PALAEOCLIMATE

A climate for fire

Glob. Biogeochem. Cycles http://doi.org/jgs (2012)

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Climate is an important control on the frequency and extent of biomass burning globally, but fire risk sensitivity to changes in climatic factors like temperature and moisture balance remains unquantified. Fires can influence climate through the release of trace gasses and aerosol precursors, as well as carbon dioxide, so a better appreciation of feedbacks between climate and fire risk could improve climate change modelling.

Anne-Laure Daniau from the School of Geographical Sciences, University of Bristol, UK and co-workers analyzed sedimentary charcoal records to investigate changes in fire regime over the past 21,000 years and its relationships with regional climates.

Results show that fire risk increases predictably with changes in temperature, peaking at intermediate moisture levels. The authors note that temperature is quantitatively the most important driver of changes in biomass burning over the last 21,000 years, indicating a positive climate change feedback in the face of continuing global warming. *AB*

ATMOSPHERIC SCIENCE

Global implications for Africa

Climatic Change http://doi.org/jgt (2012)

A great deal of political and scientific effort has been spent in order to establish the 2 °C benchmark for dangerous climatic changes, setting the target for climate mitigation policy. Perhaps surprisingly however, given its vulnerability to climate change, there has been little research into the implications of climate change scenarios for Africa.

Research by Rachel James and Richard Washington at the Climate Research Laboratory, Oxford University, UK aims to redress this balance, and inform mitigation debates through examination of the potential temperature and precipitation changes in Africa associated with 1 °C, 2 °C, 3 °C, and 4 °C of global warming.

The global climate models examined show little significant change in precipitation at 1 °C, then larger anomalies at 2 °C which are stronger and more extensive at 3 °C and 4 °C, including a wet signal in East Africa, and dry signals in Southern Africa, the Guinea Coast, and the west of the Sahel. The authors note that these projections, despite their uncertainty, highlight the risks for Africa associated with 2 °C and beyond. *AB*

CRYOSCIENCE

Extreme melt

Geophys. Res. Lett. http://doi.org/jhb (2012)

In the summer of 2012 the Greenland Ice Sheet experienced an extreme melt event. Research led by NASA scientists used data from three different satellite sensors to create a composite melt map of the Greenland Ice Sheet. It reveals that melting had occurred at or near the surface of 98.6% of the icesheet on 12 July 2012. This result was verified by comparison with weather station temperature data.

The likely cause of the extreme melt was an anomalous ridge of warm air that stagnated over Greenland. Study of ice core records in the literature revealed that such a major melt event is rare, with the last occurrence in 1889 and the next earlier in the Medieval Warm Period.

This study highlights the capability of using data from several satellites for the most complete melt detection, providing tools for future climate research. *BW*

POLICY

Wind energy tariffs

Environ. Resour. Econ. http://doi.org/jgv (2012)

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Energy producers face high costs to meet the European Union renewable energy target of reaching a 20% share of energy from renewable sources by 2020.

The most common system to support renewable energy producers is the fixed feed-in tariff (FIT) — producers get the difference between the market price and a tariff set by the government, when the price is lower. Maria Kopsakangas-Savolainen of the Finnish Environment Institute and Rauli Svento of the University of Oulu, Finland, investigated wind technology in Finland, Sweden, Norway and Denmark, and found that a fixed FIT of €83.5 per MWh of energy produced would meet the target but result in a loss of profits. Their simulations showed that a premium-based FIT — producers get the tariff in addition to the market price — of €38.4 Euros per MWh of energy produced would meet the target with no profit loss. The researchers also analysed the role of the European Union emissions trading scheme and concluded that the scheme alone would be insufficient to meet the target. *MC*

OCEANOGRAPHY

Acidic coasts

Environ. Sci. Technol. http://doi.org/jgz (2012)

Coastal oceans are experiencing increased pressure from climate change and anthropogenic influence, such as nutrient increases from run-off. Ocean acidification is of growing concern as atmospheric carbon dioxide increases, and excess nutrients fuel large algal blooms that deplete oxygen in subsurface waters and release CO_2 on decay.

How these two CO_2 sources affect coastal water acidity was investigated by William Sunda, National Oceanic and Atmospheric Administration, North Carolina, USA and Wei-Jun Cai, University of Georgia, USA. A biogeochemical model predicted the decrease in coastal water pH from organic matter decay to be up to 1.1 units, with the greatest effects at low salinity and temperature. Complex interactions with rising atmospheric CO_2 result in the combined effects being more than additive in seawater at intermediate to higher temperatures. These interactions have important biological and food security implications as the coastal ocean supports most of the global fin fish and shellfish production. *BW*

Written by Alastair Brown, Monica Contestabile and Bronwyn Wake.