

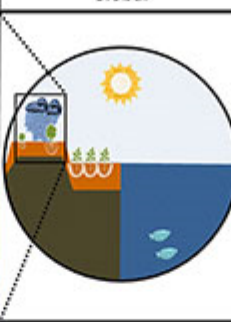


## Soil models: what's in a name?

Soil holds a vast amount of carbon - as much as there is in the atmosphere and above-ground plant matter combined. Yet this reservoir is sensitive to land management and other factors. With that in mind, Nell Campbell and Keith Paustian of Colorado State University reviewed the current scientific thinking behind techniques for modelling soil organic matter and how policymakers apply these models to make land management decisions.

Microsite	Ecosystem	Global
		
<p><b>Use</b> Modeling hypothesized mechanistic relationships, predict short-term and small-scale changes, predict dynamics of measurable soil fractions</p> <p><b>Limitations</b> Dependent on specific soil fractionation method, difficult to link to dynamics at larger scales</p> <p><b>Examples</b> EnzModel, NICA, INDISIM</p>	<p>Hypotheses based on mechanistic or empiric relationships, predict impacts of site-specific changes, simulate site and regional analyses of scenarios</p> <p>Requires site-level data to drive and evaluate model, cannot always represent mechanistic relationships important at smaller scales</p> <p>DAYCENT, RothC, Ecosys</p>	<p>Hypotheses for large-scale dynamics, predict climate change with dynamic soil feedback, simulate global scenarios</p> <p>Requires global-level data to drive and evaluate model, model complexity depends on computational capacity</p> <p>CLM, IBIS, TEM</p>

Scales

Environmentalresearchweb: why did you investigate modelling of organic matter in soils?

<http://environmentalresearchweb.org/cws/article/opinion/66062>

## Satellites confirm sinking of San Francisco tower

25 November 2016




Data from the Sentinel-1 satellites acquired between 22 February 2015 and 20 September 2016 show that Millennium Tower in San Francisco is sinking by about 40 mm a year in the 'line of sight' – the direction that the satellite is 'looking' ...[more](#)  
The Sentinel-1 satellites have shown that the Millennium Tower skyscraper in the centre of San Francisco is sinking by a few centimetres a year. Studying the city is helping scientists to improve the monitoring of urban ground movements, particularly for subsidence hotspots in Europe.

Read more at: <http://phys.org/news/2016-11-satellites-san-francisco-tower.html#iCp>

# Could farmers be facing a new environmental measure?



Margaret Donnelly   
[EMAIL](#)

PUBLISHED  
23/11/2016 | 13:00



Farmers may be held to account for soil quality, if calls for a soil directive are implemented.

The Environmental Pillar, which represents 29 national environmental NGOs, is calling for a Soil Directive, which would make countries protect soils.

Currently there are similar directives which protections for water, air and nature.

<http://www.independent.ie/business/farming/forestry-enviro/could-farmers-be-facing-a-new-environmental-measure-35217653.html>

## Tasmanian crop growers push case to use bumblebees for commercial pollination

By [Carla Howarth](#)

Updated Sun at 5:39pm Sun 27 Nov 2016, 5:39pm

Tasmanian crop growers who have to pollinate crops by hand hope a Senate inquiry will clear the way for bumblebees to do the job instead.





**Photo:** [Tomato grower Marcus Brandsema currently has to pollinate his plants by hand. \(ABC News\)](#)

The inquiry is examining the risks and opportunities associated with their use, which is currently banned under the Environment and Biodiversity Conservation Act.

Tasmania is the only Australian state where the bee has become established.

<http://www.abc.net.au/news/2016-11-27/senate-probes-commercial-bumblebee-pollination/8061554>

## Farmer survey reveals concern, shifting attitudes on climate change

**ABC Rural**

By [Anna Vidot](#)

Posted yesterday at 5:42pm Tue 29 Nov 2016, 5:42pm



**Photo:** [Peter Holding is a mixed farmer from Harden, NSW, and a member of Farmers for Climate Act](#)

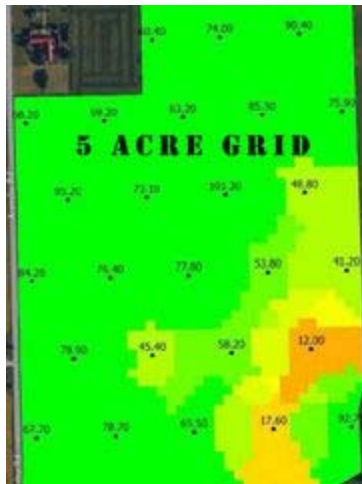
A survey of Australian farmers' attitudes to climate change has found many are concerned, and want their politicians and agricultural representatives to do more.

More than 1,300 primary producers, from a wide range of industries and states, responded to the survey which was organised by Farmers for Climate Action. <http://www.abc.net.au/news/2016-11-29/climate-change-farmer-survey/8075542>

# What soil sampling scheme is right for your operation?

Two overarching types of soil sampling, conventional and grid, exist to guide sampling for soil analysis at a laboratory.(Photo: Supplied)

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WATERTOWN



An example 5 acre grid soil sampling scheme. Differences in color showcase differences in soil nutrient levels. (Photo: Supplied)

Since the early 20th-century soil sampling has proven to be the ideal means to determine the amount of nutrients required for optimal crop production. Thanks to advances in global positioning system (GPS) technology, site-specific soil sampling has gained much attention in more recent years.

<http://www.wisfarmer.com/story/news/2016/08/29/what-soil-sampling-scheme-right-your-operation/89541264/>

## Pauline Hanson visits healthy reef to dispute effects of climate change

Updated Fri at 10:11pm Fri 25 Nov 2016, 10:11pm



**Photo:** [Pauline Hanson with marine scientist Alison Jones as she displays coral near Great Keppel Island. \(AAP Image: Dan Peled\)](#)

One Nation leader Pauline Hanson has been ridiculed for visiting a healthy section of the Great Barrier Reef while denying the effects of climate change.

<http://www.abc.net.au/news/2016-11-25/pauline-hanson-visits-the-great-barrier-reef-climate-change/8059142>

## Time for soil rehab

**There is a new task for farmers: rebuilding organic matter in soils.**

Jonathan Eisenhal and Kurt Lawton



**Hairy vetch plants from the Kingma farm. The extensive roots provide a big part of the benefit to such cover crops, by creating channels for the flow of water and adding to structure and organic matter of the soil.**

Dan Perkins, Jasper (Indiana) SWCD

### Think Different

“After World War II we converted unused ammunition into fertilizers—we literally ‘turned guns into butter’—that’s partly how we became the breadbasket of the world. But all that productivity came at a cost. We lost half our organic matter

