



National Oceanic & Atmospheric Administration

Air Resources Laboratory

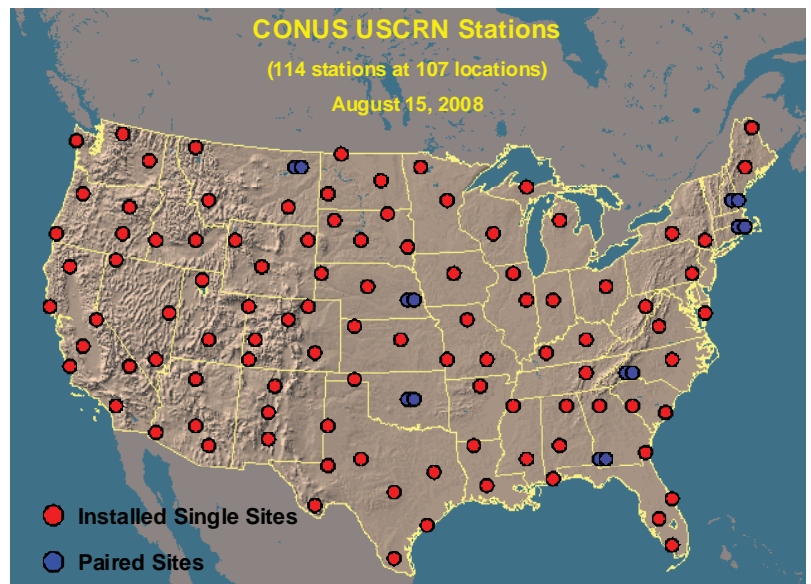
Climate Research and Development

What We Do

The Air Resources Laboratory (ARL) provides essential information and tools for decision-makers to understand how and why climate has changed and what changes might occur in the future. ARL's climate research and development concentrates on reference observations, climate variability and change analysis, and assessment of regional climate impacts. The focus of ARL's efforts is in situ measurements, although our climate analysis includes comparison with satellite-based observations and with model results.

Reference Observations

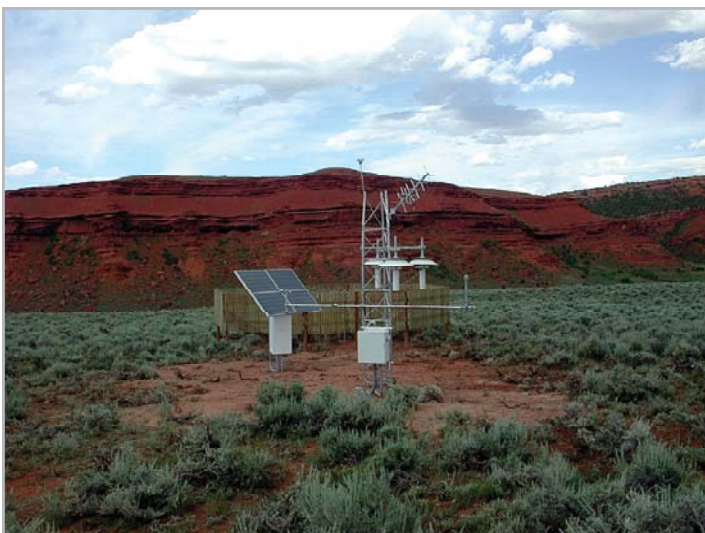
ARL designs, establishes, operates, maintains, and analyzes observing systems that provide measurements with the accuracy and reliability to support climate research and decision-making. ARL contributes to several climate networks, including the U.S. Climate Reference Network, U.S. Historic Climate Network-Modernization project, Surface Energy Budget Network, and the Global Climate Observing System Reference Upper-Air Network.



ARL provides the engineering design, measurement capabilities, and site maintenance for the U.S. Climate Reference Network (USCRN).

Climate Variability and Change Analysis

ARL analyzes daily to multi-decadal atmospheric variations measured by many types of climate observation systems, with a special emphasis on radiosonde (weather balloon) data. ARL's radiosonde research has identified important data problems and produced new, improved datasets by removing artificial, non-physical signals from weather observations. ARL uses these and other datasets to identify and characterize climate variability and trends. Through collaboration with climate modeling groups, ARL's datasets are used to evaluate global climate models.



