

Issue Contents



Volume 39, Issue 4

February 2012

Brief Detailed

Solid Earth

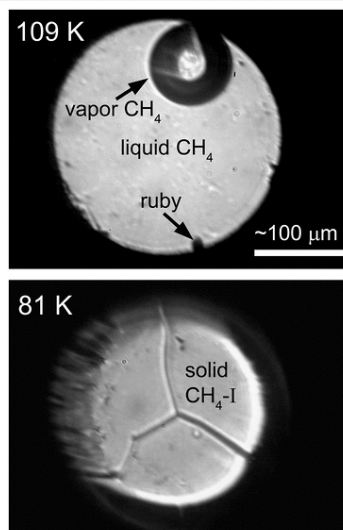
Optical reflectivity of solid and liquid methane: Application to spectroscopy of Titan's hydrocarbon lakes

Kimberly A. Adams, Steven D. Jacobsen, Zhenxian Liu, Sylvia-Monique Thomas, Maddury Somayazulu, Donna M. Jurdy

First Published: 29 February 2012 Vol: 39, L04309 | DOI: 10.1029/2011GL049710

KEY POINTS

- Measured visible and IR reflectivity of solid and liquid CH₄ between 50 and 100K
- Transition of solid to liquid CH₄ shows a reflectance ratio of 1.32-1.67 at 2 μm
- Darkening of CH₄ upon melting is consistent with observations of Titan's lakes



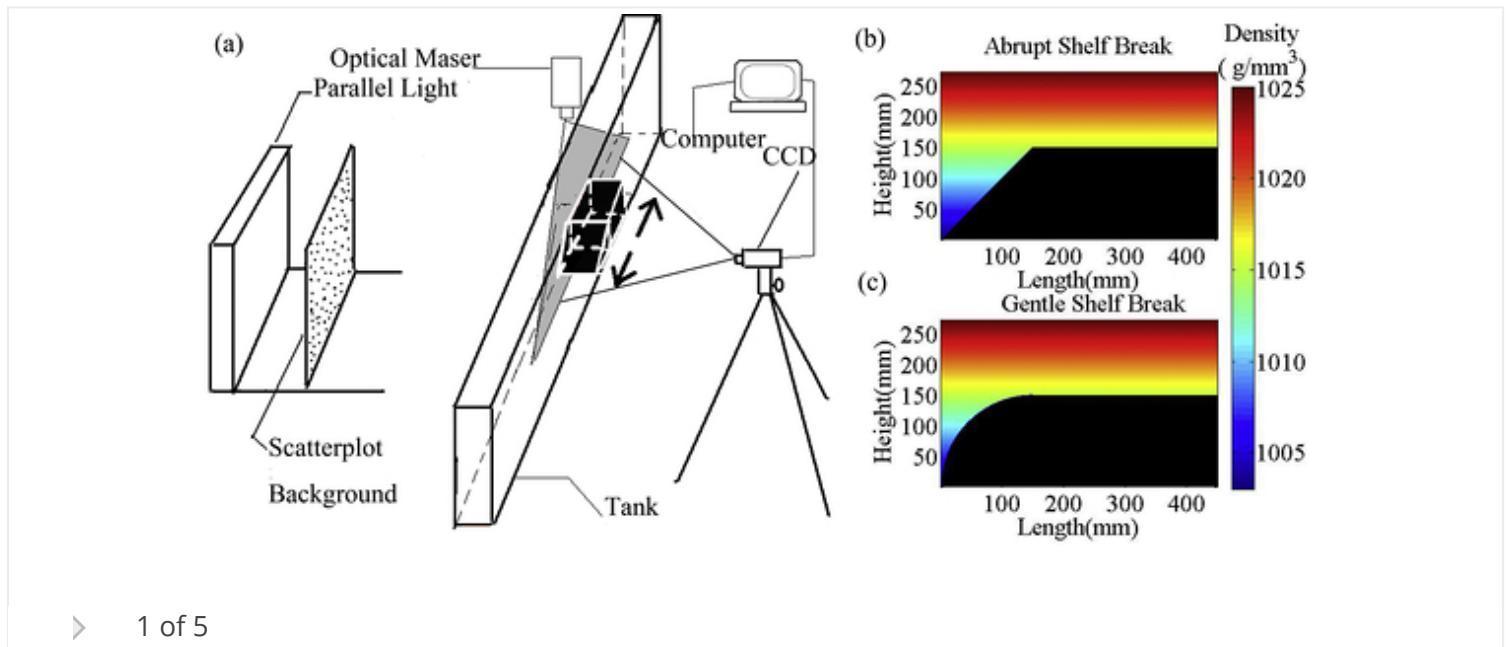
> 1 of 3

Oceans

Laboratory experiments on the generation of internal waves on two kinds of continental margin

