BIOGEOCHEMISTRY

Agricultural management

Environ. Res. Lett. **10,** 124008 (2015)

The important role of the terrestrial biosphere as a carbon sink that moderates atmospheric CO_2 concentrations — and ultimately the amount of climate change we experience — is long established. However, our understanding of the relative contribution of different processes to the overall sink effect remains surprisingly limited.

Thomas Pugh from the Karlsruhe Institute of Technology, Germany and co-workers assess the effect of agricultural land management on terrestrial carbon dynamics by adding representations of agricultural management (including harvest, grazing and tillage) to a dynamic global vegetation model.

They find that accounting for these effects resulted in simulations with cumulative emissions from land-use change since 1850 around 70% larger compared with those that ignored these processes. The majority of Earth system models omit these processes, suggesting either a general overestimation in their present-day terrestrial carbon sink or an underestimation of the increase in biospheric carbon uptake resulting from environmental change. *AB*

CLIMATE GOVERNANCE

Privatizing transparency

Curr. Opin. Environ. Sustain. **18,** 82–90 (2016)

Policymakers and the public generally consider transparency to be a good thing. This extends to reporting action on climate change. But disclosure is a complex activity, with different forms of transparency serving a variety of purposes.

Aarti Gupta from Wageningen University, The Netherlands, and Michael Mason from the London School of Economics and Political Science, UK, explore what transparency means in the context of climate governance. They analyse what kind of disclosure governments and companies offer to comply with transparency obligations in mandatory and voluntary programmes.

They find a general move away from disclosure as a means to further public scrutiny (termed 'democratization'), and towards ends designed to inform investment decisions and improve agents' public image. They call this the 'technocratization' and 'privatization' of climate transparency.

This shift can undermine the legitimacy of particular programmes such as carbon trading, they warn, by limiting the potential of public bodies to intervene. So, in the case of climate governance, policymakers must be clear about the purpose that transparency serves — be it facilitating public scrutiny, or developing an evidence base on which to assess current and future policy. *MH*

HYDROLOGY

Arctic precipitation

Proc. Natl Acad. Sci. USA **113,** 46–51 (2016)

Warming in the Arctic is decreasing sea ice, which could have implications for the hydrological cycle of the region. Higher temperatures and an exposed ocean surface will increase evaporation, with the expectation that precipitation will correspondingly increase. Although this trend is shown by modelling studies, there has been a lack of observational evidence.

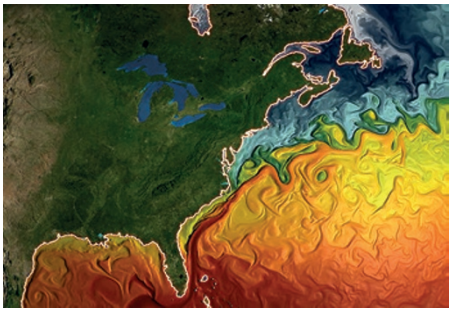
To address this issue, Ben Kopec of Dartmouth College, Hanover, USA and colleagues analysed the hydrogen and oxygen isotopic composition of precipitation at six sites for the period 1990–2012. This isotopic signature reveals moisture source changes (with contributions from both local and subtropical locations), which is then related to sea ice extent. The sites are grouped into two regions, the Canadian Arctic and Greenland Sea, with all locations in the same region having the same local moisture site — Baffin Basin and Greenland Sea, respectively.

The authors show that for every 100,000 km^2 sea ice loss, the percentage of local moisture increases by ~18% and ~11% for the Canadian Arctic and Greenland Sea sites, respectively. This increased proportion of local moisture indicates there could be an overall increase in precipitation and impact of the region energy balance, which would have implications for climate projections. *BW*

OCEAN WARMING

Northwest Atlantic

J. Geophys. Res. http://doi.org/bbs6 (2016)



Global climate models are too coarse to accurately represent the Gulf Stream position in the Northwest Atlantic, thus temperature projections in this region are based on unrealistic regional ocean circulation data. A high-resolution global climate model is now capable of accurately resolving water mass circulation in this area, increasing confidence in warming projections of the Northwest Atlantic Ocean.

Vincent S. Saba, from the National Oceanic and Atmospheric Administration, USA, and colleagues examined the effect of increasing atmospheric CO_2 on ocean temperature in the Northwest Atlantic using four models with varying resolutions. They found the highest-resolution model agreed best with the observed regional circulation and fine-scale topographic features of the ocean floor. Under a doubling of atmospheric CO_2, this model showed enhanced oceanic warming (3 °C) at a rate twice as fast as the coarsest climate model. Furthermore, the highest-resolution model also shows a northerly shift of the Gulf Stream and a retreat of the fresh polar current, contributing to the increase in temperature over the region.

Warming on the Northwest Atlantic Shelf over the past decade has already resulted in species redistribution in the area. The faster projected warming in this study will have even more pronounced effects on this rich marine ecosystem. *ET*

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