Advertisement

Volume 640 Issue 8059, 17 April 2025

← Previous issue | Volume 640

Subscribe

Current affairs

Circular ocean currents called eddies exert significant influence on ocean dynamics, affecting everything from heat circulation to the movement of nutrients. Mesoscale eddies, those that are 100–300 kilometres across, are relatively well studied, but smaller, submesoscale (10–100 km) eddies have proved much harder to view and assess at a global scale. In this week's issue, Matthew Archer and colleagues present results from the Surface Water and Ocean Topography (SWOT) satellite that change that, offering a view of ocean dynamics in unprecedented detail. SWOT — show all

Cover image: NASA/JPL-Caltech/ CNES.

Table of Contents

This Week
News in Focus
Books & Arts
Opinion
Work
Research
Amendments & Corrections
Collections

This Week

Editorial

Editorial
15 Apr 2025

High time to tackle drug-resistant fungal infections

To combat long-overlooked fungal pathogens, researchers and regulators must embrace innovative science and policy.

Advertisement

Editorial
16 Apr 2025

Don't rush promising stem-cell therapies

Potential treatments need to be subject to the highest standards of safety and efficacy.

World View

World View
15 Apr 2025

The fight to keep big tech in check: digital researchers are in 'David and Goliath' battle

Resource constraints hobble analyses of how digital technologies affect mental health, and take a huge toll on the scientists working to make the online world safer.

Amy Orben

World View
16 Apr 2025

Don't believe the hype — quantum tech can't yet solve real-world problems

Investors and the public should know what quantum devices can and, more importantly, can't do.

Joan Arrow

Research Highlights

Research Highlight
10 Apr 2025

Top quarks spotted at mega-detector could reveal clues to early Universe

Heaviest known elementary particles and their antimatter counterparts are detected after nuclear smash-ups at the Large Hadron Collider.

Research Highlight
09 Apr 2025

These 4,200-year-old cymbals show music's far-reaching power

People from modern Pakistan imported their musical technology all the way to what is now Oman.

Research Highlight
10 Apr 2025

Allergic reactions flare in the gut after cuts to the skin, mouse research shows

Damage done to the skin can increase the risk of an allergic reaction in other organs.

Research Highlight
07 Apr 2025

We've misunderstood Uranus all these years

Hubble Space Telescope data show that the time taken for the planet to revolve around its axis is almost half a minute longer than was thought.

Top of page ⤴

News in Focus

News

News
08 Apr 2025

An animal source of mpox emerges — and it's a squirrel

Researchers solve the mystery of a disease outbreak through long-term surveillance of wildlife in Africa.

Jane Qiu

News
08 Apr 2025

Does US science have a future in Antarctica? Trump cuts threaten to cancel fieldwork and more

Funding for the National Science Foundation, which finances research at US bases on the icy continent, has already been reduced, and the agency faces steeper cuts soon.

Alexandra Witze

Collection: How Trump 2.0 is reshaping science

News
09 Apr 2025

Will AI improve your life? Here's what 4,000 researchers think

Scientists working on artificial intelligence are more confident than the public that the technology will benefit people.

Fred Schwaller

News
09 Apr 2025

A mental-health crisis plagues PhDs — these evidence-led initiatives offer help

Communities of researchers worldwide are taking on the toxic research cultures that drive poor psychological health among academics.

Fred Schwaller

News
05 Apr 2025

Obesity-drug pioneers and 13,508 physicists win US$3-million Breakthrough Prizes

Advances recognized by science's most lucrative awards include Large Hadron Collider experiments and groundbreaking weight-loss treatments.

Zeeya Merali

News
08 Apr 2025

NSF slashes prestigious PhD fellowship awards by half

US National Science Foundation announces lowest number of Graduate Research Fellowship Program recipients in 15 years.

Dan Garisto

Collection: How Trump 2.0 is reshaping science

News
09 Apr 2025

What makes us human? Milestone ape genomes promise clues

DNA sequences for chimpanzees, orangutan and more will help scientists to determine what sets humans apart from other apes.

Humberto Basilio

Features

News Feature
16 Apr 2025

Japan's big bet on stem-cell therapies might soon pay off with medical breakthroughs

Induced pluripotent stem cells are being tested to treat blindness, paralysis, Parkinson's disease and more. Approvals might be around the corner.