KEY POINTS

- Internal waves with three energy rays are generated at the abrupt shelf break
- Internal waves with two energy rays are generated at the gentle shelf break
- The phases of the internal waves lag behind the oscillatory barotropic tide



Atmospheric Science

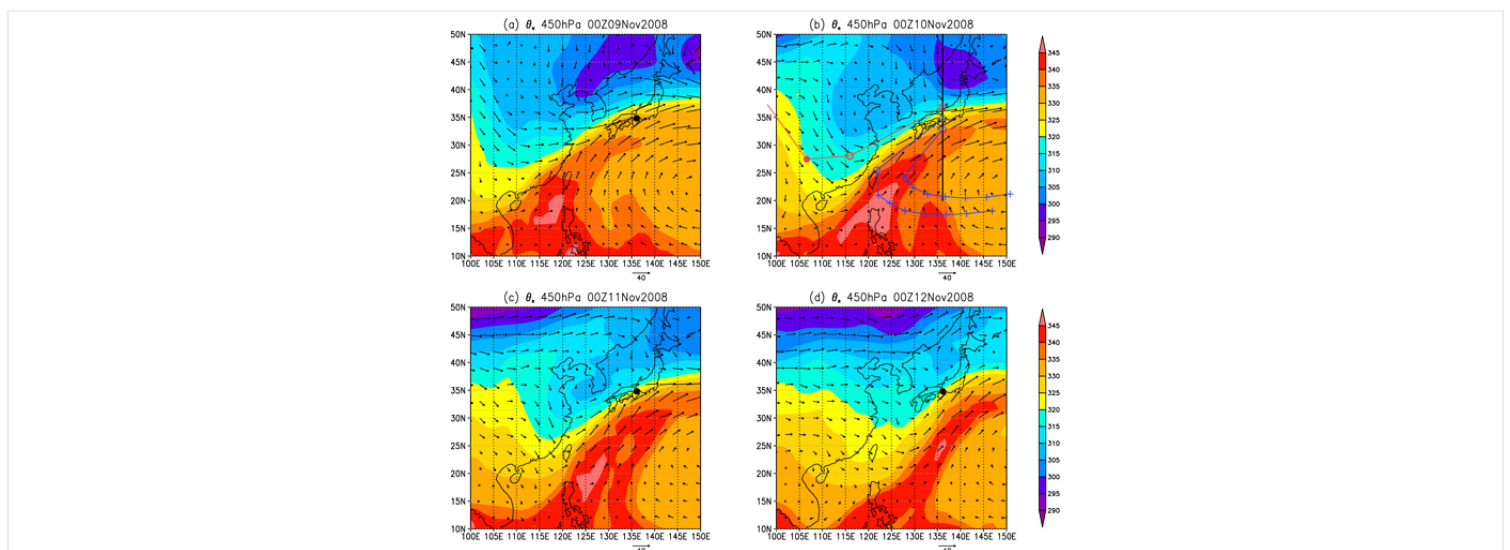
Kelvin-Helmholtz billows generated at a cirrus cloud base within a tropopause fold/upper-level frontal system

Hubert Luce, Noriyuki Nishi, Jean-Luc Caccia, Shoichiro Fukao, Masayuki K. Yamamoto, Tomoaki Mega, Hiroyuki Hashiguchi, Takuya Tajiri, Masahisa Nakazato

First Published: 24 February 2012 Vol: 39, L04807 | DOI: 10.1029/2011GL050120

KEY POINTS

- Kelvin-Helmholtz billows can persist over several days in frontal zones
- The presence of cloudy air above frontal zones is conducive to KH instabilities
- Large-amplitude KH billows do not break into 3D turbulence



