

Reading the leaves for climate clues

Some mummified birch leaves are haunting scientists who are trying to piece together the history of carbon dioxide.

These 10,000-year-old leaves, dredged from a Dutch bog, are threatening to upend ideas about how much of this greenhouse gas filled the atmosphere before the industrial revolution, reports a team of botanical investigators.

Climate scientists have traditionally drilled into glacial ice to assess the past atmospheric concentration of carbon dioxide. Ice cores in Antarctica and Greenland contain bubbles of trapped prehistoric air, the oldest of which date back 400,000 years. Studies of these bubbles indicate that carbon dioxide values remained below 300 parts per million from that time until the Industrial Revolution. Current concentrations exceed 365 ppm.

Friederike Wagner of Utrecht University in the Netherlands and her colleagues have now gauged past carbon dioxide concentrations by studying the pores on the undersides of ancient birch leaves. Experiments on living birches have shown that leaves produce fewer pores when the atmosphere holds more carbon dioxide. With fewer openings, leaves lose less water while still taking in all the carbon dioxide they need.

The pore data indicate that carbon dioxide concentrations reached values between 334 and 362 ppm about 10,000 years ago, the researchers report in the June 18 *SCIENCE*. "For the first time, we are able to trace short-term variations in carbon dioxide," says Wagner. Ice-core studies lack the resolution to pick up rapid changes, she says.

The leaf study, however, gets a chilly reception from ice-core researchers. "Their data totally contradict our data, so one of the records is wrong," says Andreas Indermühle of the University of Bern in Switzerland. "I think their results are questionable." In the March 11 *NATURE*, Indermühle and his colleagues published a study of Antarctic ice cores covering the last 11,000 years.

The ice-core method is a more direct measure of ancient carbon dioxide concentrations than the botanical analysis, which relies on determining atmospheric values from leaf pores, he says. Although the ice cores cannot resolve year-to-year changes in carbon dioxide concentration, some can detect changes over a few decades, says Indermühle. —R.M.

La Niña stirs weather extremes

The Pacific chill known as La Niña has contributed to the drought currently plaguing the Mid-Atlantic states and will whip up an unusually strong hurricane season in the Atlantic this year, according to the National Oceanic and Atmospheric Administration (NOAA).

Cold water appeared in the equatorial central Pacific in May of 1998 and has lingered there since then, upsetting weather patterns across the world. NOAA's Climate Prediction Center last month forecast that La Niña will persist for the next several months and possibly into early 2000.

In some ways the opposite of El Niño, the Pacific cooling helped set up atmospheric pressure patterns that kept rain away from the Mid-Atlantic this spring. La Niña could drag the drought out for several more months, says NOAA chief D. James Baker.

Repercussions of the Pacific cooling will reach clear around the world to West Africa, the birthing ground for Atlantic hurricanes. In May, NOAA's National Hurricane Center issued its first-ever pre-season hurricane outlook, in which it forecast above-normal storm activity this year.

La Niña fosters hurricanes by influencing the winds blowing off West Africa toward America. In particular, it tends to reduce the shearing between high-altitude and low-altitude wind. Such shearing can lop the top off storms as they build. —R.M.

Safe tobacco? Nice try, but no cigar

Persons looking for a hip alternative to cigarettes have increasingly reached for cigars. Despite a 3 percent decline in U.S. cigarette use between 1990 and 1996, cigar sales have jumped nearly 50 percent since 1993.

Cigar smoking's increasing popularity follows some heavy promotion by tobacco companies. Moreover, notes epidemiologist Carlos Iribarren of the Kaiser Permanente Medical Care Program in Oakland, Calif., many people consider stogies a relatively safe alternative to cigarettes. His new data indicate that this is a dangerous misconception.

Iribarren's team studied 17,774 men who entered the health plan 25 years earlier. Of these, 1,546 men reported smoking cigars and no other tobacco products. Some 17 percent of that number smoked more than five cigars a day.

The Kaiser team recorded hospitalizations or deaths from heart disease through 1995, and cancer diagnoses through 1996.

In the June 10 *NEW ENGLAND JOURNAL OF MEDICINE*, the researchers report that regular cigar smoking, independent of any other risk factor, increased a man's risk of coronary heart disease by about 30 percent. Cigar use boosted by roughly 40 percent the likelihood that a man would develop chronic obstructive pulmonary disease, which includes some cases of chronic bronchitis and emphysema. This study, which updates preliminary observations reported at a meeting last year (*SN*: 3/28/98, p. 204), becomes the first to tie regular stogie use with coronary heart disease. Regular use, Iribarren emphasizes, is not "a cigar now and then."

Cigar smoking also roughly doubled the chance that a man would develop cancer in the mouth, throat, esophagus, or lungs. The Kaiser team also detected hints of synergism between cigars and heavy alcohol consumption among the few throat- and mouth-cancer victims.

"It is critical that cigars not be construed as a safe or a less costly alternative to cigarettes," argues Surgeon General David Satcher in an accompanying editorial. Indeed, to discourage use, he now advocates taxing cigars at the same rate as cigarettes. Cigar labels, he says, should carry health warnings comparable to those on cigarettes. —J.R.

EMFs—doubts linger over possible risks

Although the data linking electric and magnetic fields (EMFs) to cancers or other diseases is "weak," a new federal report concludes that exposures to these fields "cannot be recognized as entirely safe."

Seven years ago, Congress established a federal EMF Research and Public Information Dissemination (RAPID) Program to try to find biological mechanisms that might explain the epidemiology linking EMFs to cancer (*SN*: 6/18/94, p. 388) and other health effects (*SN*: 1/10/98, p. 29). The National Institute of Environmental Health Sciences (NIEHS) summarized what RAPID had learned in a 75-page report it sent to Congress 2 weeks ago.

Overall, the report finds, epidemiological studies of human populations exposed to high EMFs have shown "a fairly consistent pattern of a small, increased risk with increasing exposure" for both childhood leukemia (*SN*: 11/30/91, p. 357) and chronic lymphocytic leukemia in adults. However, the fact that cellular and animal studies have failed to find any support for that link "severely complicates" the interpretation of these data, says NIEHS director Kenneth Olden in a letter accompanying the report.

Olden recommends that the federal government continue basic research on the effects of EMFs in several areas, including leukemia. Indeed, the new report identified several new findings, such as EMFs' link to reduced heart-rate variability (*SN*: 1/30/99, p. 70), that "may warrant additional study." —J.R.