

## Will grassland soil weather a change?

16 December 2015



A view of the experimental layout after initiation of warming and precipitation treatments, just prior to the first plant harvest at the site in June 2009. Credit: Photo credit Jim Nelson.

There's more to an ecosystem than the visible plants and animals. The soil underneath is alive with vital microbes. They make sure nutrients from dead plant and animal material are broken down and made useable by other plants. This completes the process of nutrient cycling and carbon storage.

Read more at: <http://phys.org/news/2015-12-grassland-soil-weather.html#jCp>

# Growing crops on organic soils increases greenhouse gas emissions

17 December 2015 by Janne Hansen



The climate can be given a helping hand by taking organic soils out of rotation. Credit: Mogens H. Greve

Growing agricultural crops on organic (peat) soils is not good for the climate. When organic soils are drained and cultivated the organic matter in the soil will decompose which leads to emissions of greenhouse gases. This emission makes up as much as 6 percent of Denmark's total greenhouse gas emission. The good news is that we can do something about it.

Read more at: <http://phys.org/news/2015-12-crops-soils-greenhouse-gas-emissions.html#jCp>

## Report dishes the dirt on world soil health

10 December 2015



A report by the Intergovernmental Technical Panel on Soils says 33 per cent of land is moderately to highly degraded.

Massey University has contributed to a report issued by the Intergovernmental Technical Panel on Soils, stating that the world's soils are at best only in fair condition and in some areas are very poor.

Read more at: <http://phys.org/news/2015-12-dishes-dirt-world-soil-health.html#jCp>

## Ethiopia: Soil Mapping Crucial to Know Deficit Nutrient, Proper Fertilizer

By Alazar Shiferaw

It is needless to say that healthy and productive soil is fundamental for all forms of life, ecosystems, agricultural productivity and ensuring food security.

However, insufficient soil conservation has resulted in highly degraded soils, causing low agricultural productivity and food insecurity. Hence, carrying out urgent soil conservation and increasing nationwide awareness on good soil health management is crucial for nation's soils for productivity and for healthy lives. <http://allafrica.com/stories/201512101544.html>

# Army Corps finds more radioactive soil at homes and businesses in north St. Louis County

By Véronique LaCapra • 7 Dec 2015

The U.S. Army Corps of Engineers has found more radioactive contamination along a north St. Louis County creek.

The latest round of sampling detected radioactive soil at three homes and four businesses near Coldwater Creek. That's in addition to the contamination found this summer at four homes and the Chez Paree apartment complex near Palm Drive in Hazelwood. <http://news.stlpublicradio.org/post/army-corps-finds-more-radioactive-soil-homes-and-businesses-north-st-louis-county>

## 'Smoke detector' enables fungal partnership that allowed plants to first survive on land

17 December 2015



This microscopic image shows the spores and hyphae of 'friendly' arbuscular mycorrhizal fungus interacting with a plant root. Credit: Paszkowski lab, Cambridge

New research has revealed that a plant protein known to detect growth-promoting compounds in smoke from burning vegetation has a much older and broader role: recognising initial signals sent from the beneficial soil fungi that deliver nutrients directly into plant cells.

Read more at: <http://phys.org/news/2015-12-detector-enables-fungal-partnership-survive.html#jCp>

## Competition launched to recognise leaders in soil health

[Oliver Hill](#)

Friday 11 December 2015 8:02



©Tim Scrivener

Growers who put soil health at the heart of their business are being encouraged to enter the Soil Farmer of the Year competition for a chance to win £250 worth of green manure seed.

The award aims to find and recognise growers who are passionate about managing their soils in a way that supports productive agriculture and biodiversity, while reducing greenhouse gas emissions and building soil organic matter and carbon.

<http://www.fwi.co.uk/arable/competition-launched-recognise-leaders-soil-health.htm>

# Fewer landslides than expected after 2015 Nepal earthquake

16 December 2015



This composite photo shows the village of Langtang, located within the Himalayan mountain region of Nepal, before and after the April 25, 2015 Gorkha earthquake. More than 350 people are estimated to have died as a result of the ...[more](#)

Fewer landslides resulted from the devastating April 2015 Nepal earthquake than expected, reports a University of Arizona-led international team of scientists in the journal *Science*.

Read more at: <http://phys.org/news/2015-12-landslides-nepal-earthquake.html#jCp>

## Impact of soil degradation on agricultural productivity in Iran

By Serge R. Nakouzi The FAO Representative to Iran and ECO



The commemoration of World Soil Day on 5 December marked the closure of the 2015 International Year of Soils, which throughout the past year had sought to raise awareness of the importance of healthy soils not only for sustaining our ecosystem but also in ensuring the well-being of humanity and in securing global food security through enhanced agricultural productivity.

[http://www.tehrantimes.com/index\\_View.asp?code=251432](http://www.tehrantimes.com/index_View.asp?code=251432)

### **Bacteria battle: How one changes appearance, moves away to resist the other**



Two types of bacteria found in the soil have enabled scientists at Texas A&M AgriLife Research to get the dirt on how resistance to antibiotics develops along with a separate survival strategy.

*Credit: Texas A&M AgriLife photo by Kathleen Phillips*

Two types of bacteria found in the soil have enabled scientists at Texas A&M AgriLife Research to get the dirt on how resistance to antibiotics develops along with a separate survival strategy.

