

Ocean Temperature



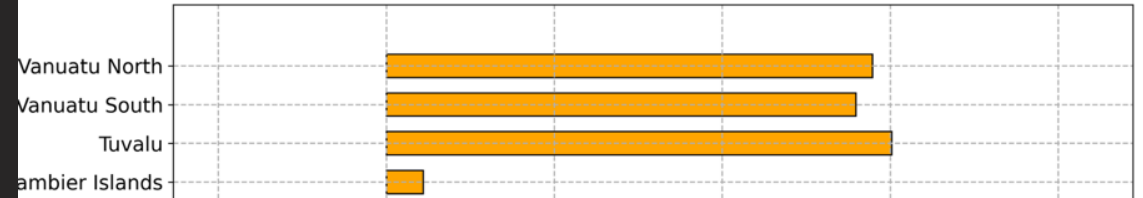
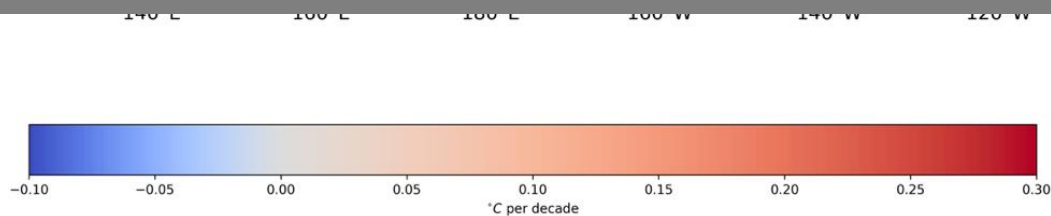
11th session of the Pacific Islands Climate Outlook Forum (PICO-11)

October 24, 2022

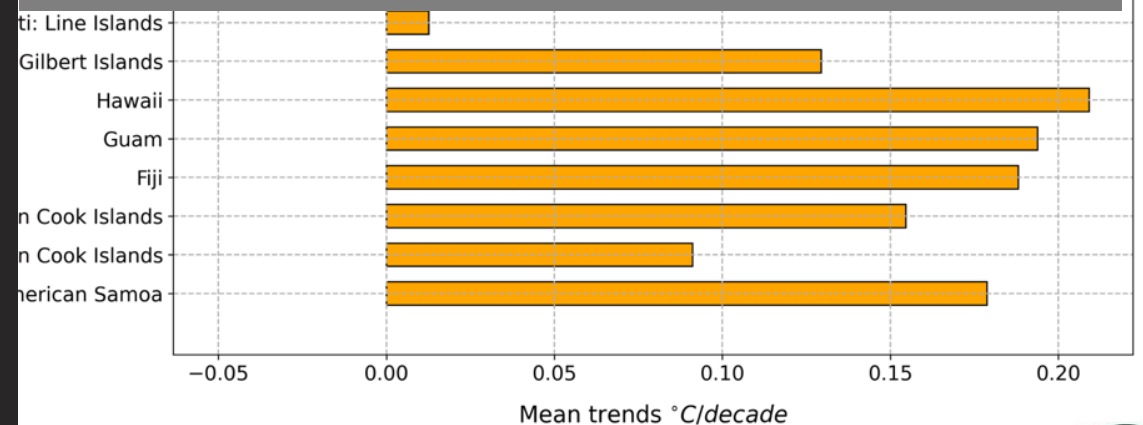
Session 4: Looking Back Long-Term: Status of Key Variables

Trends 1982-2020

- Regionally averaged SST trends follow the globally averaged trend. The absolute magnitude of the regional trends, however, are somewhat higher than the globally averaged trend—on the order of 1.20°C (2.16°F) above the global average over the past 100 years in all regions.
- Within a region changes in SST vary in space as well as time. Over the last 5 years most of the tropical Pacific and in particular areas along the equator have seen temperatures warmer than average over the last 30 years.