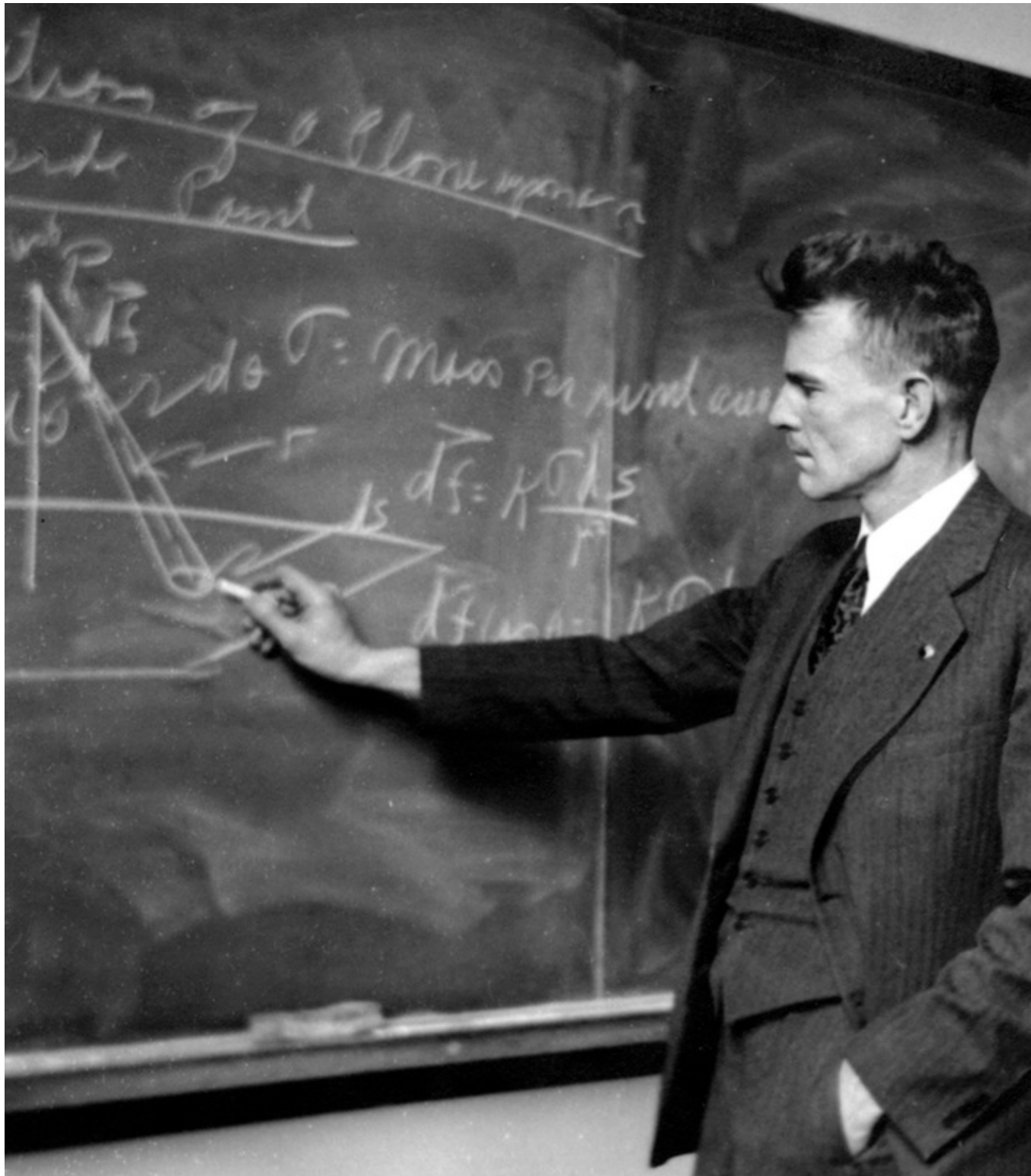
<http://cornandsoybeandigest.com/soil-health/time-soil-rehab>

## Fracking's strange origins

The recent energy boom owes much to a 60-year-old discovery by an American geologist named M. King Hubbert. Mason Inman reports.

**In the 1950s, geologist M. King Hubbert**, known as “the father of peak oil”, warned that crude oil production would eventually peak and then decline. But ironically, he also figured out the mechanics of a technique that would one day expand the life of global oil reserves: hydraulic fracturing.





Geologist M. King Hubbert figured out the complex physics behind hydraulic fracturing.

M. King Hubbert Collection / American Heritage Center / University of Wyoming

[https://cosmosmagazine.com/geoscience/fracking-s-strange-origins?utm\\_source=Today+in+Cosmos+Magazine&utm\\_campaign=5be5558415-RSS\\_EMAIL&utm\\_medium=email&utm\\_term=0\\_5f4ec2b124-5be5558415-179982353](https://cosmosmagazine.com/geoscience/fracking-s-strange-origins?utm_source=Today+in+Cosmos+Magazine&utm_campaign=5be5558415-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-5be5558415-179982353)



# Dr Bill Cotching in a soil pit teaching Tasmanian hobby farmers about soil health

Posted 22 Nov 2016, 1:15pm Tue 22 Nov 2016, 1:15pm



Dr Bill Cotching spends a lot of time in soil pits.

<http://www.abc.net.au/news/2016-11-22/dr-bill-cotching-soil/8046380>

## Pilgrims and soil: what's the connection?

Wisconsin State Farmer 9:39 a.m. CST 15 November 2016

**Madison** — Imagine arriving in a new land only to discover your food supply plans have fallen through.

Our modern Thanksgiving celebration, often sourced from grocers and accessorized with store-bought decor, is missing these “dirty” details. The Soil Science Society of America (SSSA) November 15 Soils Matter blog post explains farming challenges the Pilgrims faced, and their survival thanks to help from the Wampanoag Native Americans.

The early immigrants found unfamiliar conditions in their new setting:

- They had few farming skills;
- The soil was shallow, sandy, and stony;

- They did not have draft animals to help cultivate the soil;
- The soils were quick to dry out, had few nutrients, and little organic matter.

<http://www.wisfarmer.com/story/news/2016/11/15/pilgrims-and-soil-whats-connection/93882682/>

## Antarctic all-female expedition aims to increase number of women in important scientific roles

By [Penny Timms](#)

Posted Fri at 1:42pm Fri 25 Nov 2016, 1:42pm



**Photo:** [Once there the 77 expeditioners will spend 20 days at sea carrying out important scientific work. \(ABC News: Brooke Boney\)](#)

The largest all-female expedition to Antarctica is preparing to make its way to the earth's southernmost continent.

Once there the 77 expeditioners, who all have scientific backgrounds, will spend 20 days at sea carrying out important scientific work. <http://www.abc.net.au/news/2016-11-25/antarctic-expedition-battles-barriers-for-women-in-science/8056914>



# Thin crust hints at moon's watery youth

Experiments show the lunar crust needed water to crystallise to the thickness it is today. Jana Howden reports.



NASA's Galileo spacecraft snapped images – stitched together here – of the moon's north pole in December 1992. A new study suggests the moon's early magma ocean contained water when it crystallised and produced the crust.

NASA

**Looking up at the lump of rock circling our planet**, it's hard to imagine our moon ever harboured water.

But a team in the Netherlands calculated that if the moon's crust formed without water, it would be around twice the thickness it is today.

The work, published in *Nature Geoscience*, provides an insight into the Earth's composition while the moon was still a baby. Did it acquire water from comets and asteroids or was it there all along?

[https://cosmosmagazine.com/geoscience/thin-crust-hints-at-moon-s-watery-youth?utm\\_source=Today+in+Cosmos+Magazine&utm\\_campaign=8f04619ff0-RSS\\_EMAIL&utm\\_medium=email&utm\\_term=0\\_5f4ec2b124-8f04619ff0-179982353](https://cosmosmagazine.com/geoscience/thin-crust-hints-at-moon-s-watery-youth?utm_source=Today+in+Cosmos+Magazine&utm_campaign=8f04619ff0-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-8f04619ff0-179982353)

## Gypsum offers soil and environment boost

Research and farmer results show gypsum offers potential soil chemistry improvements.



