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U.S., Australia Establish Climate Research Site

Darwin will be newest Atmospheric Radiation Measurement facility

On July 30, 2002, the United States and Australia will formally commission a new site to monitor severe weather conditions, such as drought and monsoons, in Darwin, Australia, according a Department of Energy statement.

The Darwin facility will be part of the global Atmospheric Radiation Measurement (ARM) program, enabling scientists to collect data critical for computer models that accurately simulate climate change.

Darwin will be the fifth ARM location. The others are located in the Midwestern United States, the North Slope of Alaska, and the Pacific Islands of Manus and Nauru.

According to the Energy Department, "The ARM program concentrates on the complex role and impact that clouds have on the energy balance of the climate system, an area that researchers think is critical for more accurate predictions for climate change."

Secretary of Energy Spencer Abraham said, "'Our collaboration with Australia in the establishment of this site represents an exciting expansion of the ARM program and our ongoing quest to understand and predict the earth's climate."

Following is the text of the July 19 press release by the U.S. Department of Energy:

Press Release

U.S. Department of Energy

July 19, 2002

New Research Site Established in Australia to Help Predict Climate Change

Since acute weather conditions, like monsoons and drought, can wreak havoc on a region's economy and population, these events need to be accurately simulated and forecasted by weather and climate models. Drought and monsoons are conditions that occur at the U.S. Department of Energy's newest Atmospheric Radiation Measurement (ARM) site in Darwin, Australia, a location that will enable scientists to collect new data important to refining computer models that simulate climate change.

United States and Australian officials will formally commission the Darwin site for research and operation on July 30, 2002, in Darwin. "Our collaboration with Australia in the establishment of this site represents an exciting expansion of the ARM program and our ongoing quest to understand and predict the earth's climate," U.S. Secretary of Energy Spencer Abraham said.

The Darwin site is the fifth site established since DOE created the ARM program in 1989,

and it is the first site established with an international research partner, Australia. The ARM program works to improve the atmospheric radiation and cloud physics in global climate models, thereby improving the simulations of climate change.

The other ARM sites are located in the southern Great Plains and the North Slope of Alaska in the United States and in the Tropical Western Pacific (TWP), with individual sites situated on the islands of Manus and Nauru. The Darwin site represents the third site in the TWP. The sites have been strategically selected for diversity and significance of climate and cloud conditions.

The ARM program concentrates on the complex role and impact that clouds have on the energy balance of the climate system, an area that researchers think is critical for more accurate predictions for climate change. Clouds are the single largest factor in regulating the absorption of solar energy by the earth and an important factor in regulating the loss of infrared energy from the earth -- basically a "natural" balance of energy entering and exiting the atmosphere, but which may be altered due to increasing levels of greenhouse gases.

"The ability to measure cloud properties and weather regimes during extreme conditions of droughts and monsoons and the equally important transitional weather periods provides an important, new set of data for analysis and interpretation that has not yet been captured," said Dr. Thomas Ackerman, chief scientist for ARM. "And since this information is available to anyone through the ARM web site and archives, we are contributing significantly to the entire field of atmospheric science through the scientists who access ARM data to conduct their experiments and analyses."

The Darwin Site has been established through a collaborative agreement between DOE and the Australian Bureau of Meteorology's Special Services Unit. The Special Services Unit will operate the site, which will serve two primary functions:

- Collection of continuous scientific data for research purposes;
- Operation as a maintenance base for the Darwin, Manus, and Nauru TWP sites, thus streamlining operations in the TWP locale.

The Darwin site will feature a large array of state-of-the-art instrumentation for collecting data at the surface of the earth as well as in the atmosphere, which is then used in computer models. The measurements are crucial to understanding both cloud properties, and the effects of clouds, which collectively represent the greatest uncertainty in understanding global warming and climate change.

The instrumentation includes solar, infrared, and microwave radiometers used to measure over time the amounts of water vapor and liquid water, as well as the energy balance at the surface. Instruments such as a Micro-Pulse Lidar and a millimeter cloud radar are used to determine the altitude and profiles of clouds and cloud properties. Surface meteorology sensors obtain measurements of surface wind speed, wind direction, air temperature, humidity, barometric pressure and rain-rate.

"These efforts support a deeper understanding of the environmental changes that are occurring, and will lead to more accurate climate models. Currently, our models indicate a temperature increase of 2 to 6 degrees in the next 50 to 100 years," said Ackerman. "The variation of just a few degrees could mean drastic changes to regions and populations and how they prepare for such impacts, so it is important we increase our knowledge on the role

clouds play in climate change so our projections are as accurate as possible," he said.

Researchers from eight Energy Department national laboratories, 19 universities, 14 federal laboratories, five private agencies and six foreign countries participate in the Energy Department's ARM program managed by the Office of Science. With a budget of \$40 million a year, ARM is the Energy Department's largest contribution to the U.S. Global Change Research Program.

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