The study, published in the journal *PLOS Genetics* this month, identifies an atypical antibiotic molecule and the way in which the resistance to that molecule arises, including the identity of the genes that are responsible, according to Dr. Paul Straight, AgriLife Research biochemist.

1. Reed M. Stubbendieck, Paul D. Straight. **Escape from Lethal Bacterial Competition through Coupled Activation of Antibiotic Resistance and a Mobilized Subpopulation.** *PLOS Genetics*, 2015; 11 (12): e1005722 DOI: [10.1371/journal.pgen.1005722](https://doi.org/10.1371/journal.pgen.1005722)

<http://www.sciencedaily.com/releases/2015/12/151218130339.htm>

## Call to protect soil

Vuniwaqa Bola-Bari

Wednesday, 9 December 2015

THE International Federation of Organic Agriculture Movements (IFOAM) Organics International has called on leaders at the COP21 in Paris to include regenerative agricultural practices that protect soil as part of their solutions to climate change.

A statement from IFOAM reveals science shows that organically-managed soil have the potential to be a powerful ally in this process.

"Healthy soil are key to biodiversity, food security and play a fundamental role in fighting climate change. Carbon-rich soil are like sponges absorbing water during floods and releasing it during drought."

<http://www.fijitimes.com/story.aspx?id=333152>

## Enhanced rock weathering could counter fossil-fuel emissions and protect our oceans



14 December 2015



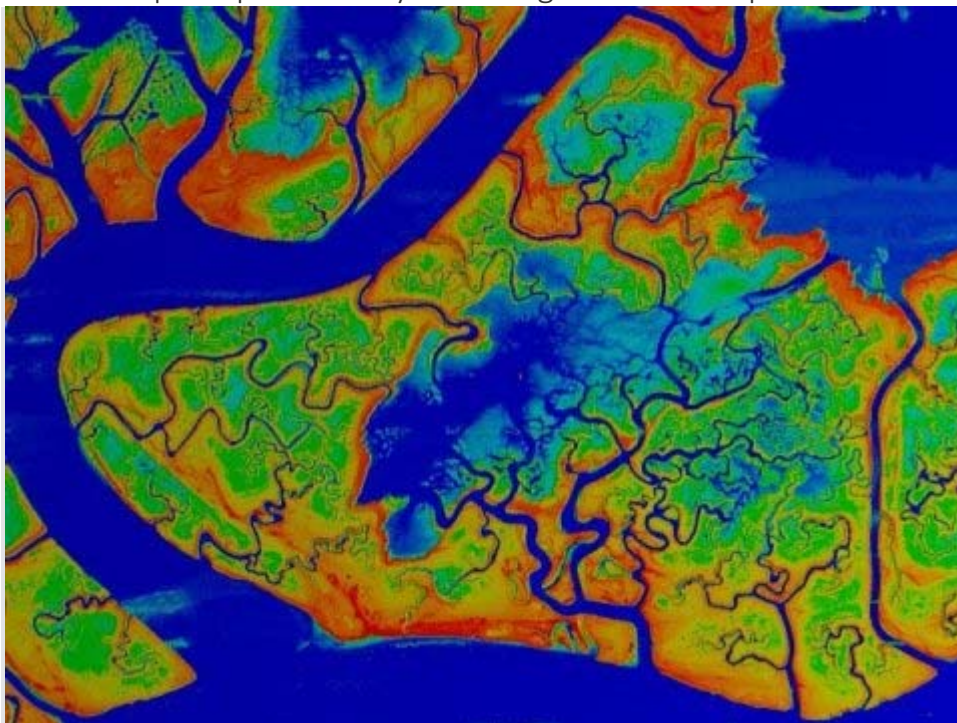
Credit: Tiago Fioreze / Wikipedia

Scientists have discovered enhanced weathering of rock could counter man-made fossil fuel CO<sub>2</sub> emissions and help to protect our oceans.

Read more at: <http://phys.org/news/2015-12-weathering-counter-fossil-fuel-emissions-oceans.html#jCp>

## **Coastal marshes more resilient to sea-level rise than previously believed**

Increased plant productivity and soil generation help marshes adapt



An aerial image with false colors shows marsh elevations in the Venice Lagoon.

*Credit: Marco Marani, Duke University*

Accelerating rates of sea-level rise linked to climate change pose a major threat to coastal marshes and the vital carbon capturing they perform. But a new Duke University study finds marshes may be more resilient than previously believed.

The research, published this month in the *Proceedings of the National Academy of Sciences*, shows that the significant boost in marsh plant productivity associated with elevated levels of atmospheric carbon dioxide will allow marshes to trap more sediment and create more organic soil.

