

Researchers find evidence of fire in Antarctic ice

December 2 2010

(PhysOrg.com) -- A team of scientists studying Antarctic ice cores have found surprising evidence of a fluctuating pattern of carbon monoxide concentrations in the Earth's atmosphere caused by biomass burning in the Southern Hemisphere over the past 650 years.

In an article published Dec. 2 in the early online version of the journal *Science*, John E. Mak, Associate Professor at Stony Brook's Institute for Terrestrial and Planetary Atmospheres in the School of Marine and Atmospheric Sciences, and co-authors Jerome Chappellaz, Laboratory for Glaciology and Geophysics of the Environment, CNRS (Centre National de Recherche Scientifique), Grenoble, France; Zhihui Wang (formerly a Stony Brook PhD student, now a postdoctoral scientist); and, Key Hong Park (currently a PhD student at Stony Brook), found that traces of [carbon monoxide](#) isotopes in the ice samples show that the amount of biomass burning – fires fueled by plant materials such as wood, peat and grasses resulting from natural forest fires and man-made cooking and communal fires – did not gradually rise over time, but rather rose and fell across the centuries.

“It was a big surprise. We certainly weren’t looking for that,” said Professor Mak. “It’s kind of a mystery.”

While the biomass burning trends were similar to those found in previous studies that measured other tracers of biomass burning, this was the first study to measure variations in stable isotopes of carbon and oxygen, the first such measurements for carbon monoxide collected

from [ice core](#) samples. The results indicated “that large variations in the degree of biomass burning in the Southern Hemisphere occurred during the last 650 years, with a decrease by about 50% in the 1600s, an increase of about 100% by the late 1800s, and another decrease by about 70% from the late 1800s to present day.” The evidence suggests that there was less biomass burning in the 20th century than in the century to century-and-a-half preceding it.

“One might think there should clearly have been more biomass burning in the Southern Hemisphere during the Industrial and post-Industrial eras. It seems logical to conclude that,” Dr. Mak said. However, both the CO measurement study and previous studies that measured charcoal particles in sediment and methane in trapped ice in the Southern Hemisphere have pointed the other way. The research team studied two ice cores from two different locations in Antarctica.

A natural follow-up to the study will be “to extend the record further back in time in Antarctica, and also we clearly want to do a similar type of study in the [Northern Hemisphere](#) from ice cores in Greenland,” Dr. Mak said.” That would be more difficult in the Northern Hemisphere because of the potential for complications in the Northern Hemisphere that we don’t have in the [Southern Hemisphere](#). There’s more going on in the Northern Hemisphere.”

Provided by Stony Brook University

Citation: Researchers find evidence of fire in Antarctic ice (2010, December 2) retrieved 20 March 2024 from <https://phys.org/news/2010-12-evidence-antarctic-ice.html>

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