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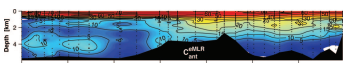
In This Issue

ENVIRONMENTAL SCIENCES

More anthropogenic CO_2 in deep ocean than previously thought

Carbon dioxide (CO_2) produced by human activities (anthropogenic CO_2) is a key driver of global climate change. Roughly half of the CO_2 generated from the burning of fossil fuels is stored in the oceans, and changing oceanic carbon concentrations can be indicators of human-generated CO_2. Estimating anthropogenic CO_2 levels in the oceans has been challenging due to natural variability, the need to estimate preindustrial oceanic carbon levels, and the different behavior and properties of "proxies," or indirect indicators of CO_2, such as chlorofluorocarbons. To avoid these problems, Toste Tanhua *et al*. developed and applied a method to estimate anthropogenic oceanic CO_2 in the North Atlantic Ocean, based on measurements of decadal changes in ocean carbon concentrations. The authors determined that anthropogenic CO_2 levels in the deep ocean are higher than previous estimates. These higher CO_2 levels could imply a longer-lived capacity of the ocean to act as a carbon sink for the future, but could also show potential for negative impact on calcification by deep-water corals and other organisms. — M.M.



Concentration of anthropogenic carbon in North Atlantic Ocean.

"An estimate of anthropogenic CO_2 inventory from decadal changes in oceanic carbon content" by Toste Tanhua, Arne Körtzinger, Karsten Friis, Darryn W. Waugh, and Douglas W. R. Wallace (see pages 3037–3042)

ECOLOGY

Little role for competition in regulating population size

Population ecologists have long debated whether population sizes are driven primarily by competition for scarce resources or by environmental factors such as precipitation or temperature. If competition is the primary driver of population size, changes in the abundance of one species should be accompanied by compensatory changes in the abundance of other species within a community; that is, there should be a negative covariance. To assess the role of such "compensatory dynamics" on population size, J. Houlahan *et al.* analyzed the amount of covariance in 41 different plant and animal communities throughout the United States and United Kingdom. In these natural communities, species tended to vary positively, contrary to the negative covariance predicted by compensatory dynamics. These results suggest that environmental factors are more important than competition among coexisting species in driving the yearly fluctuations in species abundance within a given community. — M.M.

"Compensatory dynamics are rare in natural ecological communities" by J. E. Houlahan, D. J. Currie, K. Cottenie, G. S. Cumming, S. K. M. Ernest, C. S. Findlay, S. D. Fuhlendorf, U. Gaedke, P. Legendre, J. J. Magnuson, B. H. McArdle, E. H. Muldavin, D. Noble, R. Russell, R. D. Stevens, T. J. Willis, I. P. Woiwod, and S. M. Wondzell (see pages 3273–3277)

EVOLUTION

Barley domesticated twice

Since Neolithic times, barley (*Hordeum vulgare*) has been an important crop, found at human Neolithic sites in Palestine and Syria dating back to 8500 B.C. The grain has also been cultivated for at least 8,000 years in Central Asia, but whether it was domesticated locally or imported from the Middle East remains unknown. Peter Morrell and Michael Clegg show that two independent domestications of barley occurred. The first event occurred within the Fertile Crescent, and the second occurred 1,500–3,000 km further east. The authors used DNA sequencing and genetic assignment analysis to examine >60 wild and domesticated barleys. Ten SNPs exclusive to wild and domesticated barley cultivars from east of Iran's Zagros Mountains were identified, and a number of haplotypes was associated with a genetic divide between western barley strains and wild barley found east of the Zagros Mountains. Today, most of the diversity seen in European and American barley cultivars stemmed from the Fertile Crescent domestication, whereas

Wild barley in Syria.

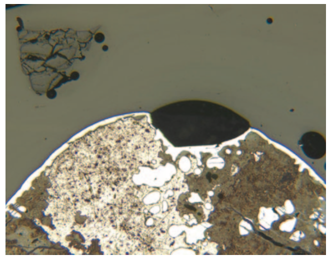
most of the diversity seen in barley cultivars from central Asia and the Far East originated from the second domestication event. — B.T.

*"Genetic evidence for a second domestication of barley (*Hordeum vulgare*) east of the Fertile Crescent" by Peter L. Morrell and Michael T. Clegg* (see pages 3289–3294)

ANTHROPOLOGY

Isotope analysis details Columbus' second expedition failure

In 1494, Christopher Columbus established La Isabela, the first European settlement in the New World, on the Dominican Republic's north coast, with the aim of discovering and exploiting gold and silver ores. The site was abandoned in 1498, but recent archaeological finds of crucibles, metallurgical slag, and silver-bearing galena seemed to indicate that the expedition had found local sources of precious metals. Alyson Thibodeau *et al.* report, however, that the lead isotope composition of La Isabela's galena does not match any known galena deposits in the Caribbean. Rather, the galena at La Isabela resembles galena deposits found in Spain. Thibodeau *et al*. infer that these ores were brought over from Spain as a reagent for metal assays during early metal exploration. In addition, most of the slag consists of lead silicate glass, which would be produced if the galena was refined using beach sand instead of the bone ash typically employed in medieval European refining practices. Combining these findings with close scrutiny of the archaeological evidence, Thibodeau *et al.* suggest that La Isabela does not represent some of the first New World mining by Europeans, but rather a desperate attempt by the survivors of a failed expedition to extract metals from their own supplies. — N.Z.



Lead silicate glass slag from La Isabela.

"The strange case of the earliest silver extraction by European colonists in the New World" by A. M. Thibodeau, D. J. Killick, J. Ruiz, J. T. Chesley, K. Deagan, J. M. Cruxent, and W. Lyman (see pages 3663–3666)