

Experimenting with the ocean

Late in 2011 California's Monterey Bay Aquarium Research Institute conducted the first controlled biological experiment on deep-sea animals using a Free-Ocean Carbon Dioxide Enrichment experiment — an experimental set-up that should have a number of benefits over conventional aquarium-based experiments. In an Interview, ocean chemist Peter Brewer talks to *Nature Climate Change* about the project, some initial findings and the prospects of this approach for the future.

[Interview p482]



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Bridging the gap

In November 2011 the United Nations Environment Programme published a report called *Bridging the Emissions Gap*, which showed that for 2020 there is an emissions gap of approximately 12 gigatonnes of carbon dioxide equivalent between business-as-usual development and pathways compatible with a maximum temperature rise of 2 °C above pre-industrial levels. In a Commentary, Kornelis Blok and co-workers propose 21 initiatives (or wedges) — additional to those agreed at the United Nations climate conference in Copenhagen in 2009 — that could together stimulate sufficient reductions by 2020 to bridge the greenhouse-gas emissions gap.

[Commentary p471]

Australian carbon policy

In this issue there are two Commentaries on Australian carbon policies. In the first, Frank Jotzo discusses Australia's recently adopted Carbon Pricing Mechanism. He argues that the policy's innovative design in price management and revenue recycling

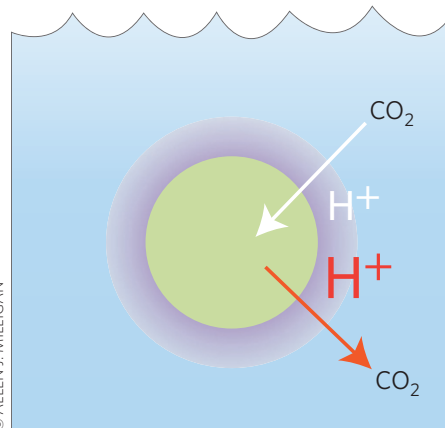
shows great promise, but nevertheless cautions that the scheme is vulnerable to the prevailing partisan politics in Australia. The second by Rodney Keenan and co-authors also focuses on the Carbon Pricing Mechanism and the extent to which scientifically sound information and advice have been used to support the policy's formulation. Overall Keenan and co-authors find that this approach gives hope that the country's climate change mitigation efforts can make an effective contribution to international objectives.

[Commentaries p475 and p477]

Plankton experiences

Ocean pH is expected to drop by 0.3 units by 2100, but it remains unclear how plankton might respond. Now research shows that pH and carbonate chemistry at the exterior surface of marine organisms deviate increasingly from those of bulk sea water as organism metabolic activity and size increases. These deviations are expected to increase in the future as the buffering capacity of sea water decreases with decreased pH, and as metabolic activity increases with raised seawater temperatures, such that many marine plankton will experience pH conditions completely outside their recent historical range. Understanding of such deviations is important for predicting ecological response of different plankton.

[Letter p510; News & Views p489]



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A creative cycle

The exchange of carbon between organisms and the environment is the inspiration for *Carbon 12*, an exhibition by five teams of artists and scientists that opened in Paris on 4 May and runs until 16 September this year. Under the aegis of Cape Farewell, each team has produced a creative response to climate change, with an emphasis on the

impact of the anthropogenically enhanced greenhouse effect on the carbon cycle. Elizabeth Straughan and Deborah Dixon review the exhibits.

[Books & Arts p480]



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Outsourcing emissions

Despite having set, and even apparently met, legally binding commitments to reduce carbon emissions, many countries have increased their appetite for carbon-intensive consumer products, making up the difference through international trade. Essentially, this means that a significant proportion of carbon emissions have not been reduced but simply moved; pollution has been outsourced. Of course such pollution transfer is questionable at the best of times, but where the pollutant's effects are global in extent, the whole purpose of emissions reductions is undermined. Anna Petherick reports on the tricky task of regulating these elusive carbon flows.

[Market Watch p484]

From the bottom up

The 2010 Cancún Agreement established a financial mechanism, through the Green Climate Fund, to support developing countries in greenhouse-gas emissions abatement. However, the different countries' financial needs are often assessed on the basis of top-down cost estimates of energy technologies. Now a study provides a more fine-grained bottom-up approach that highlights the need for a 'fair' baseline calculation methodology and calls for a phase-out of fuel subsidies.

[Article p548; News & Views p488]