

# **A year in the hothouse: El Niño, global warming and 2023 climate extremes**

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## Abstract:

This year has witnessed extraordinary weather and climate anomalies around the globe, including episodes of historic drought and flood, the warmest month record, the warmest ocean temperatures on record, and widespread coral bleaching events. After nearly a decade of near-neutral or unusually cold conditions in the tropical Pacific, an El Niño is developing that rivals the strength of some of the largest events of the past 50 years. We will present evidence that suggests the amplitude of the El Niño Southern Oscillation (ENSO) cycle, the warm phase of which is El Niño and the cold phase La Niña, may be been amplified by underlying global warming trends over the past several decades. We will also show how climate change and the evolving El Niño have contributed synergistically to the spate of extremes that have occurred in the past year.

## Short curriculum vitae:



Michael McPhaden is a Senior Scientist at NOAA's Pacific Marine Environmental Laboratory in Seattle, Washington. His research focuses on large-scale tropical ocean dynamics, ocean-atmosphere interactions, and the ocean's role in climate. He received a Ph.D. in Physical Oceanography from the Scripps Institution of Oceanography in 1980. For the past 40 years he has been involved in developing ocean observing systems for climate research and forecasting, most notably the Tropical Atmosphere Ocean (TAO) moored buoy array in the Pacific for studies of El Niño and the Southern Oscillation. He has published over 300 articles in the refereed scientific literature and is one of the most highly cited authors on the topic of El Niño.

McPhaden is a Past President of the American Geophysical Union (AGU), an organization of over 60,000 Earth and space scientists from 140 countries. He is a Nansen Medallist of the European Geosciences Union, a Sverdrup Medallist of the American Meteorological Society (AMS) and a fellow of the Oceanography Society, the AMS and the AGU. For his contributions to assessments of the Intergovernmental Panel on Climate Change (IPCC), he shared the Nobel Peace Prize in 2007 with Al Gore and other IPCC participants.