Smriti Mallapaty

News Feature
15 Apr 2025

Exclusive: the most-cited papers of the twenty-first century

A *Nature* analysis reveals the 25 highest-cited papers published this century and explores why they are breaking records.

Helen Pearson, Heidi Ledford ... Richard Van Noorden

News Feature
15 Apr 2025

These are the most-cited research papers of all time

Some studies have received hundreds of thousands of citations, *Nature*'s updated analysis shows.

Richard Van Noorden

News Feature
15 Apr 2025

Science's golden oldies: the decades-old research papers still heavily cited today

An analysis for *Nature* reveals the studies that appear most in the reference lists of current publications.

Richard Van Noorden

Advertisement Feature
Spanish genomes, quantum tech and ethical AI

Galicia is emerging as a biomedicine and tech innovation hub, tackling challenges from disease prevention to secure communications.

Top of page ⤴

Books & Arts

Book Review

Book Review
14 Apr 2025

The dangerous fantasies driving the quest for super-intelligent AI

More Everything Forever dissects the techno-utopian vision gripping Silicon Valley and Washington DC.

Jaron Lanier

Book Review
14 Apr 2025

‘I’m touching space’: the fascinating insights meteorites can bring us

Two books discuss how these space rocks are entwined with science, commerce, policy and life.

Sara Russell

Essay

Essay
14 Apr 2025

How the United States became a science superpower — and how quickly it could crumble

US global dominance in science was no accident, but a product of a far-seeing partnership between public and private sectors to boost innovation and economic growth.

Steve Blank

Collection: How Trump 2.0 is reshaping science

Top of page ⤴

Opinion

Correspondence

Correspondence
15 Apr 2025

Africa CDC must become financially independent

Nelson Aghogho Evaborhene, Jessica Oga & Echezona Udokanma

Correspondence
15 Apr 2025

Scientists must regain trust

Jonas De keersmaecker & Jay J. Van Bavel

Correspondence
15 Apr 2025

Ensuring that conferences are inclusive requires diverse organizers

Jeremiah Joven Joaquin & Hazel T. Biana

Correspondence
15 Apr 2025

Discussions of technologies’ societal impacts are still too limited

Sparky Mitra

Top of page ⤴

Work

Feature

Career Feature
15 Apr 2025

Should I return to my home country after my PhD abroad?

A graduate student from southeast Asia, now based in a European country and missing her homeland, agonizes over her next career move.

Dyna Rochmyaningsih

Where I Work

Where I Work
14 Apr 2025

Understanding bones from the remote wilderness of Wyoming

Digging in overlooked regions has opened up a world of discovery for palaeontologist David Lovelace.

Alexia Austin

Top of page ⤴

Research

News & Views

News & Views
08 Apr 2025

Tiger turnaround as populations grow in India

Tiger numbers in India are starting to rebound after decades of being perilously low. This recovery offers lessons for conserving other rare animals.

William F. Laurance & Uma Ramakrishnan

News & Views
09 Apr 2025

Docking stations in porous crystals unlock elusive molecular structures

Porous crystals have been engineered to trap 'oily' molecules — enabling X-ray structures to be determined for these compounds that defy standard crystallographic analysis.

Hongyi Xu

News & Views
19 Mar 2025

New antifungal breaks the mould

A bacterium makes a molecule that kills drug-resistant fungi in an unusual way — by targeting various phospholipid molecules in membranes.

Arun Maji & Martin D. Burke

News & Views
24 Mar 2025

Live-cell super-resolution microscopy reveals how molecules enter and exit the nucleus

The nuclear pore complex is the gateway to the nucleus of cells. Now an *in vivo* imaging technique can track the way in which molecules move through this complex.

Bernd Rieger & Enya S. Berrevoets

News & Views
16 Apr 2025

SWOT satellite provides a finer view of climate-driving ocean dynamics

High-resolution observations of ocean topography from the Surface Water and Ocean Topography (SWOT) mission reveal that small surface structures have a larger-than-expected impact on the ocean's total energy budget.

Elisa Carli

News & Views
15 Apr 2025

Early air-pollution activists fight against city smoke

A 250,000-year-old footprint preserved in ash, and the effect of a polluted atmosphere on health and the economy, in our weekly dip into *Nature*'s archive.