**Journal Reference:**

1. Katherine M. Ratliff, Anna E. Braswell, Marco Marani. **Spatial response of coastal marshes to increased atmospheric CO<sub>2</sub>**. *Proceedings of the National Academy of Sciences*, 2015; 201516286 DOI: [10.1073/pnas.1516286112](https://doi.org/10.1073/pnas.1516286112)  
<http://www.sciencedaily.com/releases/2015/12/151218084337.htm>

## Healthy soils are critical for global food production



A farming family in Zimbabwe enriches the soil with manure to help make it more fertile. Healthy soils are critical for global food production and provide a range of environmental benefits. ©IFAD/Horst Wagner

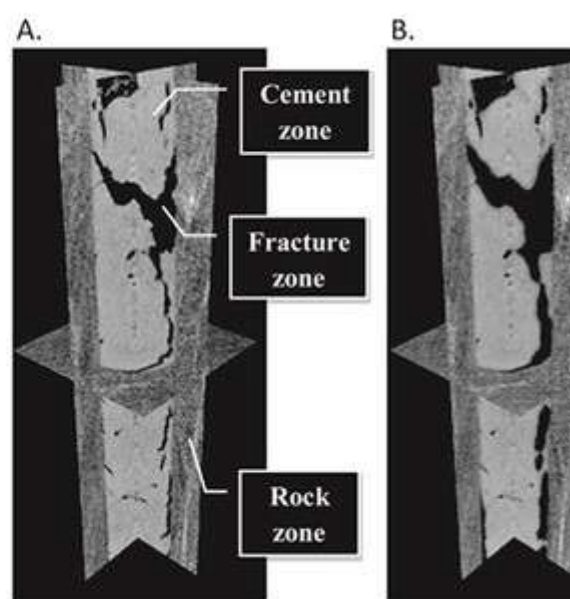
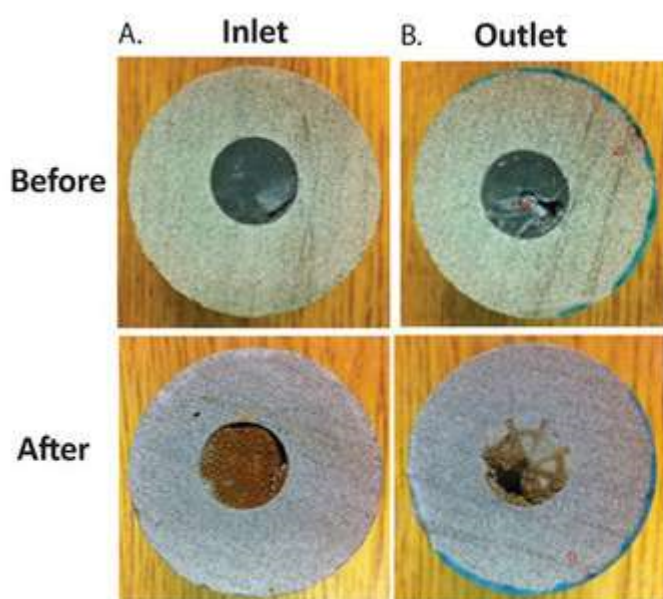
*On [World Soil Day](#), IFAD calls for improved soil management to help improve yields and food security for many rural poor people*

**Rome, 7 December 2015** – Soils are the basis for 95 per cent of the world's food production. Yet many people are failing to connect the importance of soil with food, water, climate, biodiversity and life.

This is why, on 5 December, the United Nations celebrated World Soil Day, which highlighted the vital role soils play around the world in global food and nutritional security. <http://www.ifad.org/events/soil2015/index.htm>

## Cracks in abandoned wells could hinder carbon sequestration efforts

15 December 2015 by Liam Jackson



Penn State professors Zuleima Karpyn and Li Li are researching the impact of abandoned wells on underground carbon sequestration into saline aquifers. On the left is a piece of a cement well they recreated for laboratory testing; 'A' ...[more](#)

In search of ways to reduce greenhouse gas emissions, engineers are investigating the feasibility of sequestering carbon dioxide in saltwater aquifers deep underground. New Penn State research suggests that cracks in abandoned oil and gas wells, depending on their size and other factors, may impede sequestration efforts. Read more at: <http://phys.org/news/2015-12-abandoned-wells-hinder-carbon-sequestration.html#jCp>

## Scientists peg Anthropocene to first farmers

Study shows 300-million-year natural pattern ended 6,000 years ago because of human activity

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Ox team farming (stock image). When did human domination of the planet start, asks a new study that now reports a dramatic shift in one of the rules of nature about 6,000 years ago—connected to growing human populations and the rise of farming. Nick Gotelli used his expertise on ecological statistics to find the pattern.

*Credit: © Pworadilok / Fotolia*

A new analysis of the fossil record shows that a deep pattern in nature remained the same for 300 million years. Then, 6,000 years ago, the pattern was disrupted -- at about the same time that agriculture spread across North America.

"When early humans started farming and became dominant in the terrestrial landscape, we see this dramatic restructuring of plant and animal communities," said University of Vermont biologist Nicholas Gotelli, an expert on statistics and the senior author on the new study.

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**Journal Reference:**

1. S. Kathleen Lyons, Kathryn L. Amatangelo, Anna K. Behrensmeyer, Antoine Bercovici, Jessica L. Blois, Matt Davis, William A. DiMichele, Andrew Du, Jussi T. Eronen, J. Tyler Faith, Gary R. Graves, Nathan Jud, Conrad Labandeira, Cindy V. Looy, Brian McGill, Joshua H. Miller, David Patterson, Silvia Pineda-Munoz, Richard Potts, Brett Riddle, Rebecca Terry, Anikó Tóth, Werner Ulrich, Amelia Villaseñor, Scott Wing, Heidi

Anderson, John Anderson, Donald Waller, Nicholas J. Gotelli. **Holocene shifts in the assembly of plant and animal communities implicate human impacts.** *Nature*, 2015; DOI: [10.1038/nature16447](https://doi.org/10.1038/nature16447)

<http://www.sciencedaily.com/releases/2015/12/151217143546.htm>

## Soil provides new microbial sources for natural products

14 December 2015



The role of the soil as a treasure trove of new, useful, natural products is again confirmed by the discovery of as yet unknown genes in *Lysobacter* bacteria. Research conducted by Wageningen UR and NIOO shows that these genes or gene clusters probably code for currently unknown antimicrobial substances.

