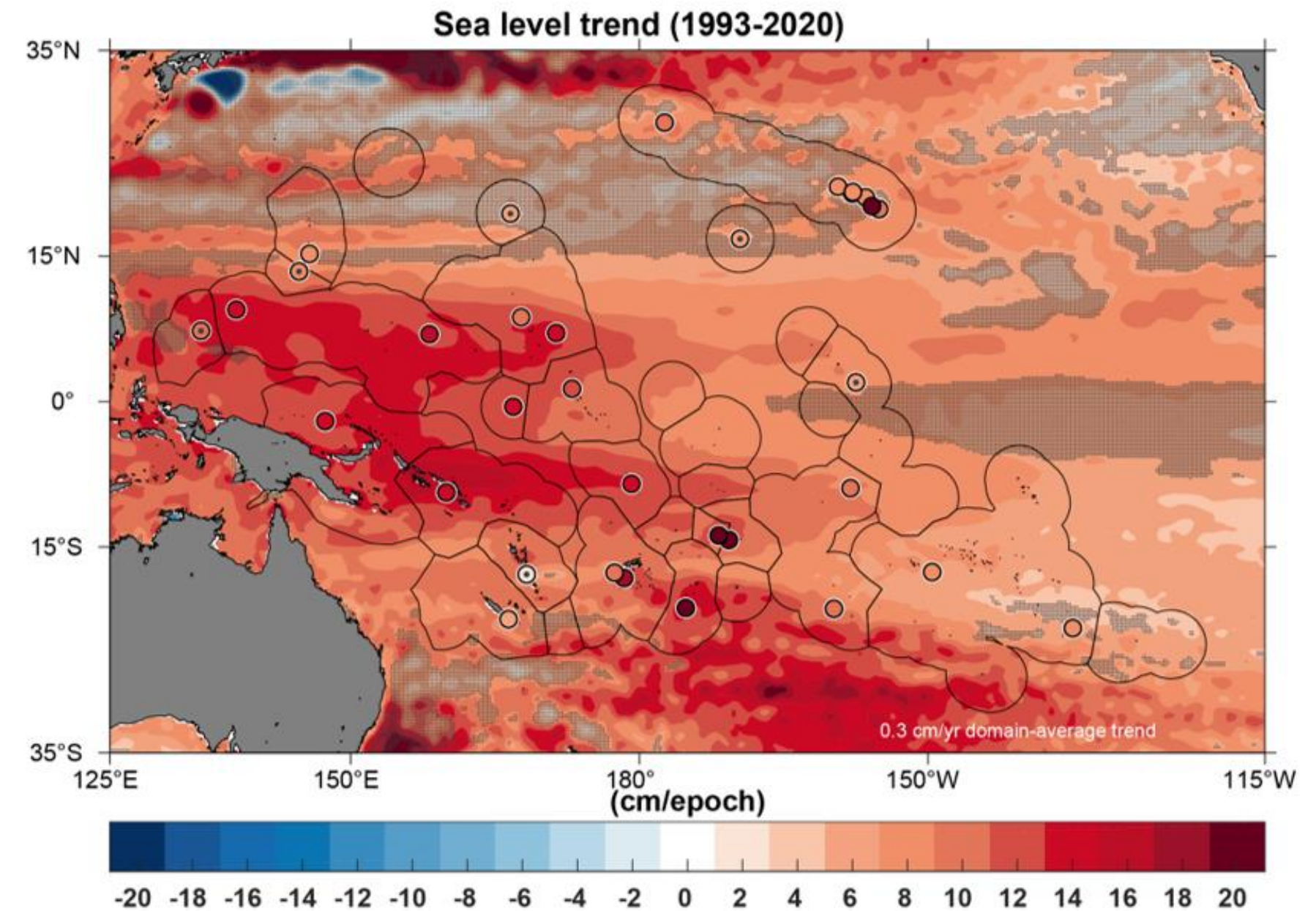
Sea level has risen across the Pacific Islands region.

10—15 cm in the western tropical Pacific and 5—10 cm in the central tropical Pacific since 1993.

Local rates of change obtained from tide gauges are in agreement with those derived from satellites. However there are exceptions (e.g., 31 ± 7 cm at tide gauge in Pago Pago, American Samoa).

Natural patterns of variability play an important role in regional and local variation in sea level – they can reach 30 cm above or below normal.

Other factors affecting local sea levels include vertical land motion.



Regional Sea Level Trends from Satellite Altimetry and Tide Gauges.

Sea level trends from satellite altimetry (colored contours) and from tide gauges (circles) from 1993-2020.