Solid Earth

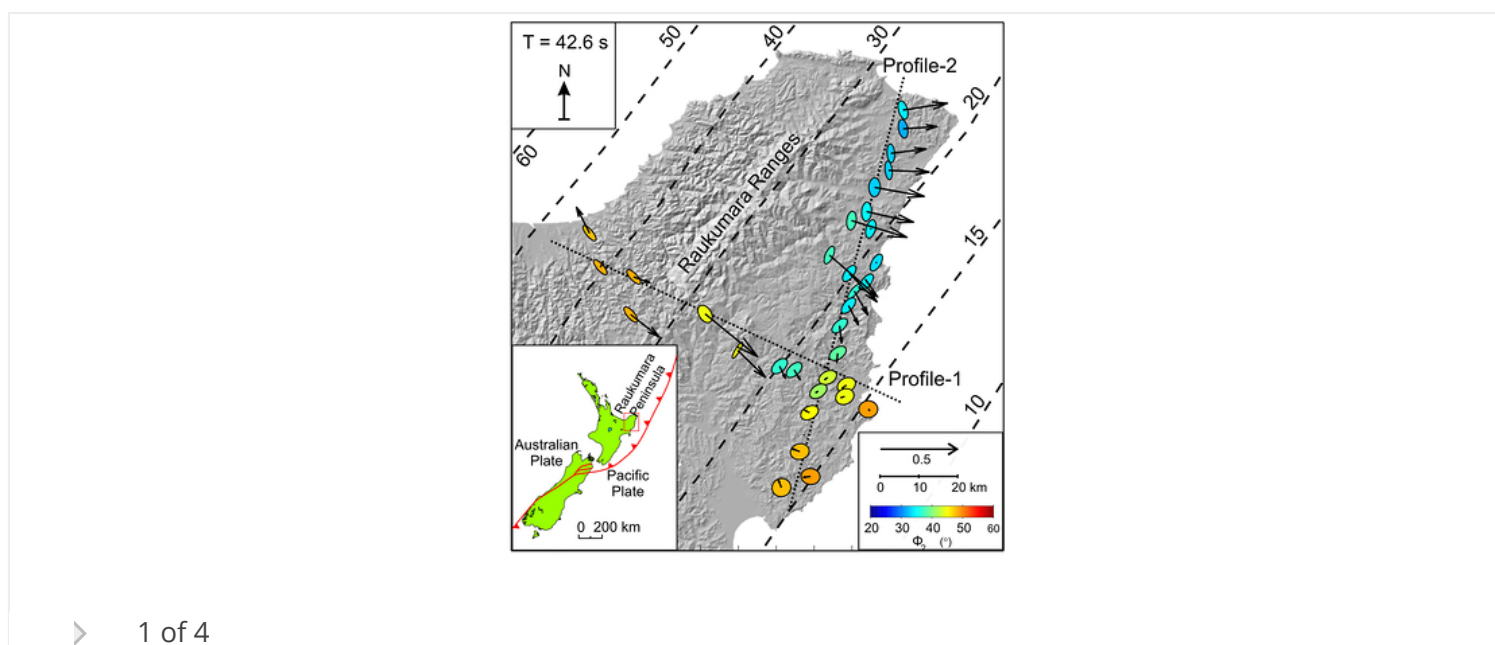
Magnetotelluric imaging of fluid processes at the subduction interface of the Hikurangi margin, New Zealand

Wiebke Heise, T. Grant Caldwell, Graham J. Hill, Stewart L. Bennie, Erin Wallin, Edward A. Bertrand

First Published: 25 February 2012 Vol: 39, L04308 | DOI: 10.1029/2011GL050150

KEY POINTS

- Magnetotelluric data was inverted using a 3D modelling algorithm
- The model shows sedimentary underplating and a region of upward fluid escape



