

Global Burp Gassed Ancient Earth

Some 55 million years ago, the planet belched up billions of tons of carbon-rich gas, sending an already warm climate into a feverish state. A study of ocean sediments laid down at this time, during the Paleocene epoch, is now helping track the source of this gas attack.

Researchers discovered the first signs of this ancient carbon surge nearly a decade ago, but they have had difficulty determining the timing of the event. The sediment study reveals that the upheaval developed extremely rapidly by geological standards, making it almost as fast-paced as modern emissions of greenhouse gases.

"We now can say we have a better estimate of the event—when it happened and how long it took before everything returned to so-called normal conditions," says Ursula Röhl of Bremen University in Germany. She and Richard D. Norris of the Woods Hole (Mass.) Oceanographic Institution report their findings in the Oct. 21 *NATURE*.

The evidence of the climate catastrophe appears in the shells of tiny marine animals and plants, which rained down on the ocean floor after the organisms died. The ratio of two oxygen isotopes in these shells indicates that the polar seas and the bottom layer of all the oceans warmed by 5° to 7°C.

At the same time, the sediments record a jump in the ratio of two carbon isotopes. The oceans were flooded temporarily with some substance rich in carbon-12 and deficient in carbon-13. The source of all this relatively light carbon has remained something of a mystery.

Norris and Röhl tackled the problem by analyzing a core of sediment pulled up in 1997 off the southeast coast of the United States. Using a new method to scan the invaluable core without destroying it, they tracked variations in iron content of the sediments. Another test measured the concentration of magnetic grains in the core.

These procedures revealed a rhythmic pattern in the sediments, with magnetic grains and iron content periodically waxing and waning. Norris and Röhl recognized this cycle as the sign of climatic variations triggered by subtle wiggles in Earth's orbit—a frequent pattern in ocean sediments. Because they knew that the cycle lasts 21,000 years, the researchers could use this astronomical clock to time the shift in carbon isotopes.

They calculate that gas rich in carbon-12 flooded the ocean during a few thousand years or less. Then, it took 120,000 years for the chemistry of the ocean to

restabilize itself.

This timing matches well with a hypothesis proposed by Gerald R. Dickens of James Cook University in Townsville, Australia. In 1995, he suggested that the carbon surge came from deposits of a frozen substance called methane hydrate sitting on the continental shelves.

According to the theory, the hydrate suddenly became unstable, causing methane gas to bubble up into the ocean and then into the air, where it acted as a powerful greenhouse gas. By warming Earth, this gas would have triggered even more hydrate melting. Dickens has calculated that such an event would begin rapidly and only after 140,000 years would the carbon balance return to normal.

The new timing study is "totally consistent with the methane-release hypothesis," says James P. Kennett of the Uni-

versity of California, Santa Barbara, who originally discovered the carbon surge.

While support is growing for the hydrate explanation, researchers still must determine what destabilized these deposits. Kennett has suggested that increased polar rainfall caused a profound shift in ocean currents that warmed the deep sea. Others have implicated a gigantic volcanic eruption in the Caribbean.

Paleobiologists are interested in the event because it caused a massive oceanic extinction and fostered a grand migration of land species between continents, says Scott Wing of the Smithsonian Institution in Washington, D.C. Dating of the events on land had disagreed with evidence from the ocean, but the times reported by Norris and Röhl match up perfectly, says Wing. —R. Monastersky

Brisk steps can reduce diabetes risk

Chalk up yet another reason to walk whenever possible. Quickly striding for an hour a day, even if it takes several installments, can cut nearly in half a woman's risk of developing diabetes, according to a large nationwide study.

Among 70,102 nurses followed for 8 years, the fifth that exercised most was only 54 percent as likely to develop adult onset, or type 2, diabetes as was the fifth that exercised the least. Overall, women who were more physically active had a lower risk of diabetes, scientists report in the Oct. 20 *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*.

However, many women did not engage in what the researchers deemed vigorous activities, such as running, jogging, biking, or aerobics. Among women whose only activity was walking, the fifth who walked longest and fastest were only 58 percent as likely to develop diabetes as those who walked least.

Some benefit arises because women who exercise more tend to weigh less, which reduces their chance of developing diabetes, says lead researcher Frank B. Hu of the Harvard School of Public Health in Boston. Even after accounting for weight, however, the advantages of both vigorous exercise and walking remained.

Several other studies have suggested that the more people exercise the less likely they are to have diabetes, but this study is one of the first to follow large numbers of people, Hu says. It's also the first to look at the benefits of moderate exercise, such as walking.

His findings indicate that "there are

simple ways to accumulate enough exercise to reduce the risk of developing diabetes—walking to the bus stop in the morning, walking several flights of stairs, or doing housework," Hu says. "Importantly, practical physical activity like this can reduce the risk of type 2 diabetes among both obese and nonobese women."

Type 2 diabetes, a disorder resulting from the body's inability to control blood sugar concentrations, affects an estimated 15 million people in the United States and is the leading cause of blindness and kidney disease in adults. People with diabetes are also likely to suffer nerve damage, heart disease, and stroke.

Philip E. Cryer of Washington University School of Medicine in St. Louis cautions that exercise might simply delay the onset of diabetes in women. However, "walking is a practical activity that is within everyone's ability. Staving off complications [of diabetes] for even a few years could have a major impact," he says. —D. Christensen



Even walking as regular exercise seems to help ward off diabetes.