Rich Mort and his father Bill compared neighboring fields planted the same day with the same hybrid and starter program. The only difference was no gypsum applied to Bill Mort's field, resulting in sulfur deficiency and lower yields even though sulfur needs were met when side dressed. The 46-bushel difference made believer of Bill and reinforced Rich's confidence in gypsum.

*Gypsoil*

### Think Different

There are areas where gypsum is not the answer. To find areas where it might have a fit, consider the following:

- Check pH, and if low, consider a high calcium or low magnesium lime before or while trying gypsum
- Note calcium and sulfur levels in soil tests and tissue tests
- Evaluate fields for soil structure and ponding Discuss options with trusted advisors; test and evaluate gypsum in your soils and operation <http://cornandsoybeandigest.com/soil-health/gypsum-offers-soil-and-environment-boost>



# Life and death following Great Barrier Reef bleaching

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Dead table corals killed by bleaching on Zenith Reef, on the Northern Great Barrier Reef, November 2016.

*Credit: Greg Torda, ARC Centre of Excellence for Coral Reef Studies*

Scientists have confirmed the largest die-off of corals ever recorded on Australia's Great Barrier Reef.

The worst affected area, a 700 km swath of reefs in the northern region of the Great Barrier Reef has lost an average of 67% of its shallow-water corals in the past 8-9 months. Further south, over the vast central and southern regions of the Great Barrier Reef, the scientists were relieved to find a much lower death toll. <https://www.sciencedaily.com/releases/2016/11/161129090410.htm>

## The decline in emissions also has negative implications



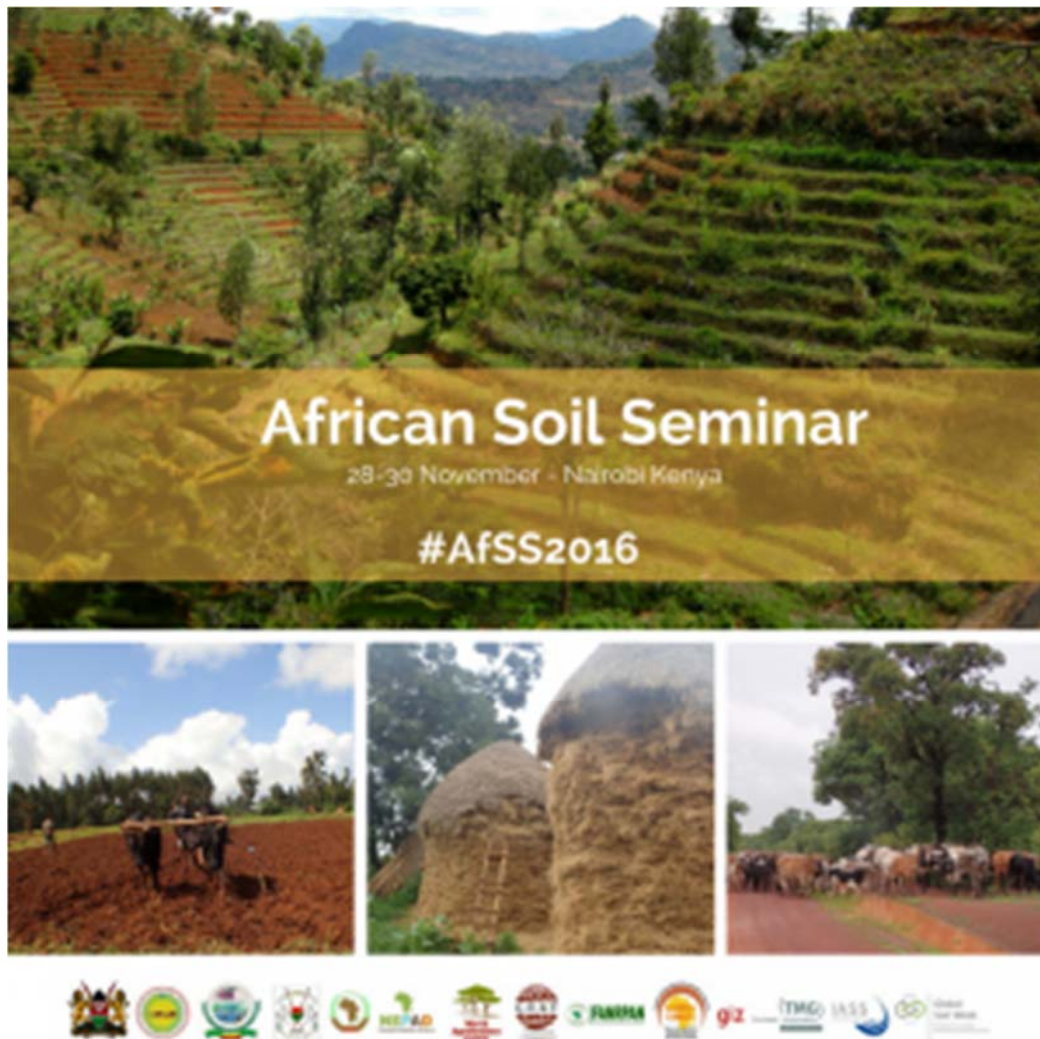
The Rappbode reservoir in the Harz region – it also is affected by the increasing brown colouration of the water. It is one of 36 reservoirs in Germany which have been studied by UFZ scientists in order to identify the causes of increasing ...[more](#)  
In large parts of Europe and North America, the decline in industrial emissions over the past 20 years has reduced pollution of the atmosphere and in turn of soils and water in many natural areas. The fact that this positive development can also have negative implications for these regions has been demonstrated by scientists at the Helmholtz Centre for Environmental Research (UFZ) in the journal *Global Change Biology*. According to their findings, declining nitrate concentrations in the riparian soils surrounding the tributary streams of reservoirs are responsible for the increasing release of dissolved organic carbon (DOC) and phosphate and a deterioration in water quality. In the case of drinking water reservoirs this can cause considerable problems with respect to water treatment.

Read more at: <http://phys.org/news/2016-11-decline-emissions-negative-implications.html#jCp>

## African Soils Seminar

27 Nov 2016





The Global Soil Week team has been trickling in to Nairobi since Wednesday evening with all hands on deck for Monday's kick-off of the first [African Soil Seminar](#). After a long year of planning and preparations, the first regional Soil Week for Africa is now less than 24 hours away. We are excited to say the least!

