EARTH SYSTEM SCIENCE & MODELING

SUPPORTING RESEARCH TO ADVANCE UNDERSTANDING OF THE EARTH SYSTEM

Advancing the science of Earth's atmosphere, ocean, land, and ice systems is key to understanding and predicting future changes. This knowledge will support the Nation's health, well-being, and economic vitality; and will inform strategies to reduce risks from extreme weather, natural disasters, and mitigate human-caused climate change.

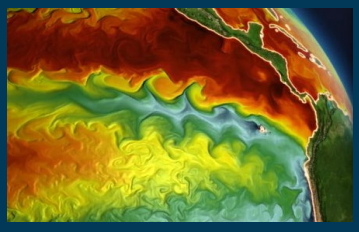
To prepare for a rapidly evolving climate, the Earth System Science and Modeling (ESSM) division in NOAA's Climate Program Office builds global and regional understanding and modeling to improve predictions and inform mitigation. ESSM leads collaborations with national and international partners to co-develop scientific priorities and coordinate resources. The division supports emerging research addressing societal challenges, advancing NOAA's climate models and applications through competitive research.

ESSM research enables decision-makers in societal risk areas to respond to extreme events created by changing climate conditions and natural variability.

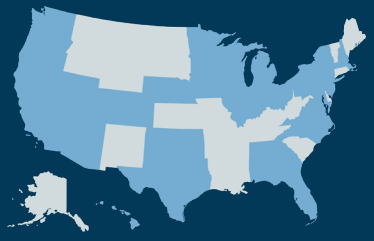
ESSM FUNDS RESEARCH THROUGH A COMPETITIVE GRANTS PROCESS

MONITORING & DATA

PROCESS LEVEL UNDERSTANDING

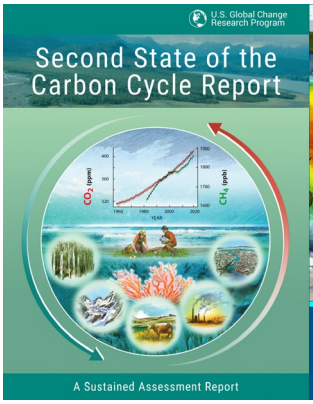


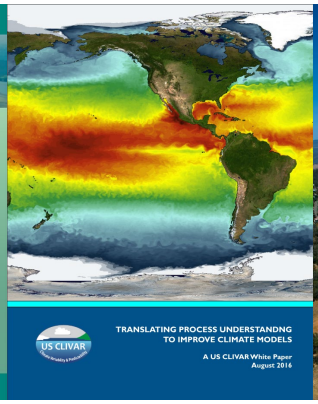
MODELING & PREDICTION

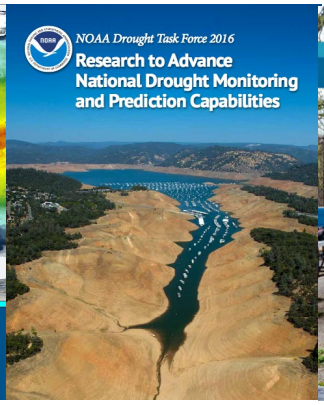


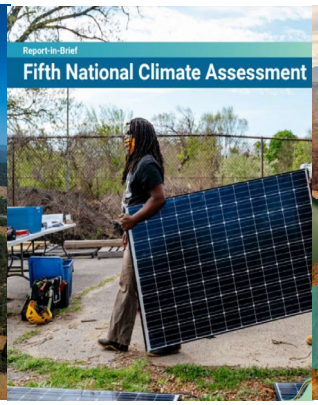
RESEARCH IN 30 STATES

ESSM research is essential to understanding climate impacts





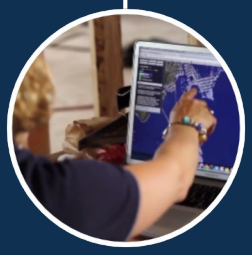




AMERICANS RELY ON NOAA'S EARTH SYSTEM SCIENCE & MODELING CAPABILITIES FOR

National Security

Risk Management



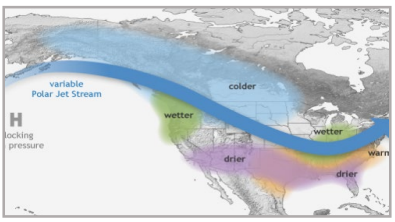
Billion-Dollar Markets

Health

ESSM supports research via the following programs:

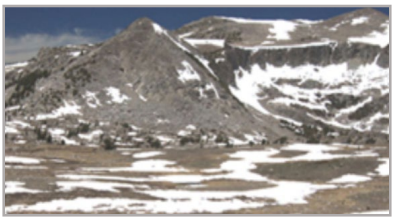
ATMOSPHERIC CHEMISTRY, CARBON CYCLE & CLIMATE (AC4)

Research under this program refines our understanding of chemical processes in the climate system, including emissions, chemistry and deposition of atmospheric trace gases and aerosols. Atmospheric composition and its impacts are studied using various measurement platforms and numerical models.



CLIMATE VARIABILITY & PREDICTABILITY (CVP)

Researchers in this program study interactions among the atmosphere, ocean, and land, and how they work together to make weather and climate events. This vital knowledge is needed to improve climate models and predictions so that scientists and society can better anticipate the impacts of future climate variability and change.



CLIMATE OBSERVATIONS AND MONITORING (COM)

The Climate Observation and Monitoring Program supports projects that develop data sets needed to understand the climate system and provides these data sets to the research community. Researchers transform observational data into authoritative products used worldwide to assess variability and change, forecast future conditions, and manage risk.

EARTH'S RADIATION BUDGET (ERB)

Researchers supported by this program investigate natural and human activities that might alter the reflectivity of the stratosphere or the marine boundary layer through the addition of aerosols and their potential impacts on Earth systems. ERB's overarching goal is to establish a baseline understanding of the energy balance in the atmosphere in order to identify and address knowledge gaps.

MODELING, ANALYSIS, PREDICTIONS & PROJECTIONS (MAPP)

This program advances climate and Earth system modeling to improve our ability to predict climate variability. Program outcomes include better simulations of climate conditions on various timescales, improvements in long-term projections of future climate, and improvements in NOAA's climate modeling capabilities.

VISIT CPO.NOAA.GOV/ESSM

CLIMATE PROGRAM OFFICE
ADVANCING SCIENTIFIC UNDERSTANDING OF CLIMATE, IMPROVING SOCIETY'S ABILITY TO PLAN AND RESPOND

EMAIL: OAR.CPO.ESSM@NOAA.GOV