Read more at: <http://phys.org/news/2015-12-soil-microbial-sources-natural-products.html#jCp>

## Soils and Seasons brings SA to the plate

9 December 2015

The Adelaide Convention Centre (ACC) has launched a new food philosophy designed to tell the stories of the South Australian farmers, fishers and growers and winemakers.



Launched by executive chef Gavin Robertson, “Soils and Seasons” celebrates the provenance of food and in particular how regional soil, climate and production methods influence the flavour of the food, and will be served up to national and international guests putting the spotlight on South Australia’s premium produce.

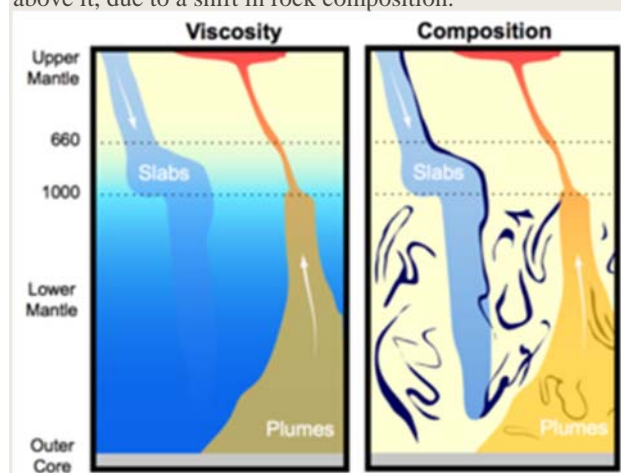
- See more at: <http://www.cimmagazine.com/2015/12/09/soils-and-seasons-brings-sa-to-the-plate/#sthash.zTQluRda.dpuf>

## Twin Studies Provide First Explanations for Boundary Within Earth’s Mantle

*UMD geologists co-author first studies to explain an observed physical transition hundreds of miles below Earth’s surface*

Earth’s mantle, the large zone of slow-flowing rock that lies between the crust and the planet’s core, powers every earthquake and volcanic eruption on the planet’s surface. Evidence suggests that the mantle behaves differently below 1 megameter (1,000 kilometers, or 621 miles) in depth, but so far seismologists have not been able to explain why this boundary exists.

Two new studies co-authored by University of Maryland geologists provide different, though not necessarily incompatible, explanations. One study suggests that the mantle below 1 megameter is more viscous—meaning it flows more slowly—than the section above the boundary. The other study proposes that the section below the boundary is denser—meaning its molecules are more tightly packed—than the section above it, due to a shift in rock composition.



[Sinking slabs of ocean crust and rising plumes of hot rock in Earth's mantle are observed to behave differently below one megameter \(1,000 kilometers\) depth. Two explanations for this behavior were published on December 11, 2015. At left, Rudolph et al. \(Science, 2015\) propose a viscosity increase \(dark blue\) below the megameter boundary. At right, Ballmer et al. \(Science Advances, 2015\) propose a density increase due to accumulated ocean crust \(dark squiggles\) below the boundary](#)

<http://cmns.umd.edu/news-events/features/3353>

## Size does not always matter for root systems

14 December 2015 by Jo Fulwood, Sciencenetwork Wa



A wheat crop efficiently taking up nitrogen is critical to its growth, grain yield, grain protein and ultimately, its profitability for the wheat grower, Dr Palta says. Credit: Sleepy Claus

Scientists will dramatically change the direction of their breeding efforts to improve nitrogen uptake by wheat, after the release of findings suggesting wheat genotypes with smaller root systems might be better suited to WA's water and nitrogen leaching soils.

