

60° S, oceans exist at all longitudes; the climatic high frequency of storms at that latitude is reflected in the rising air in the Ferrell Cell (the region near 60 S) of the general circulation. Consequently, this region contains both maritime clouds and storms, in which cloud glaciation occurs and frequently leads to precipitation. Thus, the uncertainty of results that Sarmiento and Gruber find in the region near 60° S is probably partially due to weather patterns leading to chemical reduction and removal of carbon dioxide in precipitation.

Before reading the article, we believed that the atmospheric reactions to remove CO₂ could not compare in magnitude to the estimated oceanic and terrestrial sinks. Inclusion of atmospheric reactions that chemically reduce CO₂ in mixed clouds, followed by removal of the resulting products in precipitation, might advance the modeling technique presented in Sarmiento and Gruber's article.

References

1. C. E. Junge, *Air Chemistry and Radioactivity*, Academic Press, New York (1963).
2. W. G. Finnegan, R. L. Pitter, B. A. Hinsvark, *J. Colloid Interface Sci.* **242**, 373 (2001).

Richard L. Pitter
(richpitter@aol.com)

Brookline, Massachusetts

William G. Finnegan
(billf@dri.edu)

Barbara A. Hinsvark
(barbarah@dri.edu)

Desert Research Institute
Reno, Nevada

In their article, Jorge Sarmiento and Nicolas Gruber emphasize a premise that carbon dioxide is the most prominent greenhouse gas causing global warming. In contrast, NASA, in a newspaper article two months earlier (*New York Times*, 31 May 2002, p. A16), stated that water vapor is the "dominant natural heat-trapping gas." Telemetry that NASA installed recently on the satellite Aqua is intended for making a worldwide study of water vapor.¹ We already know from previous satellite measurements summarized by B. J. Mason² that, on average, more than 50% of Earth's surface is covered by clouds.

Both CO₂ and water vapor are considered from a historical perspective by Spencer R. Weart in *PHYSICS TODAY*, January 1997, page 34. Experimental spectroscopic studies of infrared absorption in laboratory air cells are cited; the most recent of

those studies go back to 1911. John Tyndall made spectroscopic studies in 1861 on air mixtures and concluded that water vapor was a factor of 10 stronger than CO₂ in its IR absorption.

Our purpose here is to encourage revisiting and modernizing those early experiments using modern spectrographic methods to investigate a range of gas mixtures, radiation wavelengths, pressures, and temperatures. This activity would provide IR absorption coefficients having a higher confidence level.

Such scientific data will help investigators and funding agencies evaluate where money is best spent to understand global warming.

References

1. For more information on the Aqua mission, see <http://aqua.nasa.gov>.
2. B. J. Mason, *Contemp. Phys.* **43**, 1 (2002).

Thomas R. McGuire
Bernell Argyle

(argyle@us.ibm.com)

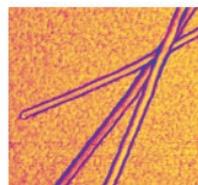
IBM Corporation

T. J. Watson Research Center
Yorktown Heights, New York

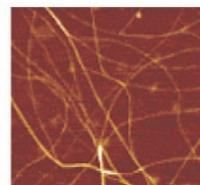
Achieve Control over Nanotube Synthesis

EASYTUBETM
System

- Turnkey System
- Safe
- Flexible
- Reliable
- Repeatable



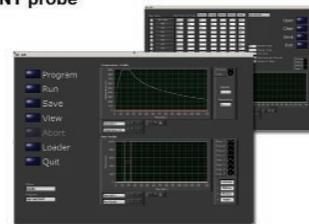
300nm AFM phase contrast image of SWNT ropes imaged with a SWNT probe



High yield SWNT synthesis process

Achieve control and repeatability with the **EasyTube System**, designed specifically for carbon nanotube synthesis.

The **EasyTube System** integrates advanced catalyzed chemical vapor deposition process with precise computer control, intuitive software interfaces, and process monitoring for safe operation.



Contact Us!

Toll Free Call in USA

1-800-715-8440

International Call

1-805-696-9002

info@nanodevices.com
www.nanodevices.com



NANO DEVICES

5571 Ekwill Street, Santa Barbara, CA 93111, USA
805-696-9002 fax: 805-696-9003