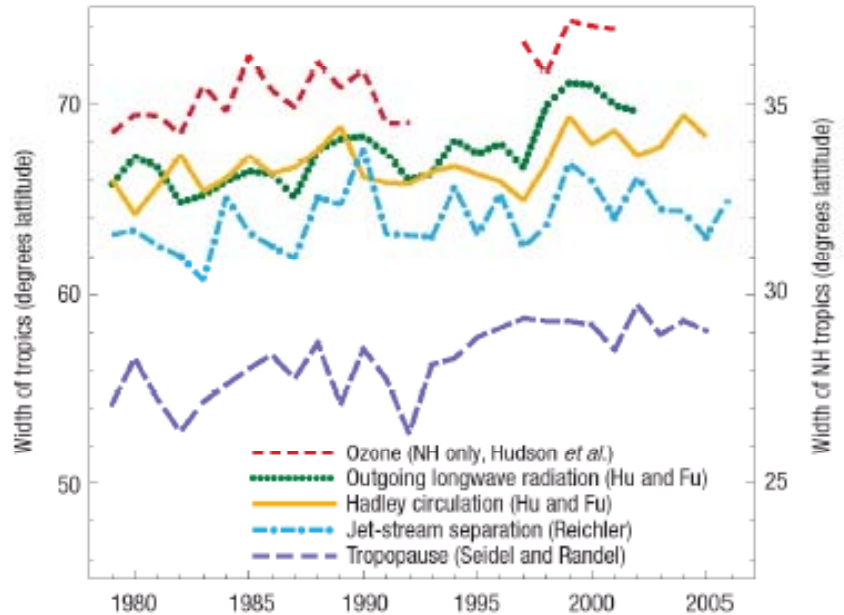
A solar-powered U.S. CRN station located at Red Canyon Ranch in Lander, WY. Property associated with The Nature Conservancy. (Photo: NOAA)

Assessment of Regional Climate Impacts

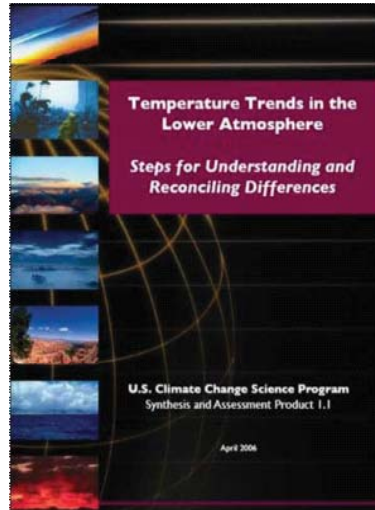
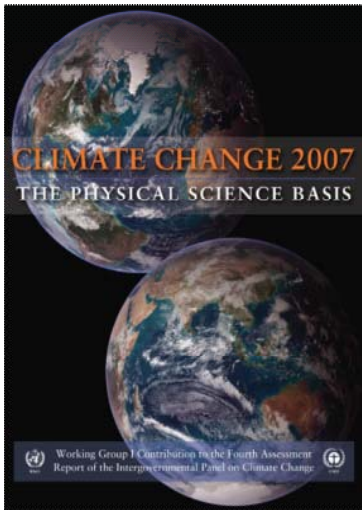
ARL supports and coordinates development of the climate extension of the Weather Research and Forecasting model so it can be used to study regional climate issues. Applications of the model include examining water resources and extreme weather events in potential future climates.

Why It Is Important

ARL's Climate Research and Development provides essential observations and analyses for monitoring climate changes and understanding why they are occurring. National and international climate scientists and decision-makers use this information to understand climate trends and the need for mitigating and adapting to climate change. ARL's research has contributed to a number of climate change assessments, including the work of the Intergovernmental Panel on Climate Change and the U.S Climate Change Science Program.



Estimates of the width of the tropics from multiple techniques. All show widening over several decades, which is occurring faster than has been predicted by climate models. Such changes could significantly affect weather patterns. (Nature Geoscience, Seidel et al., 2008)



ARL's science has also contributed to models that can be used to project weather patterns that would be associated with climate change. For instance, models may show how water availability, air quality, and severe weather would be affected by climate change, information that regional managers need to make informed decisions.

For More Information:

Climate Reference Network

www.atdd.noaa.gov/uscrn.htm

Climate Variability & Change Analysis

www.arl.noaa.gov/CVCAanalysis.php

Air Resources Laboratory

www.arl.noaa.gov

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