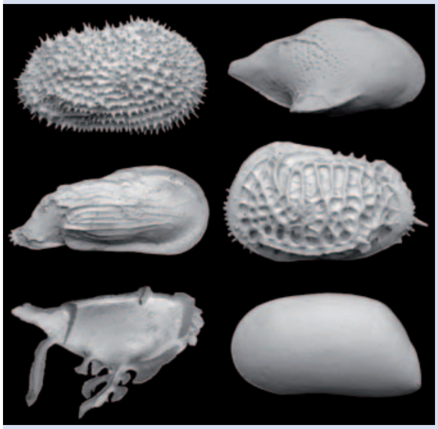
BIODIVERSITY AND ECOLOGY

Deep-sea collapse


MORIAKI YASUHARA

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The effects of human-caused climate change might eventually reach one of the least explored realms of the planet: the bottom of the ocean. A new analysis of miniscule marine fossils from the last 20,000 years shows that during past periods of global cooling, changes in ocean circulation led to the collapse of deep-sea ecosystems.

Moriaki Yasuhara, then with the US Geological Survey, and colleagues studied a core of ocean floor sediment drilled in the northwest Atlantic, identifying fossil ostracodes — bivalved crustaceans less than two millimetres long — in each layer. Because their shells fossilize so well, diverse ostracode remains represent a vibrant deep-sea community overall. Layers deposited during hundreds or thousands of years of natural cooling revealed dramatic drops in the diversity of ostracode species. During these episodes, 'opportunistic' species, able to thrive amid decay, predominated. After one particularly vicious cooling cycle ended, species diversity took thousands of years to recover, probably because of a persistent change in deep ocean currents.

Deep-sea ecosystem collapses, the authors argue, could have arisen from both altered circulation and changing populations of the ostracodes' main food source, surface algae — which might result from anthropogenic warming as well as natural cooling. A rapidly changing climate could disrupt even deep-sea life, they conclude.

Anna Barnett

CRYOSPHERE

Baffin basks


GIFFORD H. MILLER

Geophys. Res. Lett. **35,** L01502 (2008)

The melting of ancient ice caps on Baffin Island in the Canadian Arctic, one of the North American regions most sensitive to climate change, shows that the twentieth century was the island's warmest since AD 350. Vegetation that died when first covered by ice is now emerging, as are undisturbed rock surfaces.

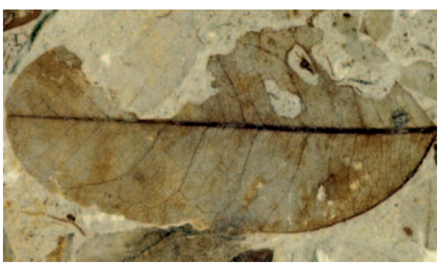
Gifford Miller of the University of Colorado and colleagues used carbon-14 to date both the vegetation and, in a novel approach, the quartz-rich rock, from which they reconstructed changes in Baffin's ice caps. As cosmic rays hit quartz, they produce carbon-14, but production is greatly reduced or eliminated under ice. By studying quartz at the melting edge of several ice caps, the researchers determined that the last ice age ended on Baffin 6,000 years ago and that local ice caps began re-forming 2,800 years ago.

Carbon-14 in emerging vegetation revealed that some of the ice caps remained intact from AD 350 through the Medieval Warm Period (around 800 to 1300) and beyond, but have shrunk by more than 50 percent since 1958. The researchers conclude that the last century was the warmest on Baffin for at least the past 1,600 years.

Harvey Leifert

BIODIVERSITY AND ECOLOGY

Warm swarms


ELLEN D. CURRANO

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Hungry herbivorous insects thrived during a period on Earth when temperatures and carbon dioxide levels soared, according to a new study, which could foreshadow a surge in swarming pests. Scientists believe that the Paleocene–Eocene Thermal Maximum (PETM), an event that occurred 55.8 million years ago, is one of the best analogues of current climate change and could hint at what lies ahead.

Ellen Currano of Pennsylvania State University and co-workers examined over 5,000 fossil leaves from Wyoming's Bighorn Basin for the telltale holes and galls left by different types of ancient insects. Recently discovered fossils from the abrupt warming event were compared with leaves that fossilized earlier or later. As temperatures rose, the authors found, so did the frequency of damaged leaves and the diversity of insects whose damage patterns could be identified.

The ravaging insects may have first followed tropical host plants whose ranges were expanding with increasing temperature, before spreading to northern plants, the scientists say. Some insects, however, apparently arrived under their own steam, before plant diversification was underway. In our rapidly warming world, say the researchers, ecological disruption on a similar scale can be expected.

Anna Barnett

REGIONAL CLIMATE

Water woes


CANDACE HARTLEY

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In the western US, where water is perhaps the most precious natural resource, anthropogenic global warming is responsible for more than half of the well-documented changes to the hydrological cycle from 1950 to 1999, researchers report. Over the last half of the twentieth century, the region's mountains received less winter snow and more rain, with snow melting earlier, causing rivers to flow more strongly in the spring and more weakly in the summer.