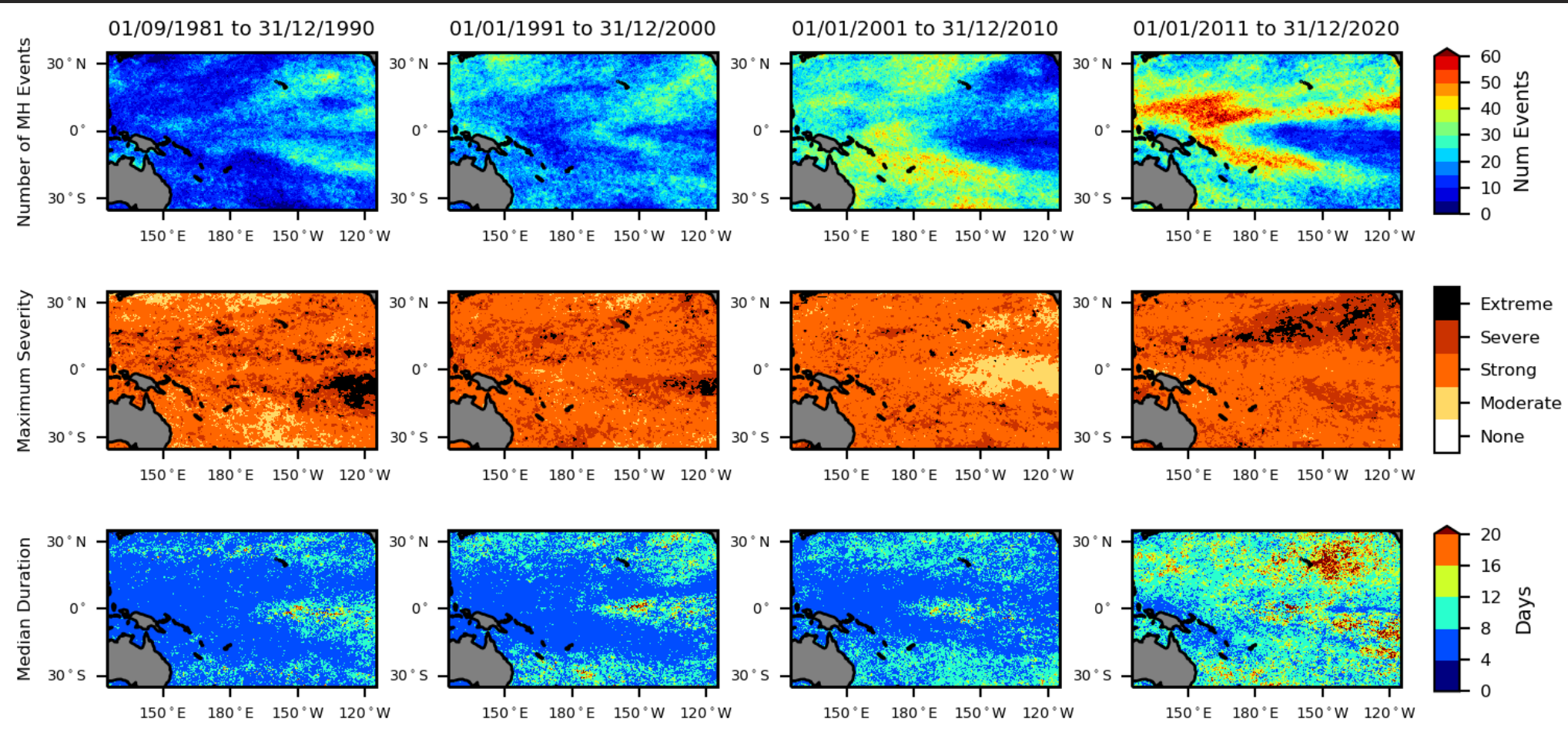


- Globally averaged sea surface temperature (SST) increased by about 1.0°C (1.8°F) over the past 100 years. Half of this rise has occurred since the early 1990s.
- In 2016, aided by the second strongest El Niño on record (1997–98 being the strongest), the annually averaged temperature for ocean surfaces around the world reached a record of 0.75°C (1.35°F) higher than the 20th century average, and the warmest in the 137-year-long record.



