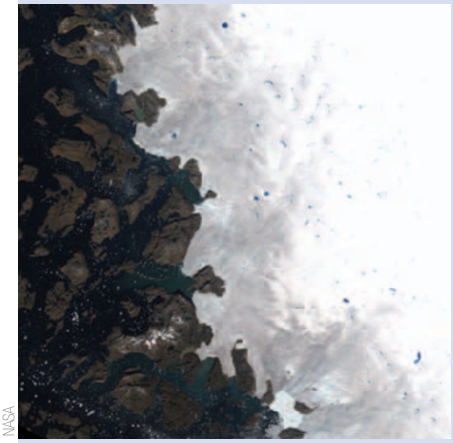
Cryosphere

Summertime snowmelt



NASA

Geophys. Res. Lett. **34**, L22507 (2007)

Summertime melting of the Greenland ice sheet has been increasing over the last 34 years and was most extreme in 2007, finds new research.

Thomas Mote from the University of Georgia in the US monitored melting of the Greenland ice sheet from 1973 until 2007 by detecting changes in microwave radiation measured by satellites. Comparing the extent of melt to seasonal averages, he found that melting during June, July and August significantly increased over the past 34 years. This trend was related to increasing air temperatures observed at three coastal Greenland stations. But in 2007 there was 60% greater melting than in 1998, the previous highest-melt year — more than expected from the temperature trend alone. This may be the accumulated effect of increased melting over the prior four years, because, for instance, more heat is absorbed by the Earth's surface when it is snow-free.

This latest study is an important step towards understanding how rapidly the Greenland ice sheet is vanishing, which has important implications for global sea-level rise.

Alex Thompson

Paleoclimate

Cod on ice

Proc. R. Soc. Lond. B
doi:10.1098/rspb.2007.1153 (2007)

Atlantic cod populations survived the last ice age on both North American and European coastlines, according to a recent study. The locations of Atlantic cod in the colder climate were predicted with models of the cod's ecological niches and then verified by genetic analyses. Similar ecological-niche modelling may help anticipate extinctions or shifts in species' ranges caused by global warming.

Grant R. Bigg of the University of Sheffield and colleagues tested two ecological-niche models against current distributions of cod and then used the models to map geographic ranges where cod should have lived during the last glacial maximum (LGM), about 21,000 years ago. To independently predict the historic ranges, the researchers examined sequence variations in certain cod genes. By measuring the likely rate of genetic change and the extent of sequence differences between present-day North American and European cod, they confirmed that the two groups diverged before the LGM and endured the ice age as separate populations.

The results support the disputed idea that parts of the Canadian coast were then free of glaciers, providing warmer refuges where hardy species such as cod could survive. Whether the fish's resilience is expected to see it through future climate regimes, however, remains to be studied.

Anna Barnett

ALAMY

Climate impacts

Late leaf fall

Glob. Change Biol. (in the press).

Over the last 30 years, leaves have started to change colour and fall later in the year, a phenomenon that scientists can now attribute directly to rising levels of atmospheric carbon dioxide.

Gail Taylor from the University of Southampton and colleagues studied the growth and leaf fall of *Populus* trees — a genus which includes aspen and poplars — growing in Tuscania and Wisconsin from 2003 to 2004. The trees were grown in plots under either current or elevated atmospheric carbon dioxide levels and their colour was monitored using remotely sensed images of canopy greenness. Leaves turned yellow later in the year under higher carbon dioxide concentrations, even when exposed to the same temperatures. The researchers think that the change in leaf colour is probably due to the effect of carbon dioxide on plant physiology.

Whereas earlier springtime leaf growth is strongly related to temperature, the belated autumn leaf fall — previously inexplicably — is not. Deciduous trees are staying greener for longer than they were 30 years ago owing to the earlier arrival of new leaves and later leaf falls.

Alex Thompson

ADRIAN PINGSTONE

Earth science

Sizing up the sink

Glob. Biogeochem. Cycles. **21**, GB4013 (2007)

The amount of the greenhouse gas methane that is soaked up by soil microbes — the soil methane sink — is greatest in temperate forests, a new study finds.

In the study, Laure Dutaur and Louis Verchot of the International Centre for Agroforestry in Nairobi, Kenya, considered 318 estimates of local methane sinks taken from 120 field studies. Previous extrapolations of the global soil methane sink from local data ranged from 17 to 44 million tonnes of methane per year and suffered from high error margins. But by attributing some local variation to different environments, Dutaur and Verchot narrowed the figure to 22 ± 12 million tonnes per year.

The consumption of methane depends more on ecosystem type than on climatic zone or soil texture, they found — the forest floor being the most methane-hungry of ecosystems — though the sink

data reflect a combination of all three factors. But the estimates of forest sinks also varied the most, pointing to a need for more detailed research. Identifying the environmental influences on sinks could help to explain fluctuations in atmospheric concentrations of methane, which remain poorly understood.

Anna Barnett

OXON HUTCH

Biodiversity and ecology

Aphid outbreaks

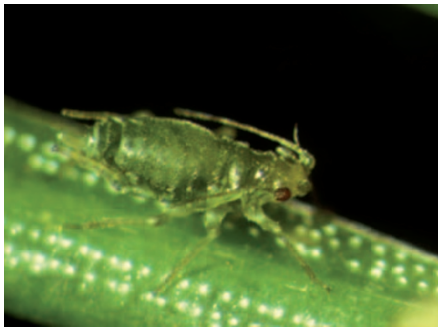
Quat. Int. **173–174**, 153–160 (2007)

Spruce trees in Britain face threats from human development and pests. A new study shows that climate change may be giving one particular insect pest an upper hand.

In the UK, infestations of the green spruce aphid (*Elatobium abietinum*) have resulted in large losses of spruce foliage and height both during the active infestation and in subsequent years. Angus Westgarth-Smith at Brunel University and colleagues analysed the timing of spring aphid flight period and changes in population size over the last four decades. For 41 years, insects were collected daily in a large suction trap located about 30 kilometres north of London. Over this period, the average number of aphids and length of time they were drinking plant sap increased steadily.

The largest populations and earliest onsets of aphid activity were associated with years with a positive North Atlantic Oscillation (NAO) index. Positive NAO values correspond to warmer atmospheric conditions over Britain. Global warming is thought to increase NAO variability, shifting the system to more positive values. This will probably increase aphid activity, further harming the spruce population.

Alicia Newton



CLIVE CARTER