

NCAR News Release

<u>2003</u>-3

FOR IMMEDIATE RELEASE: February 11, 2003

The Case of the Missing Clouds

NCAR Observing System Finds High-Level Moisture with Global Implications

"A Reference Radiosonde System for Improving Water Vapor Measurement in IHOP_2002" Symposium: Observing and Understanding the Variability of Water in Weather and Climate 83rd Annual Meeting, American Meteorological Society, Long Beach, California Tuesday, February 11, 11:30 AM

BOULDER—Hard-to-detect clouds and water vapor, hidden until now from most atmospheric sensors, could be helping to shape global climate. An instrument package developed by the National Center for Atmospheric Research (NCAR) has detected layers of moisture, indicative of high-level cirrus clouds, that were missed by standard weather balloons and other instruments. The findings are being presented by NCAR scientist Junhong Wang on Tuesday, February 11, in Long Beach, California, at the annual meeting of the American Meteorological Society (AMS).

The undetected moisture and clouds between about 5 and 9 miles high (8–14 kilometers) probably have little effect on daily weather forecasts, but their omission may be corrupting our view of long-term climate. On average, cirrus clouds tend

Contact:

David Hosansky UCAR Communications Telephone: (303) 497-8611 E-mail: <u>hosansky@ucar.edu</u>

Stephanie Kenitzer, AMS Telephone: 425-432-2192 AMS press room (2/10-2/13): 562-628-8204 E-mail: <u>kenitzer@dc.ametsoc.org</u>

to warm the planet, as they allow sunlight to enter the atmosphere while trapping radiation emitted from the ground.

"Even small amounts of water vapor and cirrus clouds at these heights are extremely important for climate, as they strongly affect Earth's radiation budget," says Richard Anthes, president of the University Corporation for Atmospheric Research, which operates NCAR. Anthes notes that radiosonde data are often used in computer models to predict the weather, and that the resulting weather analyses are then used for analyzing climate, including the calibration of models that simulate previous and future climates. "It is possible that decades of climate records have underestimated the amount of cirrus clouds in the global atmosphere," says Anthes.

Wang's study analyzes humidity data collected from the lowest few miles of the atmosphere by radiosondes (weather balloons). Over 1,500 radiosondes are launched each day around the world, forming the backbone of the planet's weather observing system. Wang and colleagues compared readings from the two inexpensive humidity sensors commonly used on radiosondes with data from Snow White, a high-quality sensor developed by the Swiss firm Meteolabor AG. Snow White is part of a reference-radiosonde package developed at NCAR and deployed in the International H20 Project (IHOP2002), a collaborative study led by NCAR last spring.

In the cold air from about 26,000 to 42,000 feet high, the team found that standard sensors nearly

always showed relative humidities ranging from about 10% to 30%. In contrast, more than half of the Snow White deployments showed areas of moisture at these altitudes with relative humidities from 90% to 100%—a strong sign of clouds. In one of these cases, a NASA ground-based lidar (laser-based radar) taking part in IHOP2002 analyzed air near the track of a Snow White deployment. The lidar confirmed that high clouds were actually present.

How do these clouds escape detection? Many of them are "subvisible cirrus," so faint they can't be seen by the naked eye. "Both ground-based observers and space-based satellites have trouble distinguishing these clouds," according to David Carlson, head of the NCAR Atmospheric Technology Division.

Wang and colleagues hope that their reference radiosonde system, which includes Snow White, will help improve the quality of radiosondes used for day-to-day observing. It may also help scientists correct the data from years past. "If developed and deployed soon," says Wang, "a reference radiosonde could help repair and improve data records over time and space."

NCAR scientist Kevin Trenberth, an expert on global climate, says better observations are critical, especially in the cold, high reaches more than five miles above ground. "Essentially the current radiosondes are not useful for measuring humidity at temperatures below about –4°F," says Trenberth. "We need a climate observing system that does a whole lot better."

The AMS, founded in 1919, promotes the development and dissemination of information on atmospheric, oceanic, and hydrologic sciences. The society publishes nine well-respected scientific journals, sponsors scientific conferences, and supports public education programs across the country. Additional information on the AMS and its annual meeting is available on the Internet at http://www.ametsoc.org/ams.

About High-Resolution Images and Video:

If your browser cannot open/download the images on this page, try our FTP site. Find the filename (e.g., cloud.tif) in the <u>FTP directory</u> and either drag its icon to your desktop, click on the filename (Mac), or right-click on the filename (PC).



high resolution image: <u>cirrus.jpg</u> (404 KB, 2700 x 1817)

Although these high clouds are visible, others aren't--and they

may be skewing our view of global climate. (Photo courtesy UCAR/NCAR/NSF.)

To receive UCAR and NCAR news releases by e-mail, fill out our Web form.

The National Center for Atmospheric Research and UCAR Office of Programs are operated by UCAR under the sponsorship of the National Science Foundation and other agencies. Opinions, findings, conclusions, or recommendations expressed in this publication do not necessarily reflect the views of any of UCAR's sponsors. UCAR is an Equal Opportunity/Affirmative Action employer.

<u>UCAR > Communications > News Releases > 2003</u>

Search

Prepared for the web by Carlye Calvin Last revised: Tuesday, February 11, 2003 12:48 PM