indicate that aspects of biodiversity, such as genetic diversity and species composition, are integral components of ecosystem response to climate change. *AB*

ECOLOGY

Invasive species chill out

PloS ONE **6,** e29657 (2011)

© JOÃO CANNING-CLODE

The poleward expansion of plants and animals is a widely observed response to climate change. However, despite a tendency towards warmer and milder conditions, climate change is not expected to eliminate periodic cold events, yet their effect on species range expansion is rarely considered.

João Canning-Clode, from the University of the Azores, and co-authors investigated the effect of cold events on the green porcelain crab, which is one of the Caribbean 'invaders' that are now found on the southern and mid-Atlantic coasts of the United States — a phenomenon known as 'Caribbean creep'.

They found that the crabs could not tolerate exposure to temperatures that mimic unusual and severe cold spells on the southern and mid-Atlantic US coasts. As a result the authors suggest that occasional cold winters may be a critical reset mechanism that will limit the range expansion of other 'Caribbean creep' species. *AB*

OCEANOGRAPHY

Low oxygen outlook

Geophys. Res. Lett. **38,** L24608 (2011)

Very-low-oxygen (hypoxic) zones occur in many coastal waters. These so-called dead zones have spread rapidly since the 1960s owing to human-induced nutrient enrichment, and pose a serious threat to coastal systems worldwide. An important question is whether climate change will enhance or attenuate this existing environmental problem.

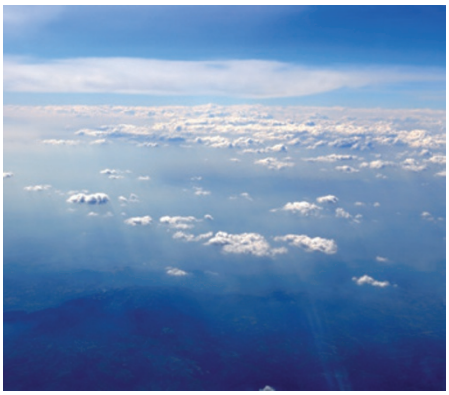
To investigate this issue, Markus Meier, from the Swedish Meteorological and Hydrological Institute, Sweden, and co-workers used modelling experiments to quantify the potential influence of climate change on oxygen conditions in the Baltic Sea over the twenty-first century.

Their results indicate that climate warming will very likely exacerbate existing hypoxic areas in the Baltic Sea, with a slight reduction in hypoxia only brought about by assuming optimistic reductions in nutrient load. These results were consistent regardless of the global climate model and carbon-emissions scenario employed, which improves confidence in the findings. The authors suggest that similar expansion of hypoxic zones can be expected for other coastal waters worldwide. *AB*

ATMOSPHERIC SCIENCE

Aerosol choices matter

Geophys. Res. Lett. **38,** L24706 (2011)



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The injection of fine particles called aerosols into the atmosphere is one approach to geoengineering the climate in an attempt to offset global warming.

Understanding the effects of aerosol injection on the temperature structure of the upper atmosphere (stratosphere) is an important step in developing predictive models of the impact of various geoengineering options on the climate.

Angus Ferraro and colleagues from the University of Reading in the UK, investigated the pattern of stratospheric temperature change induced by injecting different aerosol compounds and size distributions into the atmosphere using atmospheric model simulations.

They found that aerosol injection consistently heated the lower stratosphere in the tropics, but that the response of the stratosphere at the poles was more variable, encompassing heating, cooling or neutral effects depending on the aerosol type and size used, and the season. These differences lead to different pole–Equator temperature gradients in the stratosphere and are therefore potentially important in determining atmospheric circulation patterns resulting from geoengineering. *AB*

METEOROLOGY

Shipping emissions

J. Geophys. Res. **116,** D24205 (2011)

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Aerosols released by ships can locally induce brighter or even new clouds, but it has been unclear whether this phenomenon extends far beyond the narrow ship tracks visible in satellite images, which might be expected if aerosols are blown far downwind.

To address this issue, Karsten Peters, of the Max Planck Institute for Meteorology in Hamburg, Germany, and colleagues studied the climatic effects of ship-produced aerosols around major shipping corridors cutting across subtropical and tropical oceans, where air quality is otherwise good.

Using satellite-derived data, they investigated cloud properties along the shipping lanes as well as in upwind and downwind regions, taking into account wind trajectories and large-scale meteorological observations.

They failed to detect statistically significant effects of shipping emissions on large-scale cloud distributions in regions close to shipping lanes over the study period (2005–2007). They therefore concluded that, for the regions considered, such emissions have at most an effect on cloud presence and formation that is small compared with the natural variability, except perhaps in the immediate vicinity of ship tracks. *RH*

Written by Alastair Brown, Monica Contestabile and Rory Howlett