News & Views
12 Mar 2025

Biodiversity declines across fragmented forests

A global analysis of species in fragmented-forest landscapes reveals species losses in fragments, and that the changes in species composition across fragments is not enough to benefit biodiversity over entire landscapes.

Robert J. Fletcher Jr

Perspectives

Perspective
16 Apr 2025

The growing memristor industry

The status and prospects of the memristor industry are analysed and the obstacles and pathways to their implementation are discussed.

Mario Lanza, Sebastian Pazos ... Juan B. Roldan

Perspective
16 Apr 2025

Towards multimodal foundation models in molecular cell biology

The development of multimodal foundation models, pretrained on diverse omics datasets, to unravel the intricate complexities of molecular cell biology is envisioned.

Haotian Cui, Alejandro Tejada-Lapuerta ... Bo Wang

Articles

Article
02 Apr 2025

Near-field photon entanglement in total angular momentum

Non-classical correlations between two photons in the near-field regime give rise to entanglement in their total angular momentum, leading to a completely different structure of quantum correlations of photon pairs.

Amit Kam, Shai Tsesses ... Guy Bartal

Article
17 Feb 2025

Ambient-pressure superconductivity onset above 40 K in (La,Pr)$_3$Ni$_2$O$_7$ films

Ambient-pressure superconductivity onset above the McMillan limit in bilayer nickelate epitaxial thin films is reported, paving the way for comprehensive investigations of superconductors and for exploring superconductivity at higher transition temperatures in heterostructures.

Guangdi Zhou, Wei Lv ... Zhuoyu Chen

Article
Open Access
02 Apr 2025

Mastering diverse control tasks through world models

A general reinforcement-learning algorithm, called Dreamer, outperforms specialized expert algorithms across diverse tasks by learning a model of the environment and improving its behaviour by imagining future scenarios.

Danijar Hafner, Jurgis Pasukonis ... Timothy Lillicrap

Article
02 Apr 2025

A RISC-V 32-bit microprocessor based on two-dimensional semiconductors

A RISC-V microprocessor capable of executing standard 32-bit instructions has been designed with 5,900 MoS_2 transistors and a complete standard cell library based on 2D semiconductor technology.

Mingrui Ao, Xiucheng Zhou ... Peng Zhou

Article
Open Access
12 Feb 2025

Observation of plastic ice VII by quasi-elastic neutron scattering

Quasi-elastic neutron scattering measurements show the existence of a body-centred cubic structure, similar to that of ice VII, where water molecules exhibit picosecond rotational dynamic and rapid orientational jumps characteristic of liquid water.

Maria Rescigno, Alberto Toffano ... Livia Eleonora Bove

Article
02 Apr 2025

Metal–support frontier orbital interactions in single-atom catalysis

The acetylene hydrogenation activity and stability of a palladium single-atom catalyst are both controlled by the lowest unoccupied molecular orbital of the oxide support.

Xianxian Shi, Zhilin Wen ... Junling Lu

Article
Open Access
09 Apr 2025

Supramolecular docking structure determination of alkyl-bearing molecules

A metal–organic framework (MOF)–pillar[5]arene hybrid can bind small molecules with long alkyl chains, such that single-crystal structures of the host–guest complexes can be obtained and therefore small molecular structures determined.

Yitao Wu, Le Shi ... Feihe Huang

Article
12 Feb 2025

σ-Bond insertion reactions of two strained diradicaloids

A new synthetic method provides a coveted motif, the bicyclo[2.1.1]hexane scaffold, using the uncommon coupling of two strained diradicaloid fragments: transiently generated cyclic allenes and bicyclo[1.1.0]butanes.

Arismel Tena Meza, Christina A. Rivera ... Neil K. Garg

Article
Open Access
16 Apr 2025

Wide-swath satellite altimetry unveils global submesoscale ocean dynamics

Data from the recently launched Surface Water and Ocean Topography satellite reveal the characteristics of submesoscale eddies and waves and suggest that their potential impacts on overall ocean circulation is much larger than previously thought.

Matthew Archer, Jinbo Wang ... Lee-Lueng Fu

Article
Open Access
09 Apr 2025

Seismic imaging of a basaltic Lesser Antilles slab from ancient tectonics

Imaging of the mantle transition zone beneath the Lesser Antilles shows a basalt-rich region within the subducting slab near the proposed location of a subducted extinct spreading ridge, implying ancient tectonics play a role in influencing slab trajectories.

