HYDROLOGY

Increasing river flood risk

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GARY DYSON / ALAMY STOCK PHOTO

The hydrological cycle is predicted to strengthen with global warming, increasing the amount and intensity of precipitation and therefore the chances of flooding from large world rivers. As almost one billion people reside in floodplains, this hydrological intensification puts an ever-increasing population under the threat.

Lorenzo Alfieri from the European Commission Joint Research Centre, Italy, and colleagues explore how future global riverine flood risk, and corresponding socio-economic impacts, vary with different levels of anthropogenic warming: 1.5 °C, 2 °C and 4 °C. They utilise a hydrological modelling framework involving high-resolution climate projections from seven coupled general circulation models.

The authors reveal that flood frequency (and therefore flood risk) increases under all scenarios, but that impacts are positively dependent on the magnitude of anthropogenic warming. For example, countries representing three-quarters of the global gross domestic product exhibit a 120% increase in flood damage associated with the 1.5 °C scenario, which increases to 170% and 500% at 2 °C and 4 °C, respectively. Projected changes are spatially heterogeneous, being largest over Asia, America, and Europe. These results highlight the need to take active mitigation measures to limit global warming and thus global flood risk. *GS*

BIOGEOCHEMISTRY

Land CO_2 sink drivers

Nature **541,** 516–520 (2017)

Year to year, variations in the rate of atmospheric CO_2 growth arise primarily from fluctuations in carbon uptake by ecosystems on land. Evidence for the dominant drivers of changes in the global land carbon sink is conflicted, however.

Using a mixture of modelling approaches, Martin Jung from the Max Planck Institute for Biogeochemistry, Germany, and co-workers investigate the roles of temperature and water availability in regulating gross primary productivity, terrestrial ecosystem respiration, and net ecosystem exchange at local and global scales.

They find that drivers are scale-dependant, with water availability the dominant driver at the local scale while at the global scale temperature fluctuations dominate. Two compensatory water effects explain this apparent paradox. These findings suggest that the spatial covariation of climate variables drives the global carbon-cycle response. Consequently if climate change alters these spatial covariations it could alter carbon-cycle sensitivities and the strength of climate–carbon cycle feedbacks. *AB*

FOREST POLICY

Media influence on debate

Climatic Change http://doi.org/bzpd (2017)

Reducing emissions from deforestation and forest degradation (REDD+) is an important instrument for mitigating climate change, particularly in forest-rich countries like Brazil. Mainstream media plays a critical role in how contested policies involving diverse stakeholders such as REDD+ are defined and the levels of support they receive.

Maria Fernanda Gebara from the Federal Rural University of Rio de Janeiro, Brazil, and co-authors studied the national printed media coverage of REDD+ in Brazil over two periods (2005–2009 and 2010–2011) in order to understand how media framing contributed to the policy debates.

The analysis shows several elements that shaped the discussions around REDD+ such as conflicts between the single Brazilian states and the federal government, with different views about how to finance REDD+. Also, the attitude in the media discourse changed over time: news became less optimistic about REDD+ once it became evident for actors represented by the media that implementation would be complex and expensive. Finally, the theme of fairness in the distribution of resources appeared more often, likely due to a greater involvement of indigenous actors in the political discussion. *MG*

MARINE MICROBIOLOGY

Plasticity under acidification

Biol. Lett. **13,** 20160774 (2017)

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Ocean acidification has been shown to have different effects on different phytoplankton species. Studies on the effects often consider the differences between species but, as intra-species differences may exist, a question remains: does a single genotype study provide a representative response for a species?

Giannina Hattich, Luisa Listmann and colleagues at GEOMAR Helmholtz Centre for Ocean Research Kiel, Germany, investigate the effects of ocean acidification on different genotypes of three phytoplankton species, sampled in one geographic region — Gran Canaria in the Atlantic Ocean. For each species (two coccolithophore and one diatom species) they study the growth rates of nine different genotypes, individually and as a mix, under ambient and high CO_2 conditions, without acclimation, to see inter-species and intra-species plasticity (ability to tolerate changed conditions).

Overall each phytoplankton species showed little response difference between the two CO_2 conditions. However, within species there were growth rate differences, with the largest variance seen for the diatom. For the coccolithophores the mix sample response was not significantly different from the average across the individual genotypes, although this was not true for the diatom. These findings highlight that genotype-mix samples may be more appropriate to determine species responses to environmental change. *BW*

Written by Alastair Brown, Michele Graffeo, Graham Simpkins and Bronwyn Wake.