POLICY

Caribbean renewable energy

Energy Policy http://doi.org/kq6 (2013)

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Island regions are largely dependent on imported oil for power generation. Local governments support renewable sources to limit exposure to volatile oil markets, but barriers hinder the development of a strong renewable energy sector.

Rebekah Shirley and Daniel Kammen of the University of California, USA, analyze energy development in several Caribbean islands — Grenada, Barbados, Jamaica and the Netherland Antilles — by looking at the history of utility ownership, regulatory bodies and renewable energy projects. Renewables are found to be cost effective, a source of jobs and emissions reductions. In Grenada, with a foreign-owned power company and no regulatory body in place, domestic electricity is the most expensive in the Caribbean. Local photovoltaic energy initiatives can decrease costs, but require sector regulation and a stronger government involvement. Successful solar water heating in Barbados shows that other projects could succeed under the current regulatory structure, but will require long-term planning and a system of incentives. Finally, development of wind power in Jamaica is supported by legislation but lacks sufficient private investments whereas it would benefit from an official energy policy in the Netherland Antilles. *MC*

SOIL BIOGEOCHEMISTRY

Soil microbes find shelter

Soil Sci. Soc. Am. J. http://doi.org/kqg (2013)

Elevated atmospheric carbon dioxide concentrations along with decreased precipitation have the potential to alter soil microbial functioning with implications for the large soil carbon component of the carbon cycle. Such changes may accentuate or attenuate climate changes through feedbacks to the atmosphere.

Engil Pereira, from the Department of Plant Sciences, University of California, USA, and co-workers investigate these relationships. They used elevated CO_2 and reduced precipitation treatments at a soybean free air CO_2 enrichment (FACE) experiment to study the response of soil carbon fractions and soil microbial distribution across soil zones.

In line with previous research they found that elevated CO_2 did not affect soil carbon, nitrogen concentrations or bacterial abundance. Reduced precipitation, however, was found to lead to an increase in the formation of microscopic soil aggregates that provided protective microhabitats for soil microorganisms — indicated by greater microbial abundance in these microaggregates in reduced precipitation plots. These results suggest a degree of microbial resilience due to a better structured soil under reduced soil moisture conditions. *AB*

SEA-ICE EXTENT

Arctic marine access

The Cryosphere **7,** 321-332 (2013)

Arctic sea ice is decreasing, and with the greater access for shipping comes increased interest in the region. At present, model projections look at the whole region, and there is an emerging need for regional sea-ice forecasts for scientists, planners of all levels and other stakeholders.

Tracy Rogers, of the International Arctic Research Center and Scenarios Network for Alaska and Arctic Planning, USA, and colleagues combine observational data and model simulations in an effort to provide the information needed to address user requirements. Thirteen models are evaluated on hindcast performance and the best are used for projections. Rogers *et al.* evaluate regional and seasonal sea-ice trends, identify drivers and project future conditions.

Their results project ice cover to be reduced over key shipping routes by 2100, with access extending by one to three months annually over current conditions. *BW*

ATMOSPHERIC SCIENCE

Short-term impacts

Atmos. Chem. Phys. **13,** 2471-2485 (2013)

Short-lived climate pollutants are reactive gases and aerosols that affect the climate in the near term, typically less than 30 years. The effects of these pollutants can vary depending on the location of emissions, with important implications for climate policies.

Bill Collins of the Met Office Hadley Centre, UK, and co-workers investigate the climate effects of three aerosol species and four ozone precursors, emitted from four regions. They study the radiative forcing using global warming potential metric, and surface temperature change using global and regional temperature-change metrics.

They conclude that aerosol forcings have only a modest dependence on the emission region, whereas some ozone precursors emitted in South Asia have greater impact than those emitted from other locations. Looking at latitudinal response shows that black carbon emissions from South Asia are impacting Arctic temperatures. Work such as this will help to inform location-specific policy on emission controls and their effectiveness. *BW*

WATER RESOURCES

Depleting aquifers

Wat. Resour. Res. http://doi.org/kq5 (2013)

Water scarcity in the Middle East arises from the combination of climatic and water management factors. As the climate changes, water resource management is likely to become increasingly important. In river systems such as the Tigris and Euphrates River Basins, that traverse national boundaries, this can be particularly challenging because management choices in one part of the catchment frequently have implications for areas outside the decision-makers' jurisdiction. In the absence of well-established international collaboration, whole-catchment management can be challenging, not least because of the paucity of hydrological data.

To try to fill this gap in hydrological data for the north-central Middle East, Katalyn Voss, from the University of California Center for Hydrologic Modeling, USA, and co-workers used the Gravity Recovery and Climate Experiment (GRACE) satellite mission to evaluate trends in freshwater storage in the region.

The GRACE data reveal a steep decrease in total water storage of approximately 27.2±0.6 mm per year between 2003 and 2009. Additional remote-sensing and land surface modelling point to groundwater losses as the greatest contributor to this trend. This remote sensing and modelling approach may offer the best available practice for monitoring the response of water resources to climatic and management choices in data-poor regions, and enhance the possibility of science-informed collaborative water management. *AB*

Written by Alastair Brown, Monica Contestabile and Bronwyn Wake.