

# Are Aerosols Reducing Coastal Drizzle And Increasing Cloud Cover

July 5 2005

---

Scientists sponsored by the Department of Energy are conducting a six-month atmospheric research campaign at the Point Reyes National Seashore, in Marin County, California.

The experiment's goal is to help researchers understand how aerosols -small particles such as soot, dust and smoke - influence the structure of marine stratus clouds, and how aerosols are associated with drizzle – the misty rain regularly produced by these types of clouds.

The scientists think aerosols, which can come from both natural and manmade sources, may be reducing coastal drizzle while increasing cloud cover.

Marine stratus clouds are thin, low-level clouds that cover the sky like a blanket. They are some of the most prevalent clouds on earth, and are an important component of the earth's climate system.

Despite their importance to the earth-ocean-atmosphere system, relatively few comprehensive data sets about marine stratus clouds are available for scientists to draw firm conclusions related to aerosol effects.

To obtain more, and better, data, researchers need to go to the source. The department's Atmospheric Radiation Measurement (ARM) Program is helping them do just that.

Since the Pt. Reyes field campaign began in March, a new \$1.4 million ARM Mobile Facility – a portable atmospheric laboratory with sophisticated instruments and data systems – has been stationed about one mile from the beach, collecting data from the clouds as they move onshore.

Starting in July, activities intensify as two research aircraft -sponsored by DOE's Atmospheric Science Program and the U.S. Office of Naval Research--join the campaign.

These instrumented aircraft will obtain in-situ measurements of cloud properties, suspended particles and other atmospheric variables needed to analyze aerosol properties of the marine stratus clouds.

The aircraft data will be used to examine the regional characteristics of the marine stratus clouds being sampled at Pt. Reyes and to examine specific links between aerosol chemistry and cloud structure.

"Current theories--backed by sparse observations - suggest that the presence of manmade aerosol air pollution may cause marine stratus clouds to reflect more incoming sunlight back into space and suppress the production of drizzle within the clouds, which may enable the clouds to exist for a longer period," said Mark Miller, the ARM Program's lead scientist for this field campaign.

"If these theories prove accurate, manmade aerosols could be facilitating changes in regional and global climate through their influence on marine cloud structure. We need to determine how these effects should be represented in global climate simulations."

"With the new ARM Mobile Facility, researchers can now explore previously under-sampled climate regions," said Dr. Raymond Orbach, Director of DOE's Office of Science.

"The portability of the instrumentation allows researchers to make atmospheric measurements similar to those at the other ARM sites for periods up to a year at a time anywhere in the world."

Point Reyes National Seashore, on the coast north of San Francisco, is an ideal place to gather data about marine cloud and drizzle processes. Not only is it one of the foggiest spots in the United States, it's also home to more than 900 plant species, 490 bird species, and 28 species of reptiles and amphibians.

"It's no secret that fragile coastal ecosystems are highly sensitive to changes in their environment. A mere three degree change in temperature for an extended period of time can wipe out an entire segment of marine life," said Don Neubacher, Point Reyes National Seashore Superintendent.

"Anytime we have the opportunity to assist the scientific community in researching issues that affect our biological communities, we will."

The ARM Program - the largest global change research program supported by the Department of Energy - was created to help resolve scientific uncertainties related to global climate change.

Its specific focus is on the crucial role of clouds and their influence on warming and cooling processes in the atmosphere. The program's goal is to improve the treatment of clouds and radiation processes in global climate models.

One of DOE's major goals is to develop global climate models capable of simulating the timing and magnitude of greenhouse gas-induced global warming and the regional effects of such warming.

Previous research has shown that warming and cooling effects from

clouds are one of the major sources of uncertainty in simulations of climate change over the next century. It is imperative, therefore, that their treatment in global models be improved.

The multi-laboratory ARM program operates three field research sites gathering climate data in the North Slope of Alaska, the Southern Great Plains and the Tropical Western Pacific.

The new Mobile Facility will enable atmospheric scientists to perform climate research in remote locations around the world. Next year, the ARM Mobile Facility will be deployed in Niamey, Niger, Africa to participate in an international study of the West African monsoon system.

*Copyright 2005 by Space Daily, Distributed by United Press International*

Citation: Are Aerosols Reducing Coastal Drizzle And Increasing Cloud Cover (2005, July 5)  
retrieved 28 April 2024 from <https://phys.org/news/2005-07-aerosols-coastal-drizzle-cloud.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.