Xusong Yang, Yujiang Xie ... Richard Robertson

Article
12 Mar 2025

Species turnover does not rescue biodiversity in fragmented landscapes

An analysis of habitat fragmentation using a dataset of more than 4,000 species worldwide shows that fragmentation reduces biodiversity at all scales, and that increases in β diversity do not compensate for the loss of α diversity.

Thiago Gonçalves-Souza, Jonathan M. Chase ... Nathan J. Sanders

---

Article
12 Mar 2025

The earliest human face of Western Europe

A *Homo* aff. *erectus* individual dated to 1.4 million to 1.1 million years ago found at Sima del Elefante (Sierra de Atapuerca, Spain) does not display the modern-human-like aspect of *Homo antecessor* found at the neighbouring Gran Dolina site (900,000–800,000 years ago).

Rosa Huguet, Xosé Pedro Rodríguez-Álvarez ... José María Bermúdez de Castro

---

Article
26 Feb 2025

Integrated analysis of the complete sequence of a macaque genome

A complete genome assembly of a crab-eating macaque, revealing 46% fewer segmental duplications and 3.83 times longer centromeres than those of humans, is presented, enhancing understanding of lineage-specific phenotypes, adaptation and primate evolution.

Shilong Zhang, Ning Xu ... Yafei Mao

Article
19 Feb 2025

A dual-pathway architecture for stress to disrupt agency and promote habit

Adaptive decision-making often requires an understanding of our agency in a situation; however, chronic stress can disrupt agency and promote inflexible, habitual behaviour by turning off a brain pathway needed for agency and activating one that promotes habit.

Jacqueline R. Giovanniello, Natalie Paredes ... Kate M. Wassum

---

Article
12 Feb 2025

Topological segregation of stress sensors along the gut crypt–villus axis

Serotonergic enterochromaffin cells of the intestine exhibit distinct sensory, secretory and physiological properties depending on their location within the complex crypt–villus architecture of the gut.

Kouki K. Touhara, Nathan D. Rossen ... David Julius

Article
Open Access
19 Mar 2025

A polyene macrolide targeting phospholipids in the fungal cell membrane

Mandimycin, a polyene macrolide, exhibits strong antifungal activity and possesses a mode of action that is distinct from other compounds of this class.

Qisen Deng, Yinchuan Li ... Zongqiang Wang

Article
Open Access
12 Mar 2025

Hepatic stellate cells control liver zonation, size and functions via R-spondin 3

Hepatic stellate cells regulate hepatocyte functions via R-spondin 3.

Atsushi Sugimoto, Yoshinobu Saito ... Robert F. Schwabe

Article
Open Access
12 Mar 2025

TGFβ links EBV to multisystem inflammatory syndrome in children

Multisystem inflammatory syndrome following SARS-CoV-2 infection results from increased serum levels of TGFβ, which impairs the reactivation of virus-specific T cells.

Carl Christoph Goetzke, Mona Massoud ... Mir-Farzin Mashreghi

---

Article
08 Jan 2025

An early precursor $CD8^+$ T cell that adapts to acute or chronic viral infection

Stem-like $CD8^+$ T cells specific for lymphocytic choriomeningitis virus are generated early during chronic infection, suggesting that this crucial fate commitment occurs irrespective of the infection outcome.

Daniel T. McManus, Rajesh M. Valanparambil ... Rafi Ahmed

Article
Open Access
08 Jan 2025

Precursors of exhausted T cells are pre-emptively formed in acute infection

T cell exhaustion was thought to be strictly associated only with chronic infections and tumours, but it turns out that acute infections also generate a subset of precursor T cells with exhaustion-like phenotypes.

Talyn Chu, Ming Wu ... Dietmar Zehn

Article
30 Jan 2025

HIV immune evasin Nef enhances allogeneic CAR T cell potency

HIV-1 immune evasin Nef reduces activation-induced cell death and promotes survival of chimeric antigen receptor (CAR) T cells; thus, virus-like immune escape enhances therapeutic efficacy of allogeneic CAR T cells.

Karlo Perica, Ivan S. Kotchetkov ... Michel Sadelain

Article
19 Feb 2025

Nociceptive neurons promote gastric tumour progression via a CGRP–RAMP1 axis

Functional connectivity between gastric cancer cells and sensory neurons offers a potential therapeutic target.

