MITIGATION

Barking up the wrong tree?

Proc. Natl Acad. Sci. **104**, 6550–6555 (2007)
It is often assumed that global warming can be reduced by planting trees, which soak up carbon dioxide from the atmosphere. However, trees also change the planet's surface albedo, or its ability to reflect sunshine.

Govindasamy Bala of the Lawrence Livermore National Laboratory in California and co-workers compared a deforested world with a standard world using an integrated global carbon cycle and climate model. A treeless world would be 0.3 K cooler by 2100, they claim. Although this world would have higher carbon dioxide in the atmosphere and oceans, it would reflect more sunlight, lowering the temperature.

Deforestation does not have the same cooling effect everywhere. In the tropics, clouds forming above rainforests also reflect sunlight. Their loss would cancel out any cooling effect from increased land reflectivity as a result of logging. Compared with the standard world in 2100, a world devoid of tropical forests only would be 0.7 K warmer, mainly from CO_2-induced warming, whereas a world lacking only high-latitude trees would be 0.8 K cooler than the standard world.

The scientists advise against deforestation to mitigate global warming because of forests' many economic and environmental values.

Samia Mantoura

BIODIVERSITY AND ECOLOGY

Fruiting fungi

Science **316**, 71 (2007)
The fruiting season for fungi in southern England has more than doubled in the last half century owing to the region's warmer summers and wetter autumns. Many species are now also fruiting twice a season. This is an unprecedented change in reproductive behaviour attributable to the planet's warming.

Alan Gange of the University of London and colleagues found that the period from first to last fruiting for autumn-fruiting species has increased from around 33 days in the 1950s to almost 75 days in the current decade. The fruiting season expansion correlates to higher temperatures in the region since 1975. The researchers also found that 140 of the 315 species studied now fruit twice a year.

The study of more than 52,000 records of fruiting dates expands the body of data on the effects of climate change on living organisms. Previous studies have focused on springtime changes to growth and migration patterns of birds, insects and plants. Fungi play a key role in forest ecosystems, breaking down leaf litter and returning nutrients to trees via their roots. The expanded fruiting season implies a major increase in nutrients available to trees and thus increased tree growth.

Eric Smalley

OCEAN SCIENCE

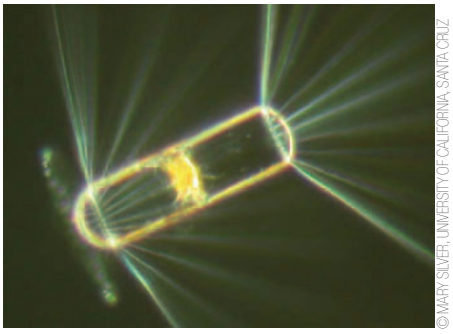
Twilight zone transport

Science **316,** 567–570 (2007)
Carbon that reaches the deep ocean is stored and does not re-enter the atmosphere for centuries, mitigating its short-term contribution to global warming. Microorganisms inhabiting the mesopelagic or 'twilight zone' between about 100 and 1,000 metres consume carbon as it sinks, however, making it available as a greenhouse gas.

Now, an international team led by Ken Buesseler of Woods Hole Oceanographic Institute has discovered that the efficiency of carbon transport to the deep sea depends critically on the type of microorganisms in the murky mesopelagic. Using a newly designed sediment trap that hovers at specific depths, they measured the transfer through the twilight zone of sinking carbon-containing particles in Hawaiian subtropical and Northwest Pacific subarctic waters.

In the Northwestern Pacific, where diatoms thrive on the nutrient-rich waters, carbon reached the deep ocean with an efficiency of 46 to 55%. In nutrient-poor Hawaiian waters, dominated by smaller, shell-less phytoplankton, the transport efficiency was only 20%. Extrapolated globally, the difference in carbon sequestration between the nutrient-rich and nutrient-poor waters is equivalent to nearly half of all human-generated carbon emissions. As the oceans warm, nutrient supply is expected to decrease, which will favour smaller phytoplankton and less carbon storage in the deep sea.