Read more at: <http://phys.org/news/2015-12-size-root.html#jCp>

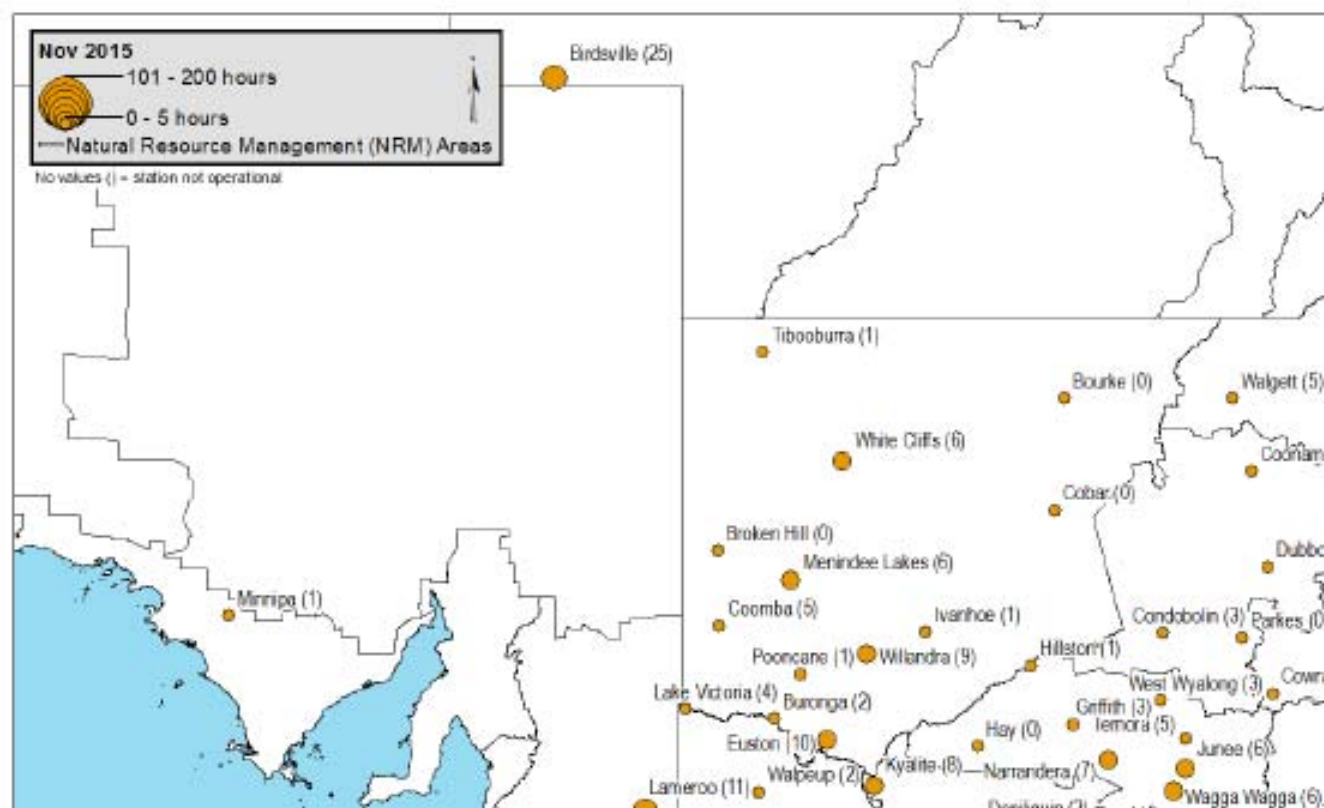
<b>Dust activity</b>	Dust storm on 25, 26 and 30 November
<b>Wind strength</b>	Stronger than last month; average for November
<b>Groundcover</b>	Substantial decline across large areas
<b>Rainfall</b>	Above average for NSW and SA; below average
<b>Land management</b>	Summer harvest almost completed

### Dust activity

November 2015 was the third warmest November since the Bureau of Meteorology began recording temperatures in New South Wales 100 years ago. Combined with September and October makes this the second warmest spring record. The higher than average temperatures intensified the decline in groundcover across large areas.

Very strong winds ahead of cold fronts on 25, 26 and 30 November 2015 created moderate dust storms with visibilities of less than 1 kilometre in the southern part of the network.

Good rainfall was recorded across large parts of New South Wales and South Australia with many areas receiving in excess of 100mm. These falls were predominantly in the early part of November.





## Plants crawled onto land earlier than we give them credit, genetic evidence suggests



This photo shows green algae *Spirogyra*, which reproduce sexually by a process known as conjugation.

*Credit: Gert Hansen, SCCAP, Copenhagen*

Plant biologists agree that it all began with green algae. At some point in our planet's history, the common ancestor of trees, ferns, and flowers developed an alternating life cycle--presumably allowing their offspring to float inland and conquer Earth. But on December 16 in *Trends in Plant Science*, Danish scientists argue that some green algae had been hanging out on land hundreds of millions of years before this adaptation and that land plants actually evolved from terrestrial, not aquatic, algae.

Botanists have suspected this possibility since 1980, but supporters have lacked proof. Now, Carlsberg Laboratory's Jesper Harholt and University of Copenhagen's Øjvind Moestrup and Peter Ulvskov present genetic and morphological evidence that corroborates the theory. Notably, traits that land plants use to survive on land today are well conserved in some species of green algae.

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**Journal Reference:**

1. Jesper Harholt, Øjvind Moestrup, Peter Ulvskov. **Why Plants Were Terrestrial from the Beginning.** *Trends in Plant Science*, 2015; DOI: [10.1016/j.tplants.2015.11.010](https://doi.org/10.1016/j.tplants.2015.11.010)

<http://www.sciencedaily.com/releases/2015/12/151216134406.htm>

## Soils are Alive

Soil is a living, dynamic resource at the surface of the earth. It is a complex habitat of mineral and organic particles; living organisms including plant roots, microbes, and larger animals; and pores filled with air or water. So it may come as no surprise that one gram of soil contains 100 million to 1 billion bacteria, several thousand protozoa (up to several hundred thousand in forest soils), and 10 to several hundred nematodes. It has been said that a handful of soil can have more living organisms than there are people on this planet. Some organisms in the soil are large and easily seen with the unaided eye, while others have to be magnified by 1,000 times.