<http://globalsoilweek.org/areas-of-work/sustainable-development-goals/afss2016-gearing-up>

## **Land Rights Now through Responsible Land Governance**

# GUIDELINES ROOTED IN HUMAN RIGHTS

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Contributing to the UN International Day of the World's Indigenous Peoples and the #LandRightsNow mobilization week, the IASS Global Soil Forum releases a short film with experiences from civil society, government and scientists on the implementation status of [...] <http://globalsoilweek.org/areas-of-work/land-governance-topic/landrightsnow-through-responsible-land-governance>

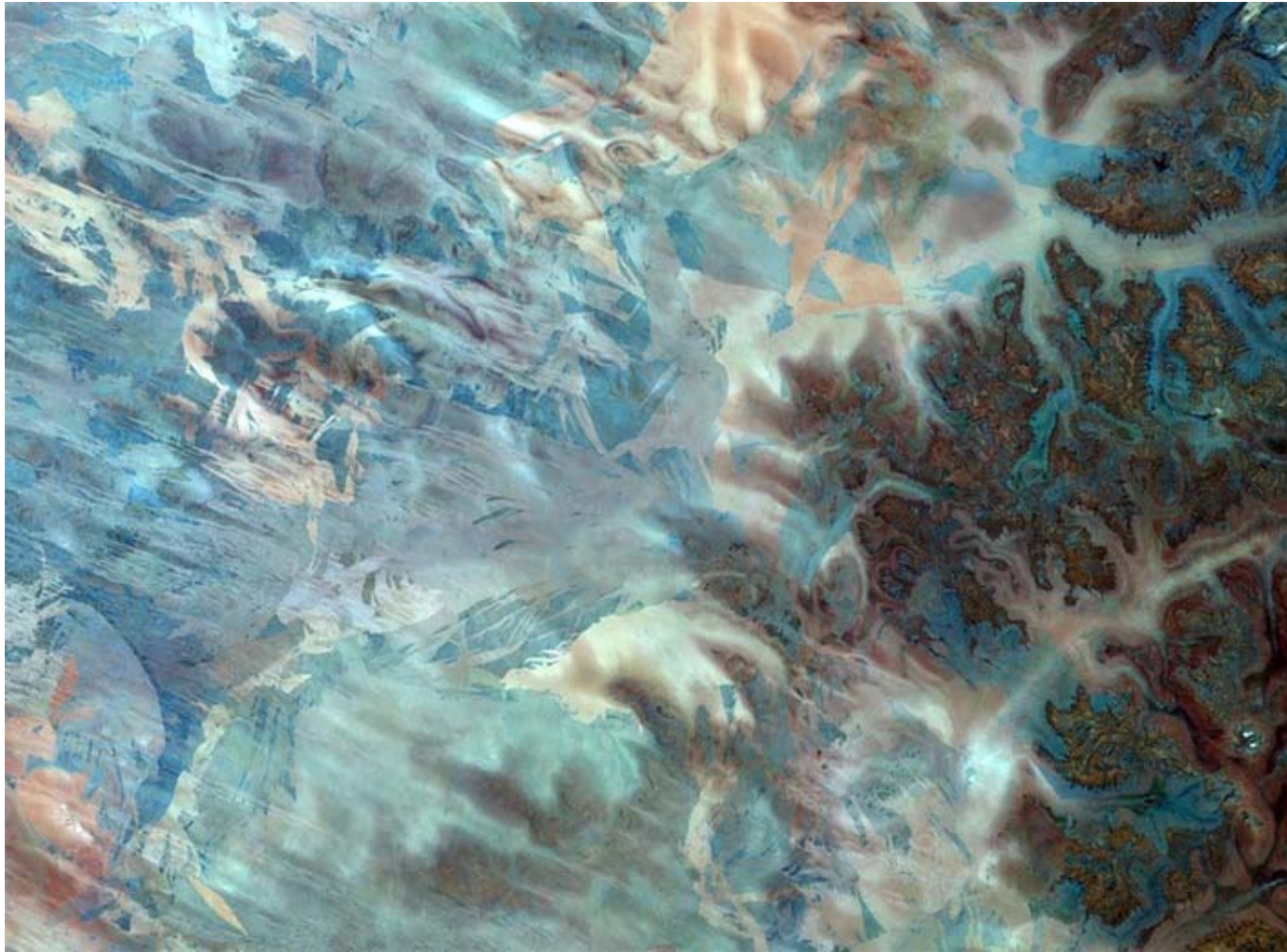
## **Burnt desert**

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Western Australia's Gibson Desert, captured by the Copernicus Sentinel-2A satellite on Christmas Day in 2015.

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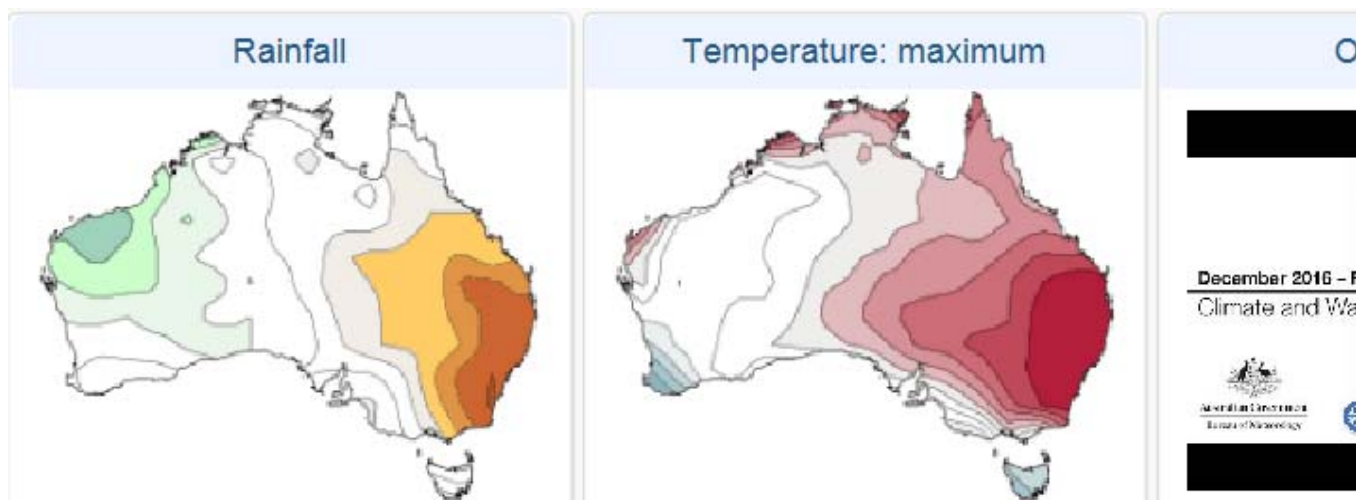
Contains modified Copernicus Sentinel data (2015), processed by ESA  
**The Sentinel-2A satellite takes us over the Gibson Desert** in Western Australia in this false-colour image.

Covering an area larger than 150,000 square kilometres, the desert sports gravel terrains covered by desert grasses, as well as red sandy plains and dunefields. A drought in the 1980s forced the indigenous Pintupi people to the central-eastern area of the desert, where they made contact with Australian society in what is believed to be one of the last first-contact events in Australia.

