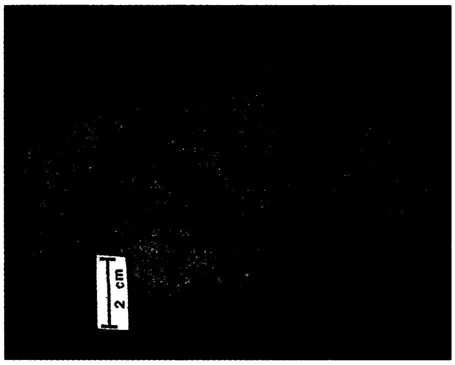
million years ago. As such, microsaurs have ardent fans among paleontologists who want to understand the adaptations that made this epochal change possible. Now these researchers have a new star to follow: a specimen that offers the earliest look yet at the kind of vertebrate that made the leap to land.

At the meeting, paleontologist John Bolt of Chicago's Field Museum of Natural History reported that he and colleague R. Eric Lombard of University of Chicago had identified microsaur remains in a hand-sized sample collected about 10 years ago in Mississippian rocks of southern Illinois by paleontologists from the University of Kansas. Until now, the oldest microsaur fossils had been dated to the early Pennsylvanian period, about 322 million years ago. But finding the new microsaur in Mississippian rock means that it lived roughly 10 million years earlier.

It is "unquestionably the oldest known microsaur," says paleontologist Robert Carroll of McGill University in Montreal. And while 10 million years isn't much on a geological timescale, it has brought microsaurs a big step closer to the critical time, about 360 million years ago, when four-legged vertebrates crept onto land, and is thus giving paleontologists a better view of what those pioneers may have looked like.



JOHN WEINSTEIN/THE FIELD MUSEUM

Relics. The seven microsaurs visible in this sample are the oldest found so far.

This particular fossil shows classic microsaur features, Bolt says. These include uniquely shaped spine bones and a simplified skull, containing just one bone instead of three. But it also has a feature that sets it apart from later microsaurs: the proatlas, a pair of rodlike bones that attach between the first vertebrae and skull and can limit head rotation to up-and-down movements. The large, but more primitive, amphibians that predated microsaurs also had these bones.

Bolt adds, however, that he was disappointed to find that this new form offers few clues to what its immediate predecessors might have been. "We would have liked to see features that were shared only between microsaurs and some other group of early amphibians," he says. Bolt hasn't given up hope of uncovering such links. "We'll find them," he predicts, "but we'll have to dig deeper into the first quarter or half of the Mississippian."

–Anne Simon Moffat

ECOLOGY

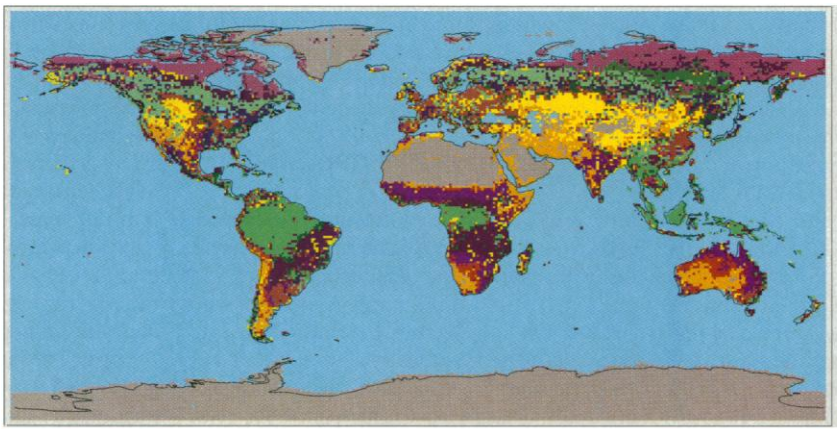
El Niño Slows Greenhouse Gas Buildup?

As anyone who tunes in to weather forecasts should know, the periodic warming of the eastern Pacific known as El Niño takes the rap for a lot of bad weather—everything from the hurricane that swept Acapulco earlier this month to the blizzard that dumped up to a meter of snow over the U.S. heartland last week. But El Niño also has an upside that may help researchers better understand global climate change. On page 870, earth scientist Rob Braswell of the University of New Hampshire, Durham, and his colleagues describe new results suggesting that, by warming global climate, an El Niño or any other warm period may help temporarily brake the ongoing rise in atmospheric carbon dioxide due to human activity. The mechanism: a delayed burst in plant growth worldwide that appears to sop up excess levels of the greenhouse gas.

The findings implicate ecosystem processes—perhaps interactions between soil microbes and plants—as a middleman between warming and plant growth. "These results are a major step forward in providing evidence for mechanisms that explain terrestrial responses to climate change," says ecologist Stuart Chapin of the University of California, Berkeley. Experts say it's unclear, however, whether such plant growth might restrain carbon dioxide buildup over the long haul.

Atmospheric carbon dioxide concentrations have increased more or less steadily over the past 20 years, continuing a trend more than a century old that is attributed largely to rising consumption of fossil fuels and large-scale destruction of forests by slash-and-burn agriculture and logging. Braswell's team analyzed shorter term fluctuations in carbon dioxide levels and—using powerful satellite-based techniques—global temperatures and plant growth after unusual warm spells, some of which are attributable to El Niño events. "We really didn't know what was going to happen, and we weren't confident we'd see anything conclusive," says Braswell.

But to their surprise, they found that the rate of increase of atmospheric carbon dioxide levels slowed significantly about 2 years after each of four warm spells that occurred between 1980 and 1991, including the major El Niño of 1982 to 1983. Global vegetation growth—as measured by light reflected from photosynthetically active leaves—also sped up after a comparable time lag, suggesting that the plants were removing the excess carbon dioxide. "It's a surprise to see such a clear delay given all the variables in global climate and plant growth," he says.



RUTH DEFRIES AND JOHN TOWNSHEND/UNIV. OF MARYLAND

Carbon sink. Two years after a warming, global plant growth seems to suck up excess CO_2.

The 2-year gap between the warming events and the changes in vegetation and atmospheric carbon dioxide concentrations indicates that the responses weren't due simply to higher temperatures spurring plant growth. "Ecologists are familiar with lags from field experiments, but such a long delay is surprising," says Braswell. Indeed, adds climate modeler Peter Cox of the Hadley Centre for Climate Research and Prediction at the Meteorological Office in Bracknell, United Kingdom, the lag "is difficult to understand, but is probably associated with processes in the soil involved with the availability of nutrients such as nitrogen." He and others suggest that warming increases the activity of microbes that make fertilizers available in the soil, increasing plant growth after a delay. The hunt is now on for exactly which soil microbes or other factors dictate how ecosystems respond to warming.

–Nigel Williams