Scientists first sounded the alarm a half-century ago about climate changes that could affect every aspect of life on Earth. Today Scripps Oceanography continues to be the world leader in climate change research. Our goal is to understand and protect the planet. We do so by observing the changes taking place in nature with the potential to adversely affect society and to communicate our observations to people who can make a difference.

Latest CO₂ reading
June 13, 2016
Carbon dioxide concentration at Mauna Loa Observatory

Latest CO₂ concentration: 407.62 ppm

XPRIZE TANK TRIALS OF TEAM DURAFET SENSORS

XPRIZE TANK TRIALS OF TEAM DURAFET SENSORS
Threshold Crossed

A critical record of humanity’s impact on the global environment is the rising curve of CO₂ concentration from the Mauna Loa Observatory, also known as the “Keeling Curve.” May 2013 marked a symbolic milestone when the Keeling Curve surpassed a concentration of 400 parts per million for the first time in human history. Now monthly averages routinely exceed 400 ppm. Thanks to steady, uninterrupted measurement, the Curve also reveals other nuances of climate change, including the recent discovery that the range of seasonal variation in CO₂ concentration is expanding for reasons that remain unclear.

Moral Authority Supports the Message of Science

Scripps Oceanography Distinguished Professor of Climate and Atmospheric Sciences Veerabhadran Ramanathan has built bridges between the worlds of science and religion. In June 2015, Pope Francis released a historic encyclical identifying environmental protection as a social justice issue and moral imperative. Ramanathan influenced the Pope’s message during an unprecedented joint workshop of the Pontifical Academy of Sciences and the Pontifical Academy of Social Sciences on this topic in May 2014. Previously, in 2012, Ramanathan engaged His Holiness the Dalai Lama on climate, eliciting a pledge from the spiritual leader to work on the issue for the rest of his life.

The Oceans Are Recognized at COP21

The final text of the landmark agreement forged among 195 countries at the COP21 climate talks in Paris made explicit mention of the need to protect the oceans for the first time in the history of the international negotiations. Scripps Oceanography researchers and students attended the December 2015 conference to press for action on a range of fronts, including enhancement of ocean observing capabilities and mitigation of greenhouse agents besides carbon dioxide. Scripps partnered with the government of Chile to present an overview of ocean stresses and mitigation strategies that may serve as models for future protective action by other countries.

Public Education, Outreach, and Research Support

Ocean pH Monitoring

A team featuring Scripps Oceanography researchers was awarded $250,000 in the Wendy Schmidt Ocean Health XPRIZE, a competition to create effective instrumentation for the measurement of ocean pH. These sensors will provide much-needed information about ocean acidification, which could be one of the most profound and widespread effects of climate change. Team DaVifEl included representatives of Honeywell Aerospace and Monterey Bay Aquarium Research Institute as well as Scripps oceanographer Todd Martz. The team will contribute the prize money to add pH sensors to select units in the international Argo network, an array of floats that makes fundamental measurements of conditions in all world ocean basins. The sensors, which are manufactured by team DaVifEl member Sea-Bird Electronics, are also being added to 40 floats to be deployed by Scripps oceanographers in the Southern Ocean.

Marine Biodiversity Under Threat

Scripps biological oceanographer Lisa Levin has documented trends in ocean deoxygenation caused by climate change. She has found evidence that declining oxygen levels, acidifying ocean waters, and rising water temperatures can be expected to substantially reduce biodiversity along continental margins, ocean regions that are among the most economically important in the world. As a means of protecting the ecosystem services upon which people rely, Levin advocates for an expansion of ocean oxygen measurement, monitoring, and analysis capabilities and networks globally, especially in deep water.

The Drought-Busting Potential of Atmospheric Rivers

Atmospheric rivers are channels of water vapor that can bring immense amounts of precipitation to a region over the course of individual storms. Historically these events have delivered up to half of the precipitation received by the state of California, but only within the last two decades have scientists even been able to identify them. A new Scripps Oceanography program, the Center for Western Weather and Water Extremes, has become a global leader in research on a phenomenon that has brought floods as well as drought-busting relief to the western United States. The advanced analysis of atmospheric rivers and improved capability to forecast how much precipitation they will produce is information that center leaders hope will aid understanding of the phenomenon in other areas of the world where it is common.