Atmospheric Science

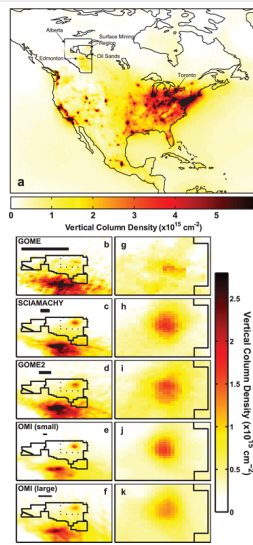
Air quality over the Canadian oil sands: A first assessment using satellite observations

C. A. McLinden, V. Fioletov, K. F. Boersma, N. Krotkov, C. E. Sioris, J. P. Veefkind, K. Yang

First Published: 22 February 2012 Vol: 39, L04804 | DOI: 10.1029/2011GL050273

KEY POINTS

- NO₂ and SO₂ show distinct enhancements over surface mining sites in the oil sand
- NO₂ and SO₂ enhancement cover 30x50km²; NO₂ increasing at a rate of 11%/year
- Demonstrates method for analyzing localized sources using coarse resolution data



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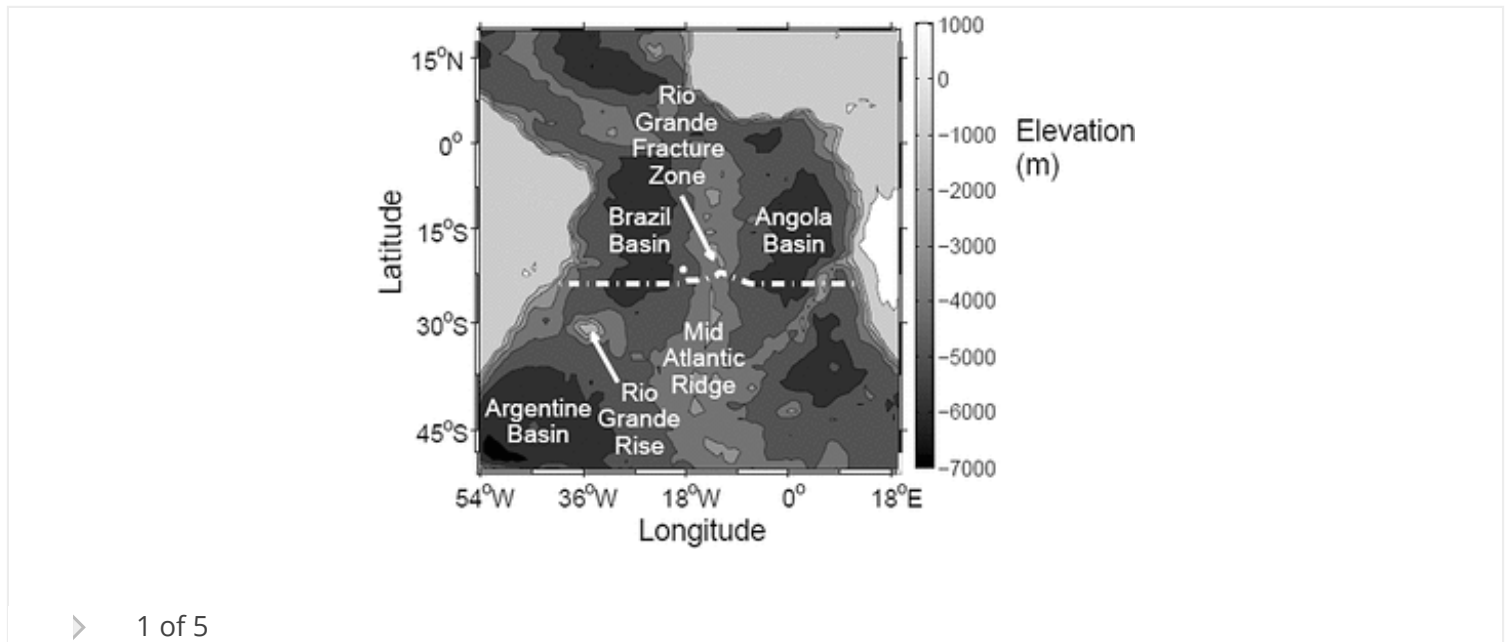
Oceans

Diapycnal diffusivities from a tracer release experiment in the deep sea, integrated over 13 years