[https://cosmosmagazine.com/geoscience/burnt-desert?utm\\_source=Today+in+Cosmos+Magazine&utm\\_campaign=fd6005a377-RSS\\_EMAIL&utm\\_medium=email&utm\\_term=0\\_5f4ec2b124-fd6005a377-179982353](https://cosmosmagazine.com/geoscience/burnt-desert?utm_source=Today+in+Cosmos+Magazine&utm_campaign=fd6005a377-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-fd6005a377-179982353)

# Climate outlook overview

- Summer (December to February) rainfall is likely to be below average in parts of the east and above average in northwest WA.
- The December outlook shows a drier month with warmer days for most of the country.
- Warmer days and nights are likely across eastern and northern Australia, with cooler days and nights more likely in Tasmania and southwest WA.
- This outlook is strongly influenced by a climate driver called the Southern Annular Mode (also known as SAM). It is expected to be in a negative phase in December. When this happens in summertime, weather systems are further north than usual, meaning Australia experiences higher pressures than normal, typically associated with reduced rainfall and higher temperatures. The Pacific Ocean, though in a neutral ENSO phase, is tilting slightly towards La Niña, increasing sea surface temperatures in the western Pacific Ocean, including around northern Australia. This may be raising the likelihood of increased rainfall over northwest WA during summer.



<http://www.bom.gov.au/climate/outlooks/#/overview/summary/>

## Novel study shows 'cocktail' of soil bacteria can protect rice plants from deadly forces



University of Delaware junior Jonathon Cottone is working with Professor Harsh Bais to study how microbes can reduce arsenic uptake and help rice plants ward off other problems. Credit: University Of Delaware/Wenbo Fan

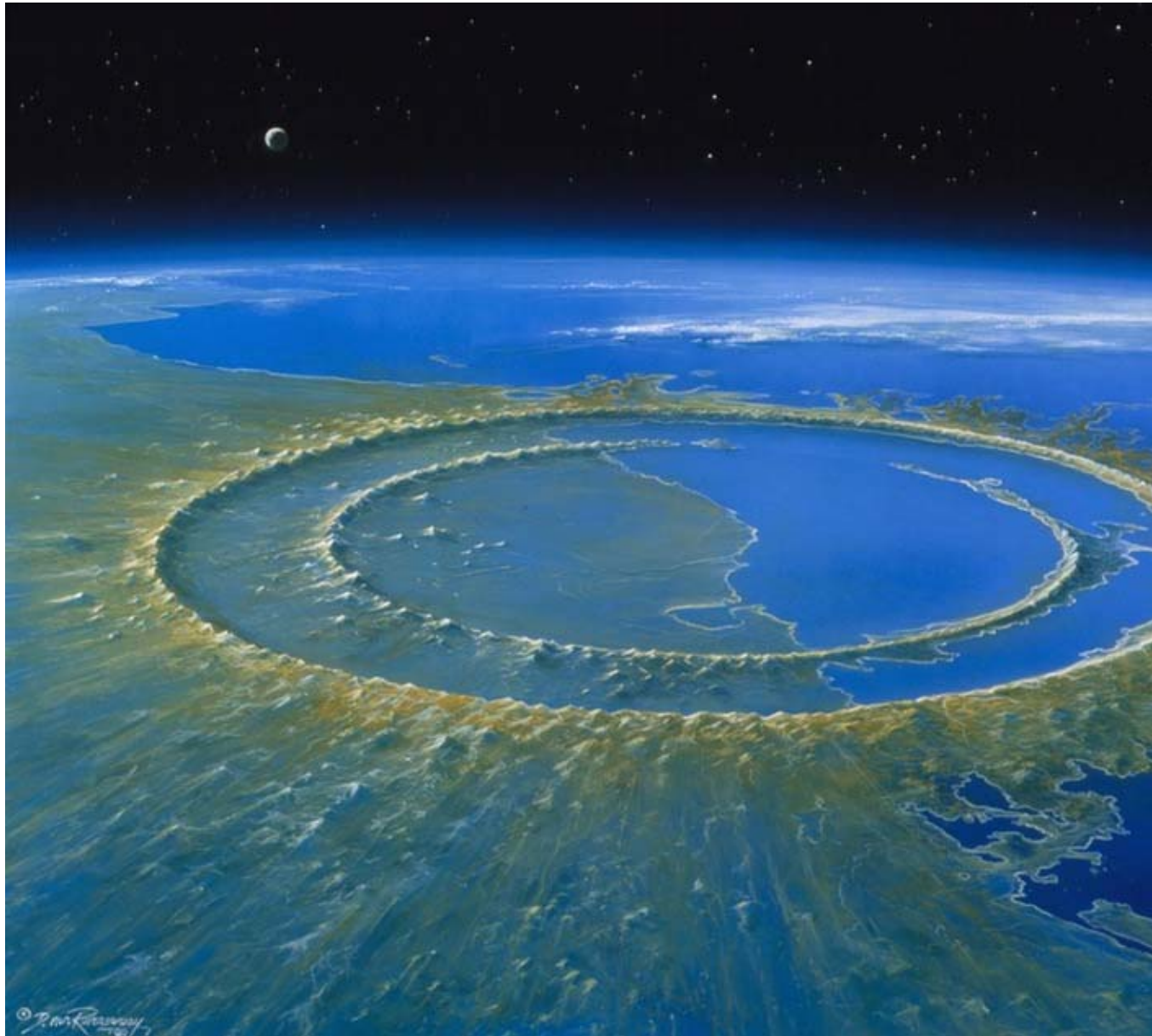
University of Delaware student Jonathon Cottone knows the tell-tale signs that rice plants are getting sick: the yellowing leaves, the faint football-shaped lesions.

<http://phys.org/news/2016-11-cocktail-soil-bacteria-rice-deadly.html>

## **Dino-killing asteroid flipped a patch of Earth's crust inside out**



Rock, tens of kilometres below the surface, was pushed down and pulled up to burst onto the surface in a ring of mountains. Belinda Smith reports.



An artist's impression of the Chicxulub crater soon after it formed, 66 million years ago. Geologists drilling into the inner ring of rock – called the peak ring – suggest it's rock from tens of kilometres below, brought to the surface as the asteroid pulse rebounded.

D Van Ravenswaay / SPL / Getty Images

**The ring of mountains in the giant crater left behind by the collision** that killed the non-avian dinosaurs was formed when masses of rock originating deep within the Earth blasted out and crashed back onto the surface. <https://cosmosmagazine.com/geoscience/dino-killing-asteroid-flipped-a-patch-of-earth-s-crust-inside-out>

## The double wonder of worms— research shows vermicomposting



## can produce cleaner soil and animal feed



Credit: Concordia University

In North America, a whopping 30 to 40 per cent of our residential waste is organic—biodegradable garbage that could be composted but is often sent to landfills.

