

Ice Age air reveals greenhouse gas story

Geochemists have faced in recent years a seeming paradox concerning the atmospheric concentration of methane, the second most important "greenhouse" gas (behind carbon dioxide). While methane levels have clearly risen by nearly 250 percent during the last 200 years as a result of human activity, several experiments had suggested that before this industrial-age increase, the methane concentration had remained surprisingly constant, even during the last Ice Age — a time that drastically affected other trace gases.

Now a group of researchers from the University of Bern in Switzerland seems to have resolved the problem by completing the first study documenting methane levels over the last 100,000 years. By measuring the gases trapped in ice layers from Antarctica and Greenland, the group found that methane concentrations have indeed fluctuated over time, especially during the Ice Age, they report in the April 28 *NATURE*.

"This is the first indication we've had that there really have been variations in atmospheric methane, going in and out of times of glaciation," says Ralph Cicerone of the National Center for Atmospheric Research in Boulder, Colo. "It sounds to me very important because it was rather suspicious that methane was just constant."

Based on numerous studies, scientists believe that before methane started accumulating in the atmosphere 200 years ago, its levels had remained near 650 parts per billion by volume (ppbv) for 3,000 years.

In contrast, the record for times much earlier is almost bare. Aside from the new study, only one previously published report looked at methane before the 3,000-year stable period. This work indicated that 70,000 years ago, the air's methane concentration was also 650 ppbv. Because this level matched the well-documented methane levels for the last few thousand years, the results suggested that methane concentrations in the atmosphere may have remained relatively constant over time.

The Swiss study, however, traced methane levels for a total of 24 times during the last 100,000 years at the two locations. They found that 60,000 years ago, methane was present at around 500 ppbv. At the height of the Ice Age, 20,000 years ago, the level dropped to 350 ppbv, or roughly half the preindustrial level.

The Swiss researchers used ice cores drilled from the thick caps covering Antarctica and Greenland. Over 2,000 meters in length, these cores contain a 100,000-year-long set of air samples trapped within bubbles. The researchers melted

sections of the core in a vacuum chamber and analyzed the methane content of the released gas.

To explain the low methane levels during the last Ice Age, the researchers suggest that wetlands — a leading source of methane — were less biologically active because of lower temperatures and ice cover.

Cicerone believes the Swiss data will help scientists in the difficult task of determining how much specific modern and ancient sources of methane have contributed to the atmospheric levels. "These kinds of data are telling us something about the effects of glaciation on the terrestrial sources of methane," he says. "We can't say exactly what it's telling us yet, but without these data, we can't even start to think." — R. Monastersky

X-rays, cancer in China

Everyone knows radiation can cause cancer. But which organs are most vulnerable and under what conditions? In confronting such questions, scientists have relatively few epidemiologic data to go on. That's why a new study in the May 4 *JOURNAL OF THE NATIONAL CANCER INSTITUTE* is important. While it doesn't reveal any striking new findings, the large number of people studied adds considerably to the epidemiologic-data pot.

Chinese researcher Ji-Xian Wang, John D. Boice of the National Cancer Institute in Bethesda, Md., and their co-workers examined the incidence in China of different cancers among 27,011 radiologists and diagnostic X-ray technicians employed between 1950 and 1980, and compared that to the cancer rate of 25,782 Chinese medical specialists who did not work with radiation. Overall, X-ray workers had a 50 percent higher risk of developing cancer than their colleagues. Like previous but much smaller U.S. and British studies of radiologists, the China study showed that long-term, small-dose exposure can cause leukemia: X-ray workers were 3.5 times as likely to get leukemia. Incidences of breast, thyroid and skin cancers also were higher.

Wang's group reports no excess lung cancer risk among Chinese X-ray workers. This is in marked contrast to the high lung cancer rates reported for Japanese survivors of atomic blasts. "This is one of the first convincing indications that if you split the dose over long periods of time the risk for lung cancer is diminished," Boice says.

The China study is more sensitive than previous work because it examines cancer incidence rather than deaths. Its main limitation is that no exact dosages could be determined since the workers did not use radiation badges. □

Happy birthday, condor chick



Photos: Ron Garrison/San Diego Wild Animal Park

This is a face only a condor mom — or a conservationist — could love. It belongs to Molloko, the first California condor chick conceived and hatched in captivity. The chick, whose sex is yet to be determined, is a rare bird indeed. Counting this birth, there are only 28 California condors living, all of which reside at the San Diego Wild Animal Park or the Los Angeles Zoo.

While condors once ruled the western skies, the birds have soared close to extinction in modern times — partly due to feeding on leadshot-poisoned carcasses abandoned by hunters as well as other hazards. The fate of some condors remains a mystery, since a few have disappeared without a trace. The 28 survivors are part of a controversial captive breeding program designed to increase their numbers before researchers begin their release in 1992. The last bird in the wild was captured one year ago (*SN*: 4/25/87, p.263).

Molloko, whose name comes from the Indian word for the condor species, was helped out of its shell April 29 (see inset), nearly three days after the chick began to crack it open. According to a Wild Animal Park spokeswoman, Molloko is healthy and is getting stronger every day. At present there are four breeding-age pairs of California condors, but only Molloko's parents have been in the mood to court. They have one more week in the breeding season to lay another egg this year. Thirteen chicks already have been born in captivity from eggs taken from the wild. Researchers hope 200 chicks will hatch in the next 10 years.

Late this summer, scientists plan to release radio-tagged Andean condors, a related and less critically endangered species, in California to scout out the possible environmental hazards their California cousins may encounter.

— S. Weisburd

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