BIODIVERSITY AND ECOLOGY

The whale story

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Fish Fisheries
doi:10.1111/j.1467-2979.2010.00356.x (2010)
Baleen whales, a new study finds, have a key role in making iron available in the Southern Ocean, where it is typically in short supply. Some scientists have proposed adding iron to surface waters in the region to boost phytoplankton growth, which would draw down carbon into the deep ocean. The new discovery thus suggests that recovery of baleen whales — a group of extremely endangered species — could be another means of sequestering carbon.

A team of scientists led by Stephen Nicol of the Australian Antarctic Division in Tasmania analysed 27 faecal samples taken from four species of baleen whale and found that the whale faeces contained, on average, ten million times more iron than Antarctic sea water. They also found high concentrations of iron in whale muscle tissue and in whole krill, the whales' main foodstuff. They propose that baleen whales, in abundance, could make large quantities of iron available for phytoplankton growth by converting krill into iron-rich faeces. They also suggest that krill can act as a long-term reservoir for the nutrient, an especially important function when baleen whales migrate out of the region to breed.

The study points to a previously underappreciated role of whales and krill in supplying iron for phytoplankton growth in the Southern Ocean.

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Northward shift

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Geophys. Res. Lett. **37,** L06501 (2010)
The Greenland ice sheet has been rapidly losing mass in recent years, with glaciers spitting large chunks of ice out into the ocean. New research shows that, since 2005, this ice loss has spread from the south of Greenland all the way to the northwest coast.

A team of European and US researchers led by Shfaqat Abbas Khan of the National Space Institute in Copenhagen, Denmark, used global positioning system (GPS) measurements and data from NASA's gravity recovery and climate experiment (GRACE) satellites to observe changes in the mass of the Greenland ice sheet. The GPS measurements, taken at three bedrock sites near the ice sheet, were used to calculate 'crustal uplift' caused by ice mass loss along the coast. The GRACE satellites, which detect subtle shifts in the Earth's gravity field owing to changes in mass — including those from ice loss — can also be used to predict uplift, so the two data sets were comparable.

As well as detecting that ice loss is spreading northward, the researchers found a rapid acceleration of ice loss in southern Greenland in late 2003, followed by a slowdown in 2006. They note that, overall, the rate of ice loss in the region is much higher now than before 2003.

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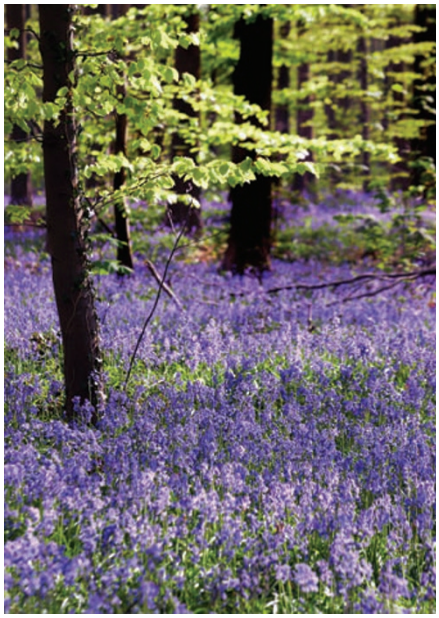
Biodiversity and ecology

British blooming

Proc. R. Soc. B doi:10.1098/rspb.2010.0291 (2010)
British plants have responded to rising temperatures in the past quarter-century by flowering early, finds a new study. Although numerous studies have reported changes in the timing of spring events in response to climate change, the new report documents changes across plant communities throughout the whole of the United Kingdom.

A team of scientists led by Tatsuya Amano of the National Institute for Agro-Environmental Sciences in Japan analysed almost 400,000 records of first flowering dates for 405 species across the UK. The records, which extend back to 1760, come from a variety of sources, including a national network of amateur botanists



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organized by the UK Woodland Trust. The researchers found that for every 1 °C increase in temperature, flowering occurred — on average — five days earlier. In the past 25 years, flowers bloomed 2.2 to 12.7 days earlier than in any other consecutive 25-year period since 1760.
Gauging the impact of climate change on biodiversity is a key challenge for policymakers; the authors say that indices of community-level responses to temperature rise could prove especially useful. They note that the approach could be extended to further taxa and nations if data were available.

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Ocean science

Reassessing sea level

Geophys. Res. Lett. **37,** L07703 (2010)
Sea level could rise by 0.6–1.6 metres by 2100, according to a new analysis. In its 2007 assessment report, the Intergovernmental Panel on Climate Change estimated that thermal expansion of the ocean and ice melt alone could raise sea level by 18–59 centimetres this century.

Rather than projecting individual components of sea level rise separately, Svetlana Jevrejeva of the Proudman Oceanographic Laboratory, UK, and colleagues used a statistical model to estimate the cumulative impact of a variety of warming and cooling agents — both natural and man-made — on twenty-first-century sea level rise. They also looked at the relative importance of factors contributing to future sea level rise and found that higher concentrations of atmospheric carbon dioxide would be responsible for the majority of the increase.