Marine Heat Waves

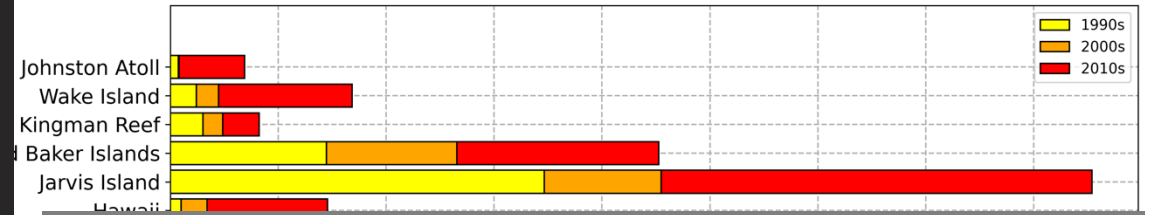
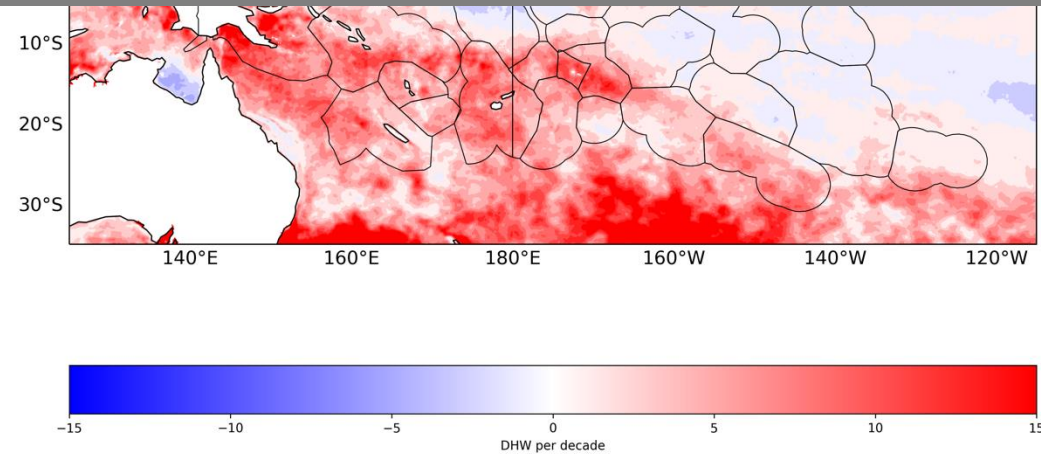
Marine heatwave summaries from satellite SST (1982-2020) showing number of events, maximum severity, and average duration in each decade since 1981



Degree Heating Weeks

CRW DHW Trend (1986-2020)

Extended periods of coral bleaching heat stress were not usually observed in the tropical Pacific until 1998, and then only over an area limited mostly to Micronesia. In some locations, such as the Marshall Islands and the Main Hawaiian Islands, extended periods of bleaching heat stress did not first occur until 2014 and 2015, respectively, as part of the 2014–17 global scale bleaching event that is the longest ever recorded.



Analysis of the Degree Heating Week (DHW), a measure of accumulated coral bleaching heat stress that can be used to quantify the impacts of changing ocean temperature on coral, indicates that anomalous warming harmful to coral is covering a larger area, occurring more often, lasting longer, and reaching higher intensity. Over the past 25 years, the number of days per year with a DHW value reaching at least 1°C-week has increased dramatically at many Pacific reef regions; for instance, at the eastern Federated States of Micronesia the number has increased from a maximum of 14 during the first 10 years of the record to frequently more than 20 days during the last 10 years of the record, and for American Samoa and Samoa from 8 days to frequently more than 50 days.

