

Fish in hot water

Small temperature increases will benefit the growth of many cold-blooded animals, but laboratory studies indicate that warming can eventually exceed physiological limits, resulting in reduced growth. Evidence from analysis of fish otoliths — bony structures that fish use for orientation and detection of movement — shows that this may have already happened for one species, the banded morwong, at the warm northern edge of their distribution in the Tasman Sea.

[Letter p110; News & Views p95]



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Internal oscillation

The El Niño/Southern Oscillation (ENSO) is the dominant mode of interannual climate variability on Earth, alternating between anomalously warm (El Niño) and cold (La Niña) conditions in the tropical Pacific at intervals of 2–8 years. The ability to predict ENSO activity is hampered by the relatively short length of the instrumental record. An annually resolved record of ENSO variability over the past millennium based on tree rings indicates that ENSO amplitude varies on a 50–90 year cycle, providing an important constraint for improving predictions.

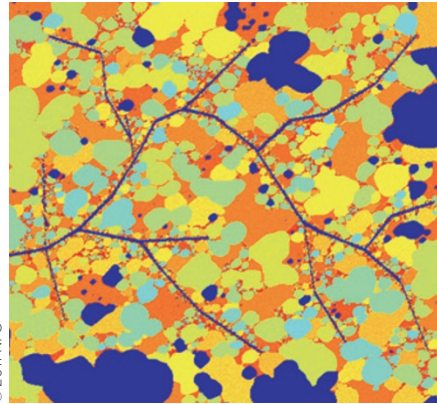
[Letter p114]

Limited lake expansion

Thaw-lake expansion is enhanced by climate warming, boosting methane emissions and contributing a positive feedback to future climate change. A modelling study of the life cycle of Siberian thaw lakes indicates that drainage strongly limits lake expansion, and suggests that methane emissions from thawing lakes are substantially lower than previously suggested. However,

predicted lake expansion will still profoundly affect permafrost ecosystems and infrastructure.

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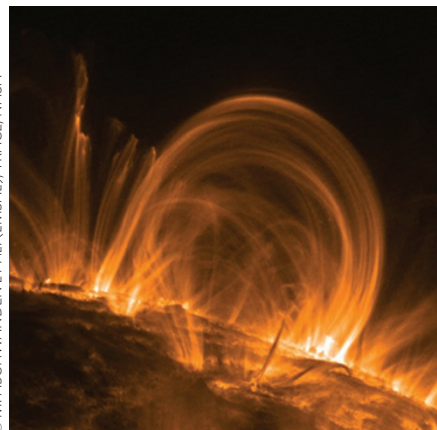


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Shining a light

Light and heat from the Sun power the Earth's climate, and although the thermal capacity of the Sun means that variations in the radiation emitted are small, studying changes in temperature and solar radiation on centennial timescales helps to constrain the Sun's impact on climate. Two studies regarding the minimum activity level of the Sun, which occurred in the later half of the seventeenth century, reveal that these comparisons may have been too simplistic.

[News & Views p98]



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Green innovation

Over 60 key inventions of the twentieth century — from the jet engine to the helicopter — were invented by entrepreneurs. Without them, the world would be very different. But can they find a techno-fix for the climate? With corporate research and development

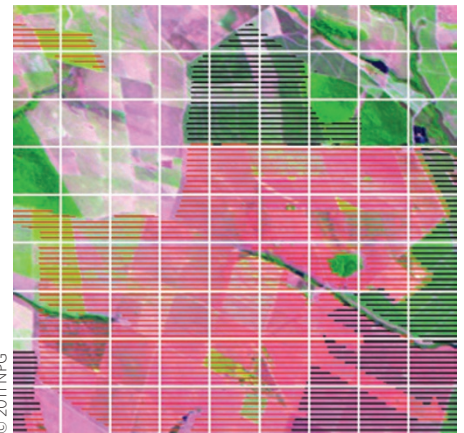
dwindling and many government coffers empty, many believe that entrepreneurship is the only process that is sufficiently powerful to tackle climate change in the timescales required. Shanta Barley reports on the obstacles faced by clean-tech innovators — from finding initial seed money to surviving the 'valley of death' — all in the hope of discovering a game-changing technology that could help shift the world to a more sustainable future.

[Feature p76]

Sweet success for biofuels

The increasing global demand for biofuels will require conversion of conventional agricultural or natural ecosystems. Expanding biofuel production into agricultural land reduces the need to clear natural ecosystems and can benefit the global climate through reduced greenhouse-gas emissions. A remote-sensing study of the Brazilian Cerrado now provides empirical evidence that sugar-cane expansion also cools local climate directly by altering surface reflectivity and evapotranspiration.

[Letter p105; News & Views p99]



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State of the science

A deeper understanding of current climate change and the mitigation of its potential future effects are among the greatest challenges facing modern science and society as a whole. In recognition of this, the past few years have seen a striking growth in funding and publication of climate change research, a trend that looks set to continue. Moreover, these trends have been matched by an increase in media coverage of climate change.

[Correspondence p72]