<https://alldailydirt.wordpress.com/2015/07/02/july-soils-are-alive/>

# 10,000-year record shows dramatic uplift at Andean volcano

17 December 2015 by David Tenenbaum

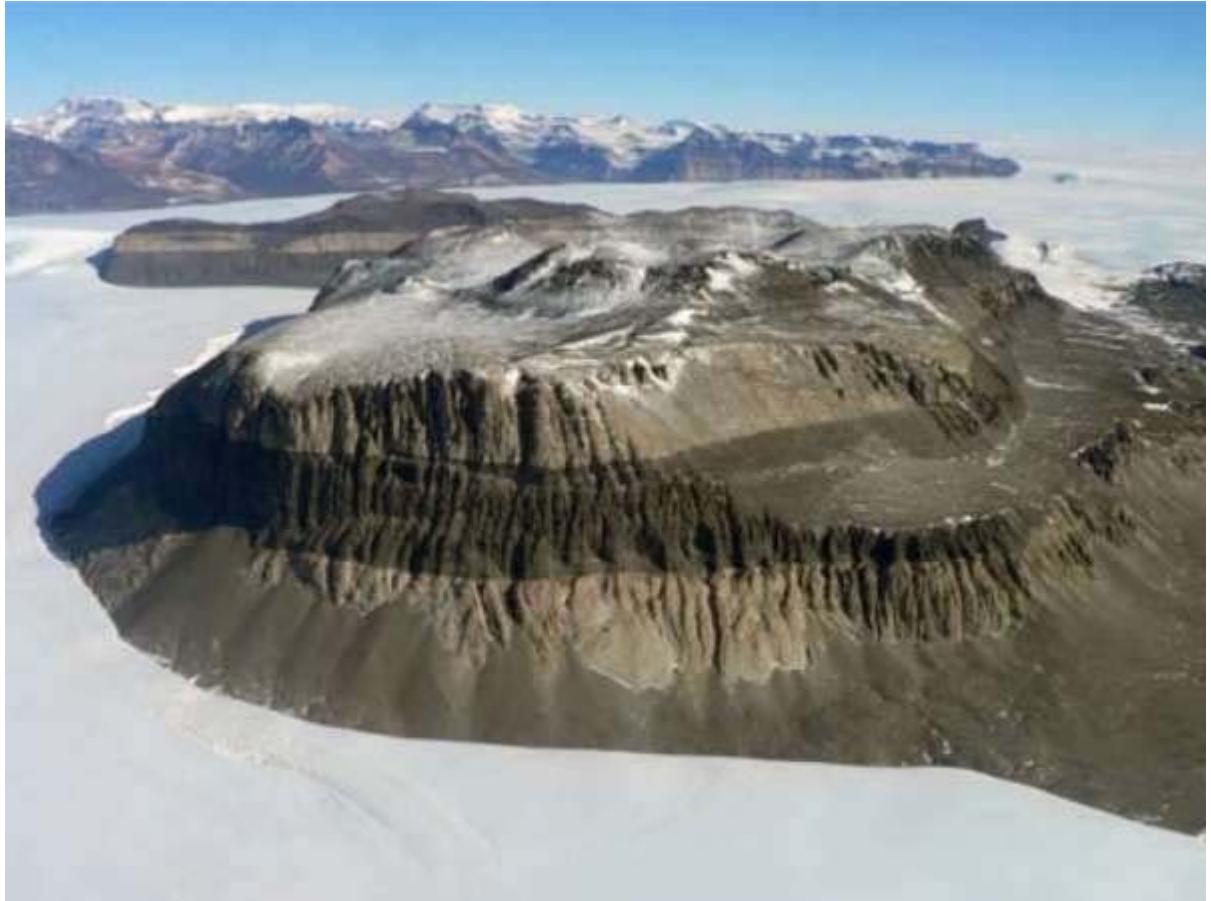


Basil Tikoff, professor of geoscience at UW–Madison, uses a precise GPS instrument to record shoreline altitude at Laguna del Maule. Credit: Brad Singer

Ongoing studies of a massive volcanic field in the Andes mountains show that the rapid uplift which has raised the surface more than six feet in eight years has occurred many times during the past 10,000 years.

Read more at: <http://phys.org/news/2015-12-year-uplift-andean-volcano.html#jCp>

## East Antarctic Ice Sheet has stayed frozen for 14 million years

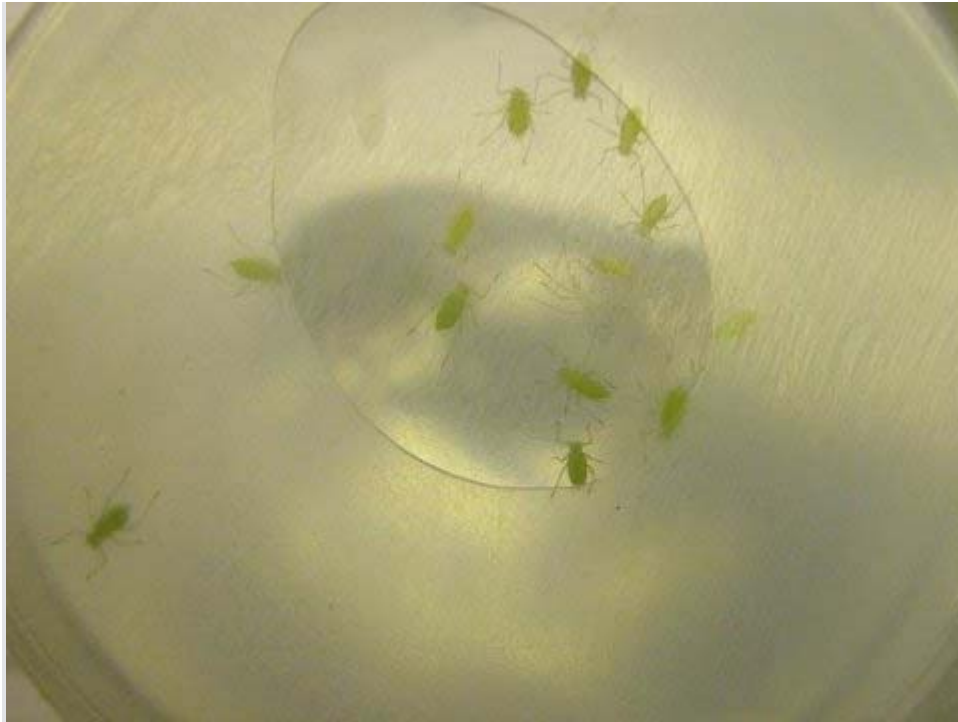


The field site in East Antarctica, which has been frozen for more than 14 million years.

Antarctica was once a balmy place, lush with plants and lakes. Figuring out just how long the continent has been a barren, cold desert of ice can give clues as to how Antarctica responded to the effects of past climates and can perhaps also indicate what to expect there in the future as Earth's atmospheric concentration of carbon dioxide grows.

Read more at: <http://phys.org/news/2015-12-east-antarctic-ice-sheet-frozen.html#jCp>

## **Aphids balance their diets by rebuilding plant amino acids**



Aphids in the lab feed on a bubble of sugar water and labeled amino acids.

*Credit: Meena Haribal*

Aphids suck up an almost endless supply of sugary sap from their plant hosts. They can survive on this junk food diet because bacterial partners help them convert the handful of amino acids in the sap into other, essential amino acids--not by recycling them, but by breaking them down and rebuilding from scratch, a new study finds.

Scientists have long assumed that aphids either use these amino acids directly or convert their carbon skeletons into other amino acids, which they use to make proteins. But by following the fate of carbon and nitrogen atoms ingested by the aphids, BTI scientists Georg Jander and Meena Haribal found that amino acid synthesis takes a very indirect route. Their findings appear in the *Journal of Experimental Biology*.

"We were surprised," said Haribal, a research associate. "We didn't know that they would deplete everything and make it from scratch."

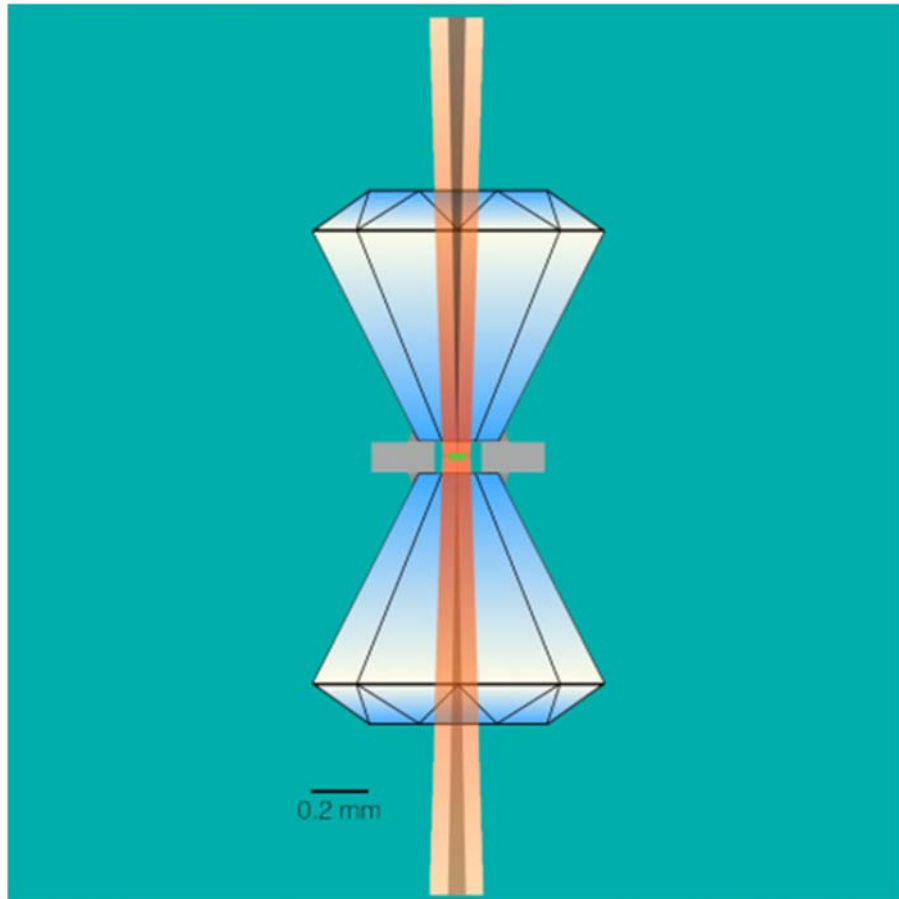
Plant sap is such a limited food source for the aphid because it predominantly contains four amino acids--glutamine, glutamate, asparagine and aspartate--which serve as the primary nitrogen source for the aphid. Plant roots synthesize these amino acids to transport nitrogen compounds, which they take up from soil. M. Haribal, G. Jander.

**Stable isotope studies reveal pathways for the incorporation of non-essential amino acids in *Acyrtosiphon pisum* (pea aphids).** *Journal of Experimental Biology*, 2015; 218 (23): 3797 DOI: [10.1242/jeb.129189](https://doi.org/10.1242/jeb.129189)

<http://www.sciencedaily.com/releases/2015/12/151216151742.htm>

# Developing a picture of the Earth's mantle

14 December 2015



This illustration shows a bridgmanite sample that is being laser-heated between two diamond anvils. This set-up allows researchers to measure a sample at compressions over 1 million times the earth's atmospheric pressure, while being heated ...[more](#)

Deep inside the earth, seismic observations reveal that three distinct structures make up the boundary between the earth's metallic core and overlying silicate mantle at a depth of about 2,900 kilometers—an area whose composition is key to understanding the evolution and dynamics of our planet. These structures include remnants of subducted plates that originated near the earth's surface, ultralow-velocity zones believed to be enriched in iron, and large dense provinces of unknown composition and mineralogy. A team led by Caltech's Jennifer Jackson, professor of mineral physics has new evidence for the origin of these features that occur at the core-mantle boundary.

Read more at: <http://phys.org/news/2015-12-picture-earth-mantle.html#jCp>



SHARE THIS ARTICLE




New findings about manmade earthquakes could have implications for both the oil and natural gas industry and for government regulators. Under current practices, extraction activities typically shut down in an area if a high-magnitude earthquake occurs. But a better approach might be to limit production before a large quake occurs, Jenny Suckale says. (Credit: [iStockphoto](#))

## SIZE OF MANMADE EARTHQUAKES GETS BIGGER OVER TIME

**STANFORD UNIVERSITY**

Posted by [Ker Than-Stanford](#) on December 17, 2015

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Earthquakes triggered by human activity follow several indicative patterns that could help scientists distinguish them from naturally occurring temblors, new research suggests.

<http://www.futurity.org/earthquakes-fracking-1072832-2/>

## Rare wetland fires can help, hurt habitat



A bird can be seen in the Big Cypress Preserve in South Florida. Former UF/IFAS Post-Doctoral Research Associate Adam Watts led a study of fires in the Big Cypress Preserve. Among other things, the rare wetland blazes can change how the soil stores water. They can also help preserve endangered species, Watts said.

*Credit: UF/IFAS file photo*

When you think of wildfires, you may not think of wetlands. But the seldom-seen blazes may help some endangered species, according to a newly published study by a former UF/IFAS researcher.

Severe wetland fires -- so rare they occur only a few times per century -- also can change vegetation and patterns of water movement, said Adam Watts, who led the study as a post-doctoral researcher in the UF/IFAS School of Forest Resources and Conservation. During a smoldering fire, wetlands can become deeper if the fires burn muck or peat soils.

**Journal Reference:**

1. Adam C. Watts, Casey A. Schmidt, Daniel L. McLaughlin, David A. Kaplan. **Hydrologic implications of smoldering fires in wetland landscapes.** *Freshwater Science*, 2015; 34 (4): 1394 DOI: [10.1086/683484](https://doi.org/10.1086/683484)

<http://www.sciencedaily.com/releases/2015/12/151216110158.htm>





## Do You Have Problems With:

- Nutrient deficiencies in crops
- Poor plant growth and response from applied fertilizers
- Hard to manage weeds
- Low crop yields
- Poor quality forages
- Irregular plant growth in your fields
- Managing manure or compost applications

## Soil Testing Can Help



*Soil tests help to identify production nutrient deficiencies or imbalances in corn (photo: Ryan St. Phosphorus deficiency in corn)*

[http://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1167377.pdf](http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1167377.pdf)




"We're in this time of visible climate change," says Jeffrey Clary. "Land uses we once thought were permanent, we're now seeing are likely not. As a land manager, to me, it only makes sense to look at a longer-term picture." (Credit: [iStockphoto](#))

## HOW TO TURN SLOPES GREEN AFTER SKIERS GO AWAY

UNIVERSITY OF CALIFORNIA, DAVIS → [Original Study](#)

Posted by [Kat Kerlin-UC Davis](#) on December 18, 2015

 You are free to share this article under the [Attribution 4.0 International](#) license.

The recovery of an abandoned ski run depends on whether or not it was graded, a new study shows.

Researchers, who report their findings in the *Journal of Applied Ecology*, evaluated six abandoned ski areas in the Northern Sierra region of California and Nevada. They found that runs that were graded showed no predictable recovery even 40 years after abandonment. With graded runs, heavy machinery is used to remove vegetation, boulders, and, consequently, much of the topsoil and seed bank during construction.

<http://www.futurity.org/ski-runs-land-grading-1073582-2/>

## December



**Soils, Culture, and People.** Soil is woven into the fabric of our society. It is the source of our food, fiber, and energy, and a vital part of our cultural heritage. From pain relief to pottery and clay, many materials used for works of art are derived from the earth's crust. The Egyptians, Greeks, and Romans used soil for the therapeutic properties of soils for spa treatments. Ancient cosmetics, and ancient writings are preserved in soil, showing a spiritual and artistic connection to the soil is

[View the IYS December video.](#)

[https://www.youtube.com/watch?v=T-lkKk4hsSo&list=PL4J8PxoprGZ3gPDXRfa\\_DNBYXoF-ruG2&index=13](https://www.youtube.com/watch?v=T-lkKk4hsSo&list=PL4J8PxoprGZ3gPDXRfa_DNBYXoF-ruG2&index=13)

**“Our safety could be dependent on understanding the behaviour of just a few grains of sand”** -- Wang Shengzhe, postgraduate research, Sydney University