Craig D. Rye, Marie-Jose Messias, James R. Ledwell, Andrew J. Watson, Andrew Brousseau, Brian A. King
 First Published: 21 February 2012 Vol: 39, L04603 | DOI: 10.1029/2011GL050294

KEY POINTS

- A mean diffusivity estimate of $\sim 3 \times 10^{-4} \text{ m}^2/\text{s}$ for the deep Brazil Basin
- This estimate is an average over a period of 13 years
- This estimate is consistent with the equivalent measurement for 1 year



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Climate

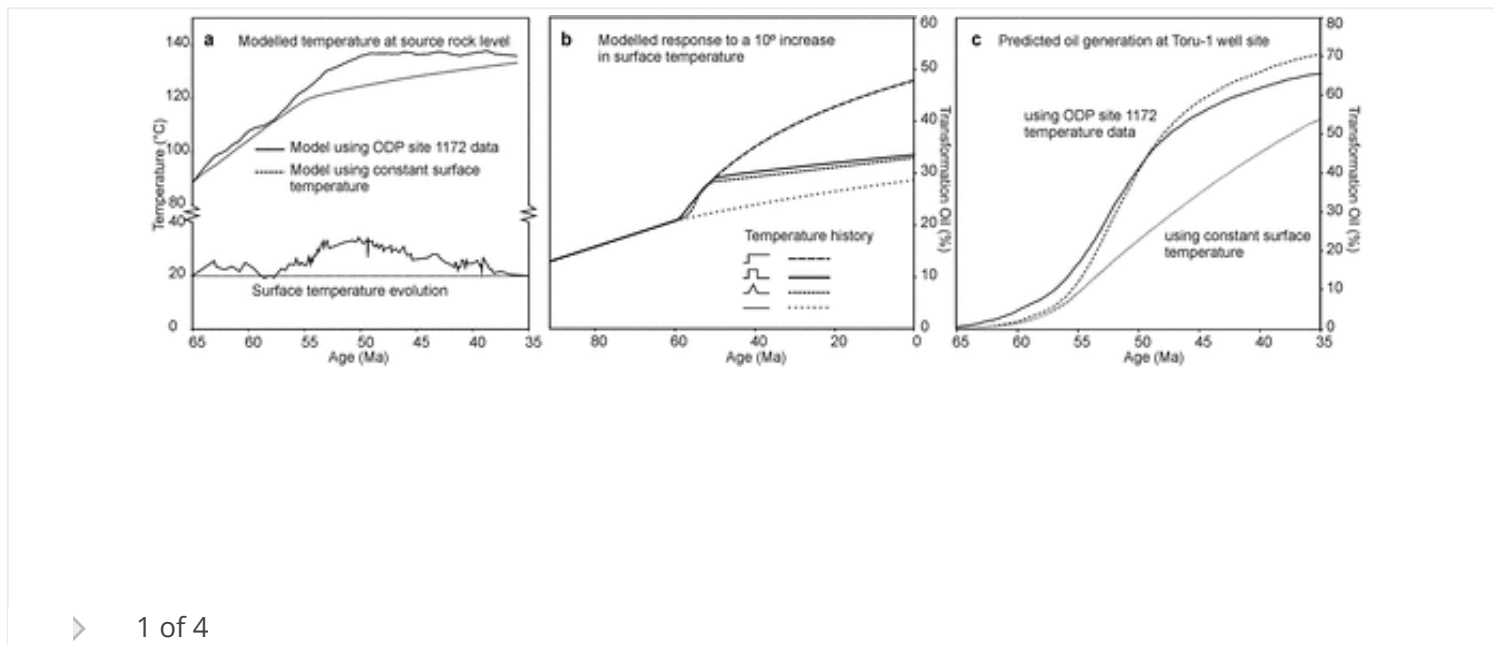
Warm Eocene climate enhanced petroleum generation from Cretaceous source rocks: A potential climate feedback mechanism?

K. F. Kroeger, R. H. Funnell

KEY POINTS

- Southwest Pacific petroleum systems reacted to climate warming
- Models predict an up to 50% increase in oil and gas generation
- Leakage from sedimentary basins may have driven early-Eocene climate

Highlight



Atmospheric Science

