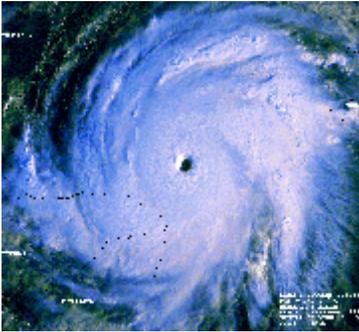




Atmospheric Research Theme

*Understanding atmospheric events
to save lives and property worldwide*



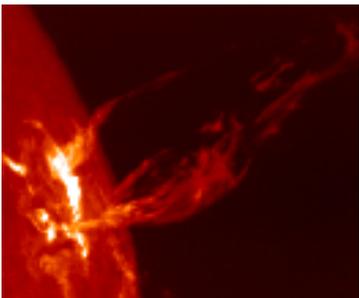
Overview

The well-being and prosperity of the United States is dependent on the environment. One-seventh of the U.S. economy, almost \$1 trillion a year, is weather sensitive. In addition, national and global economies are so interdependent that disruption in one place by weather events can show up in increased costs and delays on the other side of the world. As more and more people move to areas of high risk to natural disasters, situations will arise in which weather events will significantly challenge the way Americans live or cause dramatic departures in the way the economy functions.



NOAA Research conducts directed basic and applied research on the upper and lower atmosphere as well as the space environment. Research programs focus on observing and understanding chemical and physical processes in the atmosphere, determining the effects of pollution on those processes, and monitoring and forecasting the phenomena affecting the Sun-Earth environment. The results contribute to major national and international environmental programs and agreements. They also underpin many of the services we provide to our partners in industry and academia.

Every day NOAA scientists and research partners are expanding the body of atmospheric knowledge, shedding new light on the processes that contribute to weather and air quality, and developing new tools for understanding and prediction. By doing so, we help mitigate the adverse effects of weather and air quality on quality of life and the economy.



Key Issues for the United States

Extreme weather events and air pollution have dramatic impacts on public safety, the nation's economy, public health and national security. These stressors can cause numerous fatalities and injuries and billions of dollars in damage and severe disruptions to the national economy. In 1999, Hurricane Floyd not only caused more than \$100 million dollars in damage, but also induced a severe ecosystem condition resulting in harmful algal blooms. The social and economic impacts of weather and poor air quality in the United States include:

	Average # of deaths /year	Average loss/cost /year
Hurricanes	20	\$6.2 billion
Tornadoes	44	\$2.9 billion
Floods	96	\$2.4 billion
Extreme Heat	148 - 1,700	
Air Quality	50,000	\$40 billion

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NOAA Research addresses these key issues by conducting the following research:

Impacts on Public Safety

Along with periods of severe drought, hard winters, and heat waves, severe storm events such as hurricanes translate into considerable loss of life and annual property damages estimated in billions of dollars. Although there is nothing we can do to prevent natural disturbances, NOAA Research recognizes that we must do everything possible to minimize their impacts through improving understanding and predictability of such events.

Impacts on the Economy

The U.S. sustained forty-four weather-related disasters during the 1980-1999 period in which overall damages/costs reached or exceeded \$1 billion. Thirty-eight of these disasters occurred between 1988 and 1999 with total damages exceeding \$170 billion. The economic costs are not limited to direct property damage. Excessive heat or cold as well as air pressure changes can cause extensive agricultural losses. Both weather and poor visibility can lead to delays and cancellations in air traffic. NOAA researchers and their partners are dedicated to improving severe weather warnings and forecasts in order to save lives and reduce property damage.

Impacts on Public Health

Not only are there risks from such obvious threats as heat waves or thunderstorms, but the atmosphere holds long term threats as well. Fragile lung tissue is easily damaged by pollutants in the air, resulting in increased risk of asthma and allergies, chronic bronchitis, lung cancer and other respiratory diseases. NOAA researchers work to better understand the sociological and ecological impacts of severe weather and poor air quality.

Impacts on National Security

National security can be compromised during the disruption of the satellite operations caused by severe space weather. Solar disturbances and geomagnetic storms can affect communications, power grids, space missions, satellite operations. NOAA researchers are working to provide improved forecasts to mitigate the effects of severe space weather.

What NOAA Research Can Do

- Improve regional daily weather forecasts;
 - Improve the accuracy and timeliness of severe weather warnings and forecasts;
 - Develop quantitative precipitation forecasting to reduce risks due to flooding;
 - Provide air quality forecast information;
 - Develop rapid response forecast tools for locations downwind from emergency situations such as wildfires and chemical spills; and
 - Better understand severe weather conditions that induce extreme ecological events such as harmful algal blooms.
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