<http://phys.org/news/2016-11-wormsresearch-vermicomposting-cleaner-soil-animal.html>

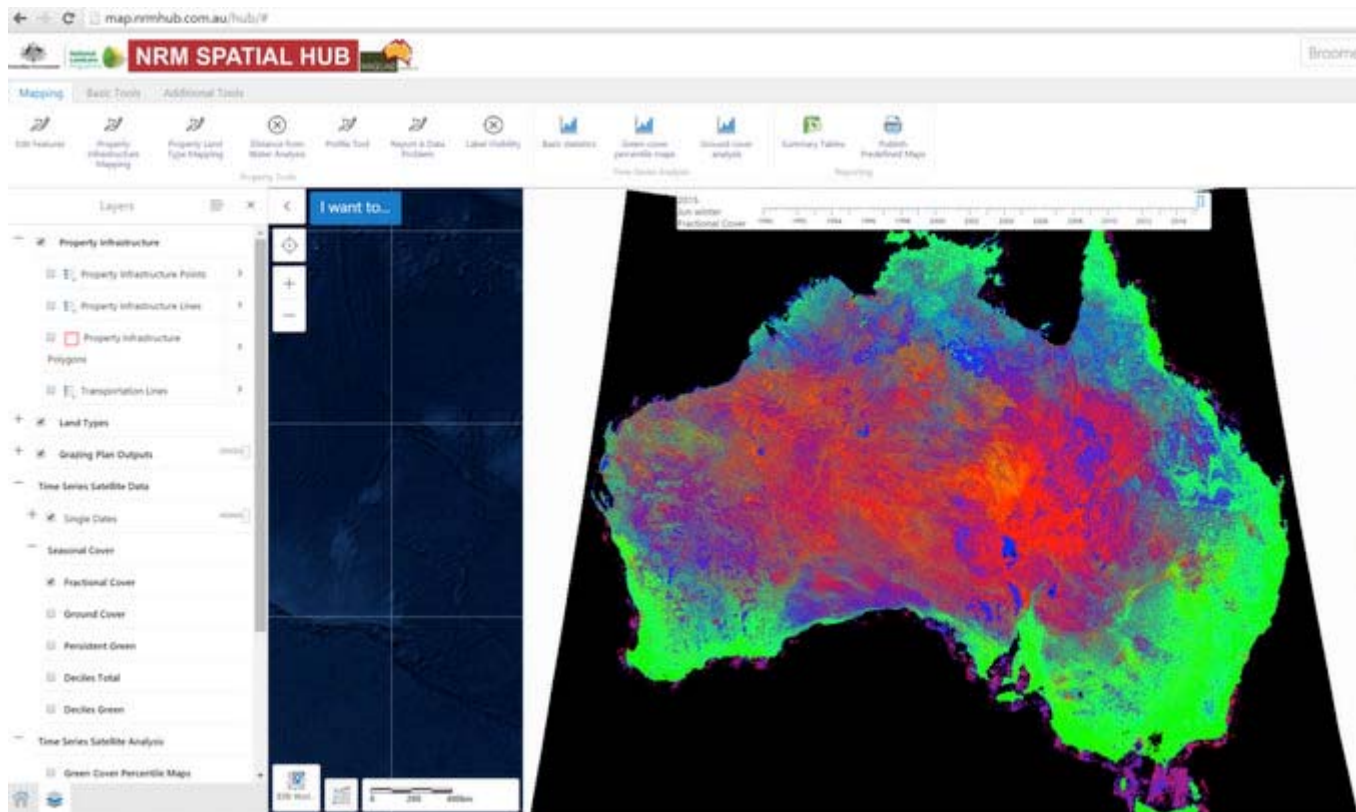
## Online data and tools transforming farm planning and monitoring

A natural resource management, research and industry consortium have used TERN infrastructure to deliver an innovative service that equips landholders to make better decisions for improved productivity and sustainability.

The [NRM Spatial Hub](#) is a web tool that utilises a combination of commercial cloud computing and TERN data and infrastructure to give farm managers the ability to map their properties, analyse land resources and monitor land condition.

In just a few minutes they can access and analyse the latest time-series ground cover data at paddock scales and also compare their property with the neighbours over the last 30 years.

Landholders and industry bodies [...]



*A screenshot from the NRM Spatial Hub showing nation wide ground cover data made available by TERN AusCover*

<http://www.tern.org.au/Newsletter-2016-Oct-NRM-Spatial-Hub-pg31627.html>

## Detecting landscape change with drones

Over the past few years, drones have become widely available to the ecosystem science community and are increasingly providing new avenues and opportunities for conducting and supporting environmental research.

TERN has provided the research infrastructure and collaborative networks to support a landmark project that demonstrates the game changing role drones can play in characterising, mapping and monitoring changes in our natural and managed landscapes, including mapping vegetation and landforms, tracking stock movements, and counting animals such as kangaroos.



Detecting landscape change with drones - Fowler's Gap UAV Campaign 01 from TERN Australia on Vimeo.

<http://www.tern.org.au/Newsletter-2016-Oct-Fowlers-Gap-Drones-pg31637.html>

## Open data drives innovation

A suite of inspiring and practical land management products created thanks to open data from TERN and its NCRIS partners have been recognised at the annual GovHack awards.

The annual [GovHack](#) awards were presented on 22<sup>nd</sup> October at the State Library in Adelaide. GovHack is an annual 'hackathon' competition where participants create programs, apps and useful products using openly accessible government data.

Teams work together over a 46 hour period to explore, mash up, ideate and communicate concepts. It's a competition, and there are prizes, but GovHack is a friendly creative environment.

The best teams have a mix of skills to help contribute to all

<http://www.tern.org.au/Newsletter-2016-Nov-GovHack-Awards-pg31716.html>

## Hard soils no headache for pocket gopher





Credit: University of Queensland

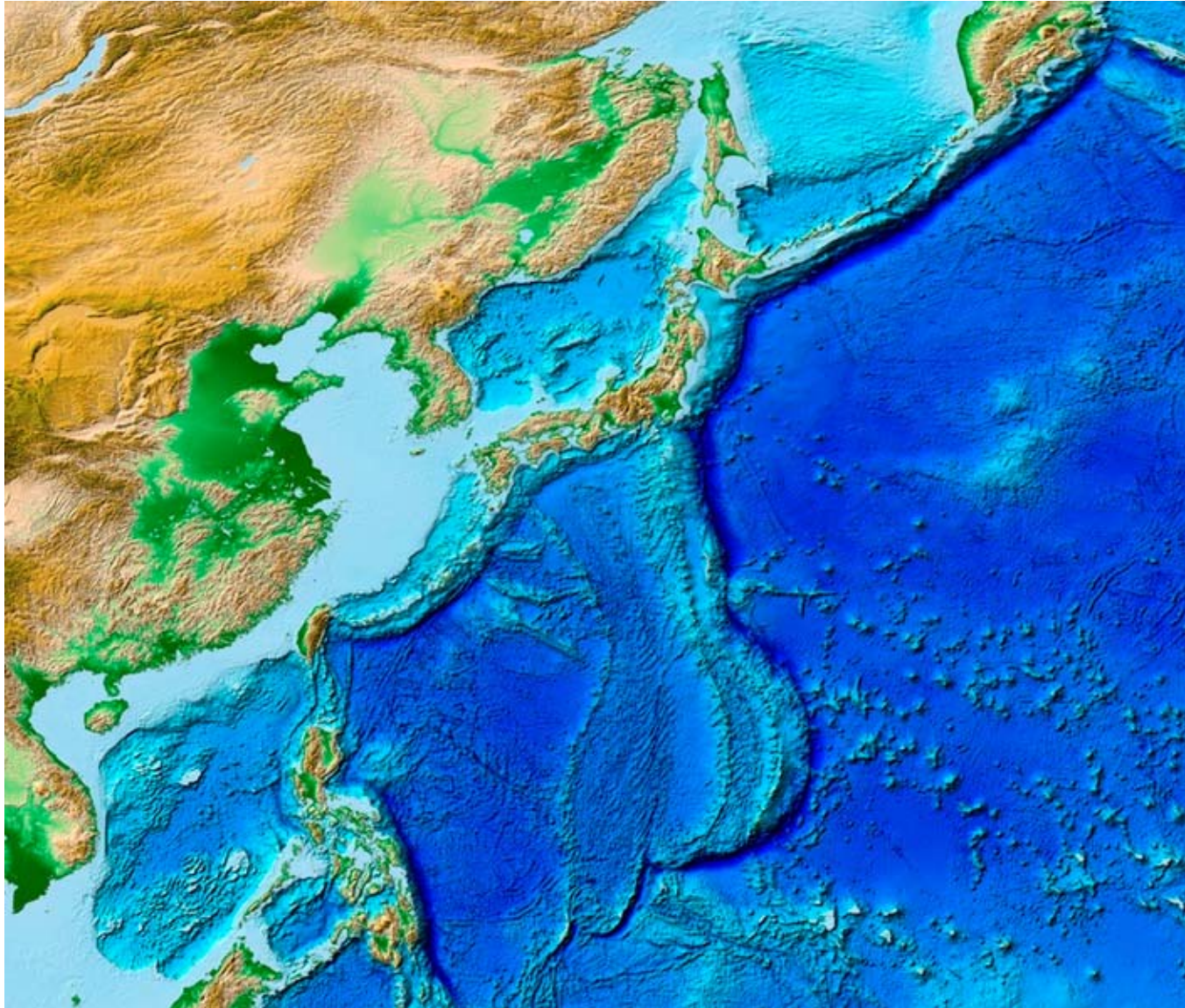
The evolutionary secrets of an extraordinary North American rodent are being uncovered by University of Queensland School of Biological Sciences researchers.

