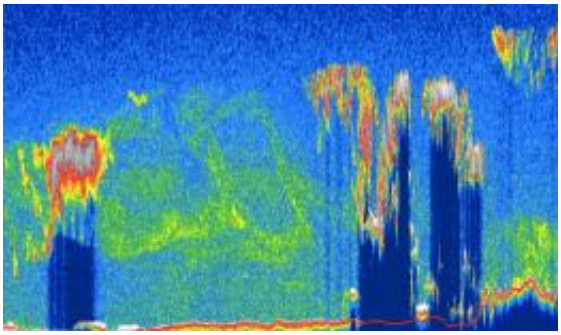
Dust Cloud From China Shows How We Share the Air

May 19 2010, by Jennifer Collings



The six-mile-high Chinese dust plume detected by CALIPSO appears as yellow-green swirls in this image. The tall columns topped in red and yellow are clouds. Credit: NASA

(PhysOrg.com) -- The air we breathe doesn't always come from our own backyard. In fact, sometimes it doesn't even come from our neighbors.

On April 22, 2010, a NASA satellite captured the appearance of a large dust cloud over the eastern coast of United States that originated on the other side of the world -- in China.

"Dust can stimulate the production of more clouds, altering local weather and potentially the climate," said Zhoayan Liu, a researcher at the National Institute of Aerospace and NASA's Langley Research Center who is monitoring the dust movement. The dust cloud was in upper troposphere, the atmospheric layer in which we live.

The dust plume that arrived in the U.S. maintained an average size of more than 1,200 miles wide and six miles tall as it traveled across the Earth. It began in China's Taklimakan and Gobi Deserts, and over 10 days, NASA captured the dust moving across the Pacific Ocean, through the United States and Canada and over Virginia.

"It is likely that a cold front over the deserts generated strong surface winds that pushed a large amount of the dust into the atmosphere and from there the jet streams brought it across the world," said Liu.

Liu and his colleagues at NASA discovered the relocation of the dust after analyzing data from Langley's Earth observing satellite CALIPSO (Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observations). It can be difficult to distinguish dust from regular clouds and other types of aerosols in photographs taken from space. CALIPSO, however, measures vertical profiles of the atmosphere and produces data that makes a distinction between the different particle types in our atmosphere, such as clouds, smoke, or dust. Not only can it tell scientists what is in our air, CALIPSO can also identify the vertical and horizontal location of the particles as well.

To validate what the satellite saw, NASA scientists took to the sky with the NASA King Air B200 aircraft and a lidar instrument similar to the one on CALIPSO. Aboard the plane, scientists were able to take the same measurements as CALIPSO over North Carolina, Virginia, Maryland, Kentucky, and Pennsylvania. The local flights, which took place the same day and time that the satellite detected the dust, confirmed what the satellite observed.

"This transport of dust out of China happens every spring, but we rarely see it move this far with such intensity," said Raymond Rogers, a Langley scientist who participated in the local flights. The air is always made up of various kinds of particles, but it is uncommon that those

particles relocate in such large amounts that can their origin can be visibly tracked.

Rogers and Liu said that using CALIPSO and local airborne measurements to monitor the presence of dust in our atmosphere will provide others with data that can be used to gain a better understanding of how dust impacts humans and ecosystems.

Provided by JPL/NASA