CLIMATE SCIENCE

Dry heat

Proc. Natl Acad. Sci. USA **109,** 12398–12403 (2012)

Hot days and heatwaves became more frequent in the latter half of the twentieth century. Soil moisture deficits increase the probability of hot extremes, according to global analysis of observational data.

Brigitte Mueller and Sonia Seneviratne, of the Institute for Atmospheric and Climate Science, ETH Zurich, used observational and reanalysis data to examine the relationship between precipitation deficits — a proxy for surface moisture deficits — and hot extremes across the globe between 1979 and 2010. According to their analysis, surface moisture deficits in the three months leading up to the hottest month of the year were associated with an increased number of hot days during that month. A correlation between dryness and heat was apparent in most regions, but the strongest relationships were found in North and South America, Australia, Southern and Eastern Europe, and parts of Asia.

Surface moisture deficits appeared to increase the probability of an above-average number of hot days by 30–60%, relative to wet conditions. Incorporation of this relationship into long-range forecasts could help in the prediction of extreme weather events. *AA*

OCEANOGRAPHY

Tasman eddy express

Geophys. Res. Lett. http://doi.org/h58 (2012)

Where the East Australian Current flows into the Tasman Sea, eddies are spawned. Satellite measurements show an area of exceptionally intense eddy activity in the western Tasman Sea.

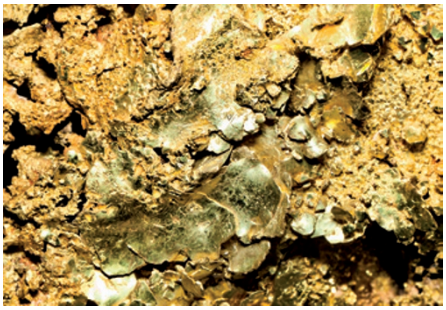
Jason Everett of the University of New South Wales and colleagues assessed Tasman eddy dynamics using a compilation of eddy occurrences and remote sensing of surface ocean properties. They identified a narrow strip of ocean, parallel to the Australian coast between about 32–39° S, where eddies were unusually fast and strong. Eddies in this region, which they term the Eddy Avenue, have greater sea surface temperature anomalies than the Tasman Sea eddy average. They also show greater anomalies in surface chlorophyll *a*, an indicator of phytoplankton activity, than the typical Tasman eddies. Both cyclonic and anticyclonic eddies were more common in this alley than the Tasman Sea as a whole, but the clockwise spinning cyclonic eddies slightly more so.

In the Eddy Avenue, cyclonic eddies often entrain the nutrient-rich coastal waters, and therefore carry water rich in plankton and larval fish, whereas anti-cyclonic eddies remain nutrient poor. These mesoscale processes may dominate variability in the physics and biogeochemistry of the Tasman Sea. *AN*

ECONOMIC GEOLOGY

Gold from destruction

Earth Planet. Sci. Lett. **349–350,** 26–37 (2012)



Many large reserves of gold are thought to have been deposited when the stable interiors of Earth's continents — cratons — formed more than 2.5 billion years ago. The age of gold deposits in the North China Craton, however, implies that some of China's gold may have instead accumulated during the partial destruction of the craton.

Jian-Wei Li at the China University of Geoscience, Wuhan, and colleagues dated deposits of gold located in eastern parts of the North China Craton. They found that the gold was deposited between 154 and 119 million years ago, about 1.7 billion years after the North China Craton formed. Isotopic analyses of the gold deposits indicate a source from the mantle. The gold was deposited during a period of extensive volcanic activity, during which the eastern part of the North China Craton was stretched and extended. The researchers suggest that the vast volumes of gold accumulated when hot mantle material upwelled beneath the stretched eastern craton, as this part of the once-stable land mass was gradually broken up and destroyed.

Giant gold deposits could potentially have formed in other locations where Earth's outer shell has been exposed to intense destruction and volcanic activity. *AW*

PLANETARY SCIENCE

Cosmic rain

Meteoritics Planet. Sci. **47,** 1297–1304 (2012)

A pulse of micrometeorites reaching the Earth's surface following the breakup of an asteroid has been proposed to explain the abundance of extraterrestrial grains in 470-million-year-old rocks in Sweden. An unusual concentration of extraterrestrial material has also been identified in sedimentary rocks of this age in China, suggesting that the micrometeorite rain was a global event.

Carl Alwmark of Lund University and colleagues analysed chromite grains found in 470-million-year-old rocks near the Puxi River, China. The concentrations and isotopic ratios of neon trapped in these grains indicate that they had been directly exposed to the solar wind, suggesting that the grains were formed in the solar system and then delivered to Earth as micrometeorites. The high number of chromite grains points to an influx of micrometeorites two to three orders of magnitude higher than background levels, consistent with the breakup of an asteroid.

Age estimates of the Chinese rocks suggest that the micrometeorite pulse continued for at least two million years following the meteorite-forming event. *TG*

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