<http://phys.org/news/2016-11-hard-soils-headache-pocket-gopher.html>

## **Mega-earthquakes strike where fault lines are flat**



The biggest earthquakes don't occur where plate boundaries are curved and locked together, spelling bad news for Mexico. Kate Ravillious reports.



The flat north section of the subduction zone sliding beneath Japan – the dark blue line near the top of this image – is a prime spot for earthquakes larger than magnitude-9 to strike, new research says.

NOAA

**When it comes to giant earthquakes**, it's the smooth, ramp-shaped fault lines you need to watch.

New work published in *Science* changes how seismologists understand which parts of the world are capable of producing a mega-quake – magnitude 8.5 or greater – and adds Mexico to the hit list, despite there being no historical evidence of mega-quakes there.

[https://cosmosmagazine.com/geoscience/mega-quakes-strike-where-fault-lines-are-flat?utm\\_source=Today+in+Cosmos+Magazine&utm\\_campaign=a695a4a358-RSS\\_EMAIL&utm\\_medium=email&utm\\_term=0\\_5f4ec2b124-a695a4a358-179982353](https://cosmosmagazine.com/geoscience/mega-quakes-strike-where-fault-lines-are-flat?utm_source=Today+in+Cosmos+Magazine&utm_campaign=a695a4a358-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-a695a4a358-179982353)

# Once started, Antarctica's fastest melting glacier's retreat was unstoppable

An unusually warm ocean in 1945 started the Pine Island Glacier melting. Even though temperatures then returned to normal, the melting still hasn't stopped. Amy Middleton reports.



Crevasses on Pine Island Glacier, the fastest melting glacier in Antarctica.

J Smith

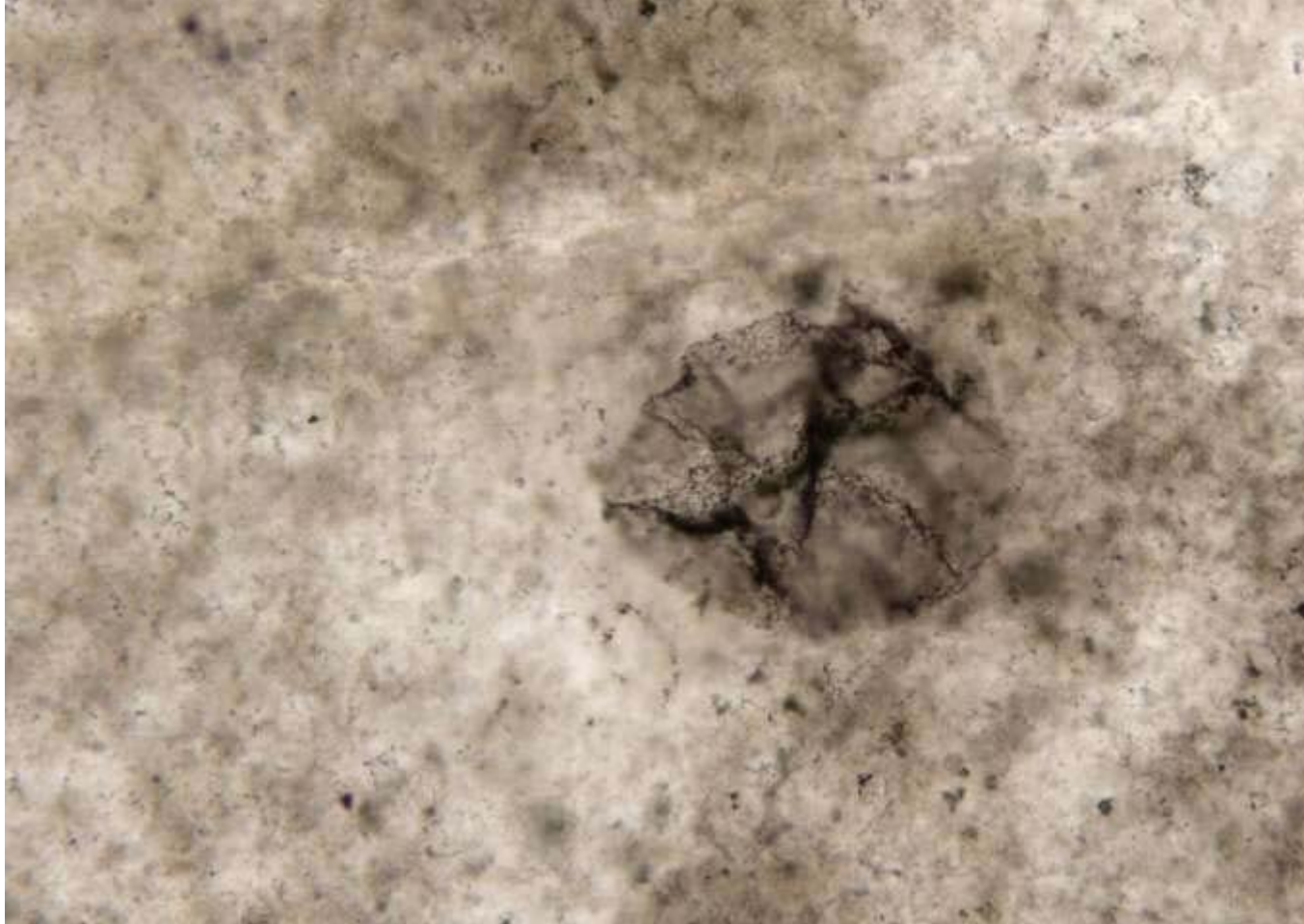
**The fastest draining glacier in Antarctica** began to melt during an unusually strong El Niño in the 1940s. New research shows that once set in motion, the process has turned out to be irreversible.