Eric Smalley



EXTREME EVENTS

Rainfall rules

Geophys. Res. Lett. **34,** L07711 (2007)
Checking Mediterranean rain gauges in winter may provide clues for predicting Europe's next deadly heat wave. Robert Vautard of France's Institut Pierre-Simon Laplace and colleagues have now discovered that a deficit of winter rainfall in southern Europe is a good indicator of high summertime temperatures and drought farther north.

Using meteorological data from over 100 sites in Europe, Vautard's team analysed the ten hottest European summers between 1948 and 2005, including 2003 when some 35,000 people died. All were preceded by southern

European winters of below average rainfall. The water reservoir in Mediterranean soils plays a crucial role in maintaining this link, the researchers say.

During dry southern winters, soils release little moisture to the atmosphere. As a result, southerly winds blow warm dry air northward, reducing cloud cover and warming the air. Northern soils also dry faster, causing further warming from below. Scientists expect southern Europe to become increasingly dry, triggering more frequent heat waves and drought, as a result of climate change. Authorities can better prepare for extreme summer heat by studying rainfall patterns in the Mediterranean each winter.

Harvey Leifert

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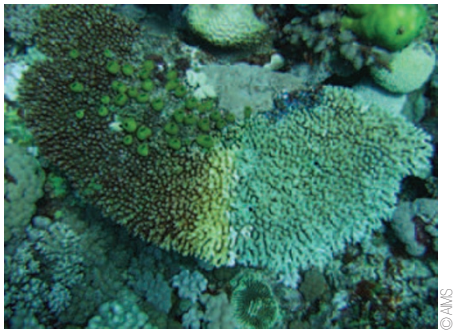
Biodiversity and Ecology

Healthiest corals hit hardest

PLoS Biol. **5** (6), e124 (2007)

White syndrome is a disease fatal to Pacific reef-building corals. Although the disease has been linked to an increase in ocean temperature, it has a complex epidemiology and predicting its spread has proven difficult. John Bruno of the University of North Carolina in the USA and colleagues have now found the first conclusive evidence of a link between the frequency of warm years and the severity of the disease on corals along Australia's Great Barrier Reef.

Combining high-resolution satellite observations of ocean temperature with annual on-site epidemiological inspections, the researchers tracked white syndrome along 48 reefs over six years. They found that warmer ocean temperature was a necessary, but not sufficient, condition for the spread of the disease. When temperatures increased by at least 1 °C in 1 to 6 months, healthy reefs



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with a minimum of 50 % living coral cover suffered more severe outbreaks than reefs with less living coral.

The greater concentration of fish and other species on healthy reefs may assist the spread of white syndrome, the researchers say. Weaker reefs attract far fewer fish and paradoxically escape such epidemics. Rising sea temperatures resulting from climate change could see diseases like white syndrome destroying reefs.

Harvey Leifert

Atmospheric science

Winds of change

Geophys. Res. Lett. **34,** L08702 (2007)

An increase in the intensity of Atlantic hurricanes over the past decade has been attributed to climate change. Now, a new study suggests that global warming could induce atmospheric changes that will tear apart Atlantic hurricanes during this century.

Using 18 of the latest global climate models, Gabriel Vecchi at the National Oceanic and Atmospheric Administration in Princeton, New Jersey and Brian J. Soden from the University of Miami in Florida predicted the number and intensity of tropical Atlantic storms for early and late twenty-first century. Wind shear, caused by differences in the speed or direction of wind with altitude, is likely to strengthen in the region, they found. This effect is linked to weakening of the Pacific Walker circulation, a wind system that influences global climate and slows during El Niño events when fewer hurricanes form.

The study represents the first evidence that changes in wind shear could be large enough to counteract the increase in hurricane activity associated with higher sea surface temperatures. In the tropical Atlantic and East Pacific, the effect of wind shear on hurricanes could overpower that of ocean warming. Most other areas, however, will experience more frequent and intense storms.

Samia Mantoura