Source PICC Monitor:2021

Increasing Minor Flood Frequency

Rising Mean Sea Levels have resulted in Increases in the Frequency of Minor Flooding

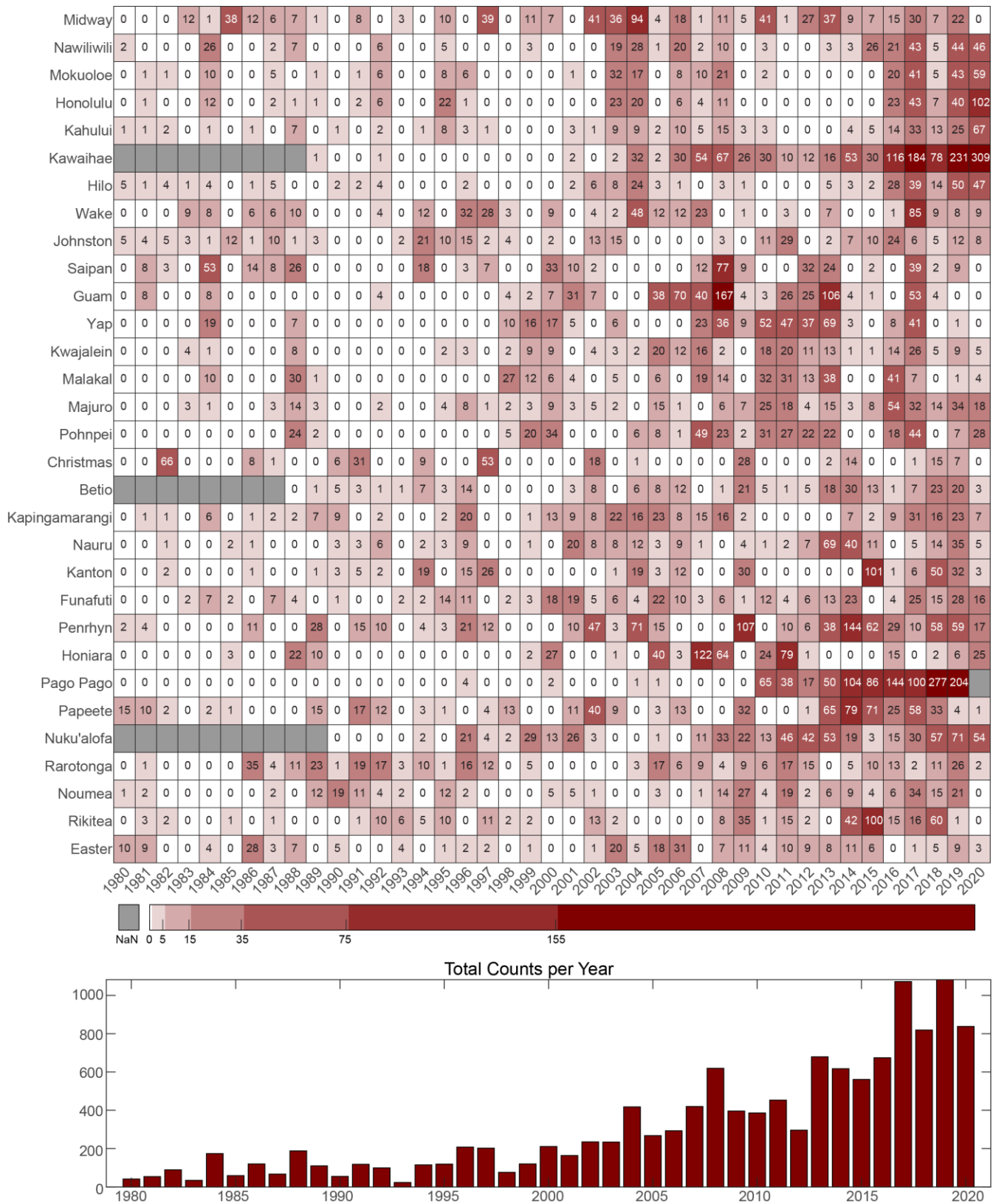
In some cases, the increase since 1980 is dramatic:

Guam from 2 to 22 times/year;

Majuro from 2 to 20 times/year; and

Pago Pago from 0 to 102 times/year.

Minor flood frequency from selected tide gauges in the tropical Pacific. The top plot shows the total number of minor flood days per year for 1980–2020. Stations are organized by latitude (north at the top). At the bottom of the figure is a plot showing annual total of minor flood counts for all stations combined.



A minor flood day is defined as a day in which the sea level at a given tide gauge exceeds the elevation reached twice a year on average

Contact

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Thank You



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