



# THE WOODS HOLE RESEARCH CENTER

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## Understanding the Global Carbon Budget:

### Woods Hole Research Center Expert Provides Insights

As climate change becomes more and more a central issue in local, national, and international discussions, understanding the global carbon budget, and how it influences trends in global warming, will become increasingly crucial. The carbon cycle is related to climate and climatic change because it controls carbon dioxide, the most important of the greenhouse gases. One of the world's preeminent experts on the topic, Dr. R. A. Houghton, has authored a synthesis paper on the topic, summarizing what is known about the global carbon budget and why it is important. The work is featured in the current issue of the *Annual Review of Earth and Planetary Sciences*.

In the paper, Dr. Houghton emphasizes that the key issue is to understand the processes responsible for adding carbon (sources) to the atmosphere and for removing it (sinks). Such understanding should lead to more accurate predictions of future concentrations of CO<sub>2</sub> and more accurate predictions of the rate and extent of climatic change. The recent past may be insufficient for prediction, however. Oceanic and terrestrial sinks that have lessened the rate of growth in atmospheric CO<sub>2</sub> until now may diminish as feedbacks between the carbon cycle and climate become more prominent.

Dr. Houghton comments, "Figuring out where all the carbon emitted from burning fossil fuels ends up is surprisingly difficult, especially when one recognizes that there are only three places it can go: the atmosphere, the oceans and land (plants and soil). The long-time effort to understand this distribution of carbon is giving way to a related question of whether and how the distribution of carbon will change as more carbon dioxide is added to that atmosphere and as the earth warms. The natural processes on land and in the ocean that have removed carbon dioxide from the atmosphere for the last century may be starting to weaken. The oceans are becoming more acidic, and we see more fires in both tropical and northern forests. If these natural sinks for carbon diminish, global warming will occur more rapidly than predicted, and efforts to manage it will become that much more difficult."

Dr. Houghton is the Deputy Director and Senior Scientist at the Woods Hole Research Center. He is an ecologist with interests in the role that terrestrial ecosystems play in climate change and the global carbon cycle. He co-ordinates the Center's efforts to understand the problems of global warming and climate change, especially the role biotic systems play in this accelerating process. Dr. Houghton has held positions as Assistant Scientist at the Ecosystems Center of the Marine Biological Laboratory and as Research Associate at Brookhaven National Laboratory. He earned his doctorate in ecology from SUNY at Stony Brook.



**Richard Houghton, Senior Scientist, Carbon Research**