

# RESEARCH HIGHLIGHTS

## NEUROSCIENCE

### Hearing what and where

*Nature Neurosci.* **11**, 609–616 (2008)

Neuroscientists have long thought that the brain uses different regions to locate sounds and to analyse them, as is known to be true for vision. Stephen Lomber of the University of Western Ontario in London, Canada, now provides behavioural evidence that this is so.

Lomber trained cats to locate the source of a sound, and then to discriminate patterns of sound. When he chilled the cats' posterior auditory fields, they got worse at pinpointing a sound's source; when the cats' anterior auditory fields were chilled, they were worse on the pattern discrimination task. The test supports the idea that the brain processes the 'what' and 'where' of sound in parallel.

## PALAEOCLIMATE

### Methane didn't act alone

*Geology* **36**, 315–318 (2008)

Methane outbursts from seafloor deposits are unlikely to have been the sole cause of an extreme episode of global warming around the time of the Palaeocene–Eocene Thermal Maximum some 55 million years ago.

Karla Panchuk of Pennsylvania State University, University Park, and her colleagues configured an Earth-system model with early Eocene geography to assess the involvement of potential carbon sources with distinct isotopic signatures.

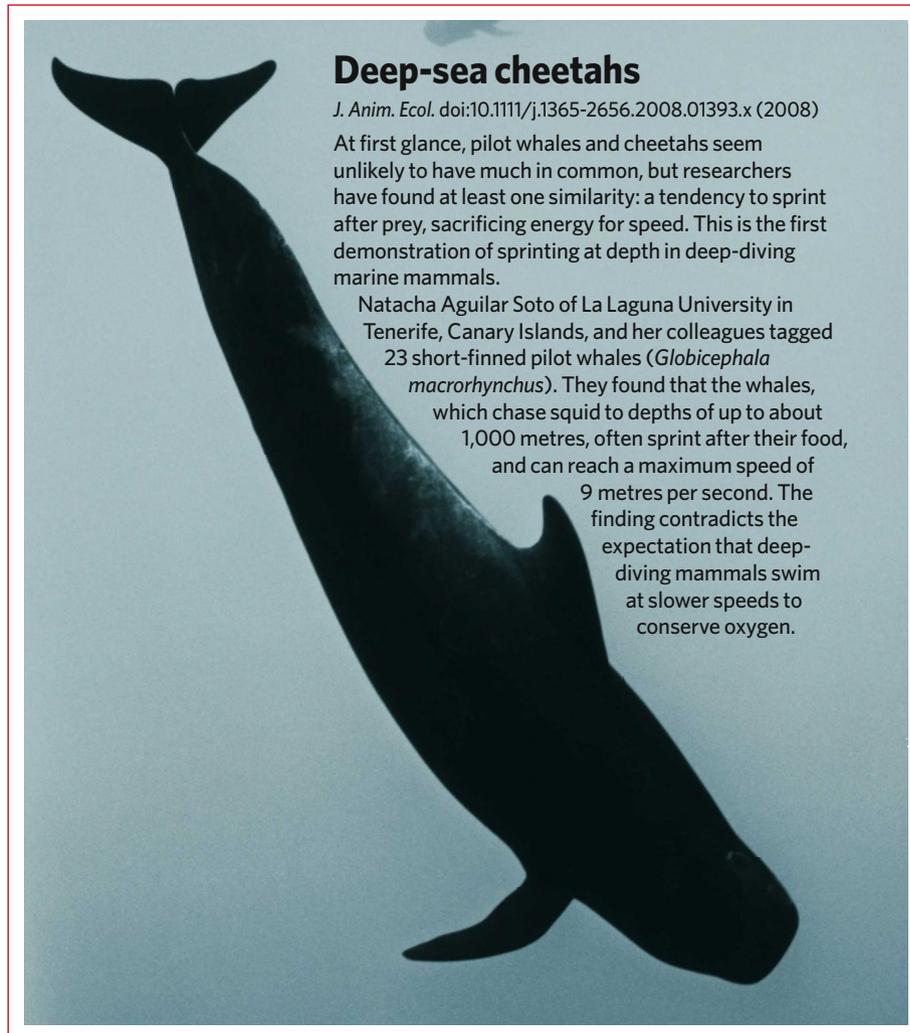
Methane could have produced an observed negative carbon-13 isotope bump, but couldn't have caused the calcium carbonate dissolution in the oceans estimated from sediment layers. The team suggests that a carbon pulse of at least 6,800 gigatonnes — three times what methane could produce — is needed to reconcile the observations.

## GEOSCIENCE

### The dust settles

*Global Biogeochem. Cycles* **22**, GB2006 (2008)

Iron-rich dust, blown from arid lands and dropped into the oceans, is an important



### Deep-sea cheetahs

*J. Anim. Ecol.* doi:10.1111/j.1365-2656.2008.01393.x (2008)

At first glance, pilot whales and cheetahs seem unlikely to have much in common, but researchers have found at least one similarity: a tendency to sprint after prey, sacrificing energy for speed. This is the first demonstration of sprinting at depth in deep-diving marine mammals.

Natacha Aguilar Soto of La Laguna University in Tenerife, Canary Islands, and her colleagues tagged 23 short-finned pilot whales (*Globicephala macrorhynchus*). They found that the whales, which chase squid to depths of up to about 1,000 metres, often sprint after their food, and can reach a maximum speed of 9 metres per second. The finding contradicts the expectation that deep-diving mammals swim at slower speeds to conserve oxygen.

W. LEVIN/GETTY IMAGES

nutrient for phytoplankton. But according to Thibaut Wagener at the Oceanographic Laboratory of France's National Centre for Scientific Research in Villefranche-sur-Mer and his colleagues, estimates for dust flux are 10 times too high in the Southern Hemisphere in global climate-change models.

They collected and analysed dust (see left, a silica particle entangled in sea salt) on cruises in the southern Pacific and Indian Oceans. The authors argue that the amount of iron in upwelling plumes of water limits phytoplankton growth in these oceans.

## QUANTUM OPTICS

### Open the box

*Europhys. Lett.* **82**, 30002 (2008)

How can online gamblers be sure that the casino isn't cheating? They can't — but the quantum gambling machine devised by Yi-Sheng Zhang and colleagues at the University of Science and Technology of China in Hefei could put an end to that. In their system,

the casino places a particle in a quantum superposition, where it is in two 'boxes' at once until the gambler opens one, 'collapsing' the particle into either box with equal probability. The gambler bets against the casino about which box the particle will be in.

The casino then sends the gambler the unselected box for checking: the quantum rules mean that if the casino tampered with the probabilities to bias the result, the gambler has a chance of finding out.

Zhang and colleagues have demonstrated the game using photons in superpositions of polarization states. Three detectors measure the result: two read the photon's state, and the third checks for tampering.

## NEUROBIOLOGY

### The heart in the head

*Science* **10.1126/science.1153651** (2008)

Do humans care more about distributing goods efficiently or fairly? Is this decision rational or emotional? Steven Quartz of

