# RESEARCH HIGHLIGHTS

*Selections from the scientific literature*

ECOLOGY

## Salt water fuels nitrogen release

Saltwater incursions into coastal wetlands can increase the release of ammonium into the ocean, complicating coastal management in the face of human development, climate change and rising sea levels.

Marcelo Ardón at East Carolina University in Greenville, North Carolina, and his colleagues analysed the impact of increased saltwater levels on natural and restored wetlands in North Carolina during four droughts from 2007 to 2012. Reduced processing of ammonium by soil microbes and less nitrogen uptake by plants contributed to ammonium runoff, but releases were higher in restored wetlands, probably due to residual nutrients from fertilizer use.

The researchers suggest that the potential for saltwater-induced nitrogen release should be assessed during the development of large coastal wetland-restoration projects.

***Glob. Change Biol.*** **http://dx.doi.org/10.1111/gcb.12287 (2013)**

TOP LEFT, B. MOOSE PETERSON/ARDEA.COM; BOTTOM LEFT, DE AGOSTINI PL/GETTY

TOP RIGHT, MINDEN PICTURES/SUPERSTOCK; BOTTOM RIGHT, NORBERT WU/MINDEN PICTURES/FLPA

EVOLUTION

## Diving is in the blood

Diving mammals ranging from water shrews, beavers and seals to ancient whales (pictured clockwise from top left) share adaptations in the protein that stores oxygen in muscles.

A team led by Michael Berenbrink at the University of Liverpool, UK, analysed the myoglobin proteins of extant mammals, and from this inferred the sequences of these proteins in the mammals' extinct relatives. Compared with non-divers, long-diving creatures tended to have higher levels of myoglobin in their muscles and these proteins were more highly charged, which probably prevents them from sticking together and reducing their utility. On the basis of this relationship, the team developed a model to estimate how long ancient animals could have stayed underwater. They calculated that after ancestors of whales moved from land to water in the Eocene, 56 million to 34 million years ago, their diving capacity increased from 1.6 to 17.4 minutes.

***Science*** **http://dx.doi.org/10.1126/science.1234192 (2013)**

ASTROPHYSICS

## Magnetic energy of supernovae

Light from five super-luminous supernovae has revealed an unusual power source behind these cosmic explosions, which were 5 to 100 times brighter than regular supernovae.

Cosimo Inserra at Queen's University Belfast, UK, and his team monitored five nearby supernovae for up to a year each. They report that the persistent glow of these flare-ups spotted by the Panoramic Survey Telescope and Rapid Response System in Maui, Hawaii, is too bright to be generated by radioactive nickel, the fuel of conventional supernovae. However, both the peak luminosity and the long tail of the light are consistent with stars collapsing to form magnetars — rapidly spinning neutron stars with powerful magnetic fields — that provide an additional reservoir of energy for the supernova. This is the strongest observational evidence so far for this supernova mechanism, the researchers say.

***Astrophys. J.*** 770, **128 (2013)**

CLIMATE CHANGE

## Acidic waters do not toughen corals

Even corals that have spent generations in acidic waters have failed to adapt completely to these harsh conditions.

As atmospheric levels of carbon dioxide increase, the world's oceans are becoming more acidic, with potentially serious consequences for animals that have carbonate skeletons and shells. Adina Paytan at the University of California, Santa Cruz, and her colleagues collected samples from seven colonies of *Porites astreoides* coral that live in the seas off the Yucatan Peninsula in southeastern Mexico, where groundwater springs have produced low-pH conditions for thousands of years. These corals had lower growth rates and experienced higher predation by boring organisms than seven samples of the coral living just beyond the influence of springs. Despite