ECOLOGICAL IMPACTS

Genetic pinch

Ecol. Lett. http://doi.org/ndr (2013)

Genetic diversity is an important determinant of species persistence and adaptive capacity in the face of environmental change, but it is often overlooked in studies of the impacts of climate change. One way to investigate the potential influence of future climate on patterns of genetic variability is by analysing how past climatic changes and migration barriers have shaped the current distribution of genetic variation in a species.

This is the approach taken by Orly Razgour from the University of Bristol, UK, and co-workers, who investigate genetic diversity in a European bat (*Plecotus austriacus*) using a combination of ecological niche modelling, genetic data and model-based inference of demographic history.

They find that southerly glacial refugia populations now contain disproportionately high genetic diversity. Unfortunately, niche conservatism (the tendency of species to track a specific set of climatic conditions), together with shifts in suitable habitat and barriers to migration, may predispose the species to loss of significant genetic diversity from these southerly populations, which are also the most immediately threatened by thermal range-contraction. *AB*

ENVIRONMENTAL ECONOMICS

Food miles debated

Environ. Resour. Econ. http://doi.org/ndv (2013)

Civil society, governments and the private sector discuss the importance of curbing the CO_2 emissions that are associated with the transport of food products (food miles). Policymakers, however, should look atemissions per dollar of food production to design adequate policies.

Misak Avetisyan of the University of Southern California, USA, and colleagues analysed greenhouse gas emissions from the consumption of a number of food products globally, with a focus on the most emission-intensive sector of all — ruminant livestock. They evaluated the substitution in households' consumption of domestically produced goods for imported commodities of the same kind. The related changes in transport and total emissions by product, and by country were then calculated. They found that in 90% of the country/commodity cases considered, emission intensities of local production dominate the food-miles patterns of products. The impact of transport emissions is more significant for non-ruminant products, dairy products and non-vegetable oils.

Food miles policies only reduce global emissions when they are implemented in regions with low emission-intensive production. *MC*

HUMAN IMPACTS

Climate-driven conflicts

Science http://doi.org/ncd (2013)

There is increasing recognition that changes in climate lead to violence and social unrest, but available evidence is scattered across disciplines. Consistency among different studies would inform governments about the strength of the climate–conflict relationship.

Solomon M. Hsiang of Princeton University, USA, and colleagues developed the first comprehensive synthesis of existing research — from archaeology, criminology, economics, geography, history, political science and psychology — to examine whether human conflicts are affected by climatic changes. Sixty comparable studies were analysed, covering 45 different conflict data sets and representing the work of over 190 experts from around the world. They found strong evidence linking climatic events to human conflict across the world, throughout history and at all scales of social organization. For each one standard deviation change in climate towards warmer temperatures or more extreme rainfall than the average, the median estimates show that the frequency of interpersonal violence rises by 4% and that of intergroup conflict by 14%.

Expected warming by 2050 is thus likely to increase the rate of human conflicts. *MC*

CARBON ACCOUNTING

Soil in the wind

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Soil erosion and dust redistribute soil organic carbon across the terrestrial environment and to the oceans and atmosphere. The dust carbon cycle is not well quantified and at present is omitted from national carbon accounting, as well as being underestimated as a source of CO_2. Long atmospheric residence-times of dust allow breakdown and may considerably increase CO_2 emissions.

Adrian Chappell from CSIRO Land and Water, Australia, and collaborators develop an approximation of eroded carbon content for a dust-emission model, and quantify this carbon source for Australia. Its agricultural soils produce larger dust emissions than rangelands per unit area, but rangelands are more extensive, contributing 84% of Australia's soil carbon emissions. With emissions of 5.83 Tg CO_2 equivalent per year, this an underestimation of ~10% for combined carbon sources in accounting under the Kyoto Protocol.

Other countries with large dust emissions will need to consider the export of soil organic carbon to ensure accurate carbon accounting. Its omission is a significant source of global uncertainty in carbon budgets. *BW*

EXTREME EVENTS

State of knowledge

Bull. Am. Meteorol. Soc. http://doi.org/ndt (2013)

The frequency of extreme events seems to be increasing under climate change. They impact society and the environment, with large costs from loss of life, property and habitat. Storms, winds, and waves are particularly relevant for coastal communities.

Russell Vose of the National Climatic Data Center, USA, with the working group of the National Climate Assessment, summarize the state of scientific knowledge on extratropical storms, winds and waves, focusing on the coastal regions of the USA during the cold season. They look at observed changes, potential causes and available data, and then rank the strength of the evidence.

Extra-tropical storms have increased in both frequency and intensity since 1950, with a suggestion that storm activity is shifting offshore. The evidence for changes in winds over land is inconclusive; whereas winds over parts of the ocean seem to have been increasing since the early–mid 1980s. There is moderate evidence for the increase of extreme waves on the Pacific Coast since the 1950s, but that for other coastlines is inconclusive. Understanding of the physical causes of these changes is judged to be low to intermediate. *BW*

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