[https://cosmosmagazine.com/climate/once-started-pine-island-glacier-s-retreat-was-unstoppable?utm\\_source=Today+in+Cosmos+Magazine&utm\\_campaign=3c07db107f-RSS\\_EMAIL&utm\\_medium=email&utm\\_term=0\\_5f4ec2b124-3c07db107f-179982353](https://cosmosmagazine.com/climate/once-started-pine-island-glacier-s-retreat-was-unstoppable?utm_source=Today+in+Cosmos+Magazine&utm_campaign=3c07db107f-RSS_EMAIL&utm_medium=email&utm_term=0_5f4ec2b124-3c07db107f-179982353)



# Geologist uncovers 2.5 billion-year-old fossils of bacteria that predate the formation of oxygen

29 November 2016 by Melanie Schefft



A microscopic image of 2.5 billion-year-old sulphur-oxidizing bacterium. Credit: Andrew Czaja, UC assistant professor of geology  
Somewhere between Earth's creation and where we are today, scientists have demonstrated that some early life forms existed just fine without any oxygen.

Read more at: <http://phys.org/news/2016-11-geologist-uncovers-billion-year-old-fossils-bacteria.html#jCp>

## How much carbon and nitrogen is there on planet Earth?



29 November 2016 by Mary L. Martialay



Credit: Rensselaer Polytechnic Institute

Carbon and nitrogen are central to life on Earth – life cannot exist without them, but an overabundance in the atmosphere imperils the life we have. So how much carbon and nitrogen is there on (and in) planet Earth? And how much was in the ancient atmosphere? Actually, no one is really sure.

Read more at: <http://phys.org/news/2016-11-carbon-nitrogen-planet-earth.html#jCp>

## **Team develops algorithm to improve online mapping of disaster areas**

28 November 2016



First Second Third

Yingjie Hu, UT assistant professor of geography, has developed an algorithm to improve online mapping of disaster areas. The image shows grid cells for disaster mapping (left) and cells prioritized using color codes (right). Credit: Yingjie Hu  
When an 8-magnitude earthquake struck Yingjie Hu's home province of Sichuan, China, in 2008, he was more than 1,000 miles away attending college in Shanghai. While Hu wanted to help, there wasn't much he could do due to the long distance.

Read more at: <http://phys.org/news/2016-11-team-algorithm-online-disaster-areas.html#iCp>

## Why are there volcanoes on an island that isn't near any tectonic boundaries?

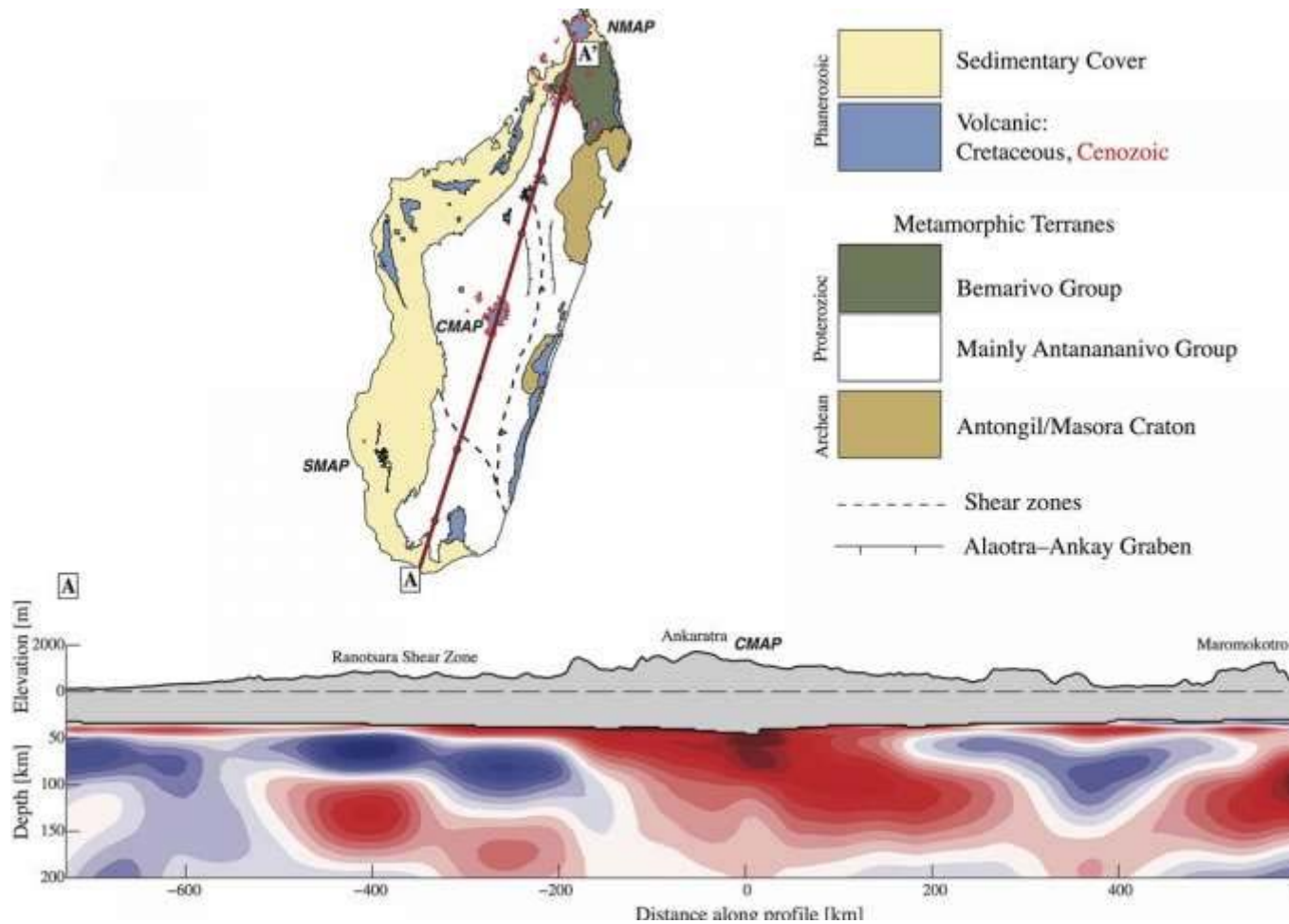


28 November 2016



Field of volcanoes on the island of Madagascar puzzles geologists. What is the source of the heat that melts the rock? Credit: Rando Trek VTT





Seismic images showed areas of hotter rock underlying elevated areas of recent volcanism (NMAP and CMAP on the seismic image; red outlines on the inset map).  
Credit: Martin Pratt

Madagascar, the big island off the east coast of Africa with the lemurs and baobabs, is thought to be sitting in the middle of an old tectonic plate, and so, by the rules of plate tectonics, should be tectonically quiet: few earthquakes and no volcanoes.

Read more at: <http://phys.org/news/2016-11-volcanoes-island-isnt-tectonic-boundaries.html#jCp>

## Researchers find biggest exposed fault on Earth

28 November 2016



Credit: Australian National University  
Geologists have for the first time seen and documented the Banda Detachment fault in eastern Indonesia and worked out how it formed.

Read more at: <http://phys.org/news/2016-11-biggest-exposed-fault-earth.html#jCp>



**“We have less and less organic matter, and fewer and fewer people who know what it feels, smells or tastes like.”** *Slow Money founder Woody Tasch at Food + Enterprise, 28 February 2015 in Brooklyn, NY*