Xiaofei Zhi, Feijing Wu ... Timothy C. Wang

Article
Open Access
12 Mar 2025

MYC ecDNA promotes intratumour heterogeneity and plasticity in PDAC

In a model of pancreatic ductal adenocarcinoma, extrachromosomal DNAs are shown to be a source of high-level focal amplification driving *MYC* heterogeneity and phenotypic adaptation.

Elena Fiorini, Antonia Malinova ... Vincenzo Corbo

Article
Open Access
19 Mar 2025

Overlapping nuclear import and export paths unveiled by two-colour MINFLUX

High spatiotemporal precision tracking using 3D MINFLUX shows that nuclear import and export occur in overlapping regions of the central pore, providing insight into transport across the nuclear pore complex.

Abhishek Sau, Sebastian Schnorrenberg ... Siegfried M. Musser

---

Article
Open Access
26 Feb 2025

Genome-coverage single-cell histone modifications for embryo lineage tracing

Two new methods, target chromatin indexing and tagmentation (TACIT) and combined TACIT (CoTACIT), enabled single-cell profiling of the epigenome and lineage tracing from mouse zygotes to blastocysts.

Min Liu, Yanzhu Yue ... Aibin He

Article
Open Access
05 Mar 2025

Chanoclavine synthase operates by an NADPH-independent superoxide mechanism

The unique structure and mechanism of chanoclavine synthase (EasC), a haem catalase that uses superoxide for substrate transformation in ergot alkaloid biosynthesis, are revealed in this study, challenging established catalase mechanisms.

Chun-Chi Chen, Zhi-Pu Yu ... Shu-Shan Gao

Matters Arising

Matters Arising
16 Apr 2025

Natively expressed AcrIII-1 does not function as an anti-CRISPR protein

Laura Martínez-Alvarez, Dominic Stickel ... Xu Peng

Matters Arising
16 Apr 2025

Reply to: Natively expressed AcrIII-1 does not function as an anti-CRISPR protein

Januka S. Athukoralage, Stephen A. McMahon ... Malcolm F. White

---

Matters Arising
16 Apr 2025

Bovine H5N1 binds poorly to human-type sialic acid receptors

Jefferson J. S. Santos, Shengyang Wang ... Scott E. Hensley

Matters Arising
16 Apr 2025

Receptor-binding specificity of a bovine influenza A virus

Pradeep Chopra, Sean D. Ray ... Geert-Jan Boons

Matters Arising
16 Apr 2025

A. J. Eisfeld et al. reply

Amie J. Eisfeld, Asim Biswas ... Yoshihiro Kawaoka

Top of page ⤴

Amendments & Corrections

Author Correction
Open Access
01 Apr 2025

Author Correction: Isoprene nitrates drive new particle formation in Amazon's upper troposphere

Joachim Curtius, Martin Heinritzi ... Jos Lelieveld

Author Correction
01 Apr 2025

Author Correction: Controlled patterning of crystalline domains by frontal polymerization

Justine E. Paul, Yuan Gao ... Nancy R. Sottos

Top of page ⤴

Collections

Nature Outlook
16 Apr 2025

Alzheimer's disease

Alzheimer's disease is the most common form of dementia, affecting more than 50 million people around the world.

Spotlight
16 Apr 2025

Spain

For many, climate change is no longer a future threat but a present reality.

Top of page ⤴

Nature (*Nature*) | ISSN 1476-4687 (online) | ISSN 0028-0836 (print)

About Nature Portfolio
About us
Press releases
Press office
Contact us

Discover content
Journals A-Z
Articles by subject
protocols.io
Nature Index

Publishing policies
Nature portfolio policies
Open access

Author & Researcher services
Reprints & permissions
Research data
Language editing
Scientific editing
Nature Masterclasses
Research Solutions

Libraries & institutions
Librarian service & tools
Librarian portal
Open research
Recommend to library

Advertising & partnerships
Advertising
Partnerships & Services
Media kits
Branded content

Professional development
Nature Careers
Nature Conferences

Regional websites
Nature Africa
Nature China
Nature India
Nature Italy
Nature Japan
Nature Middle East

Privacy Policy
Use of cookies
Your privacy choices/Manage cookies
Legal notice
Accessibility statement
Terms & Conditions
Your US state privacy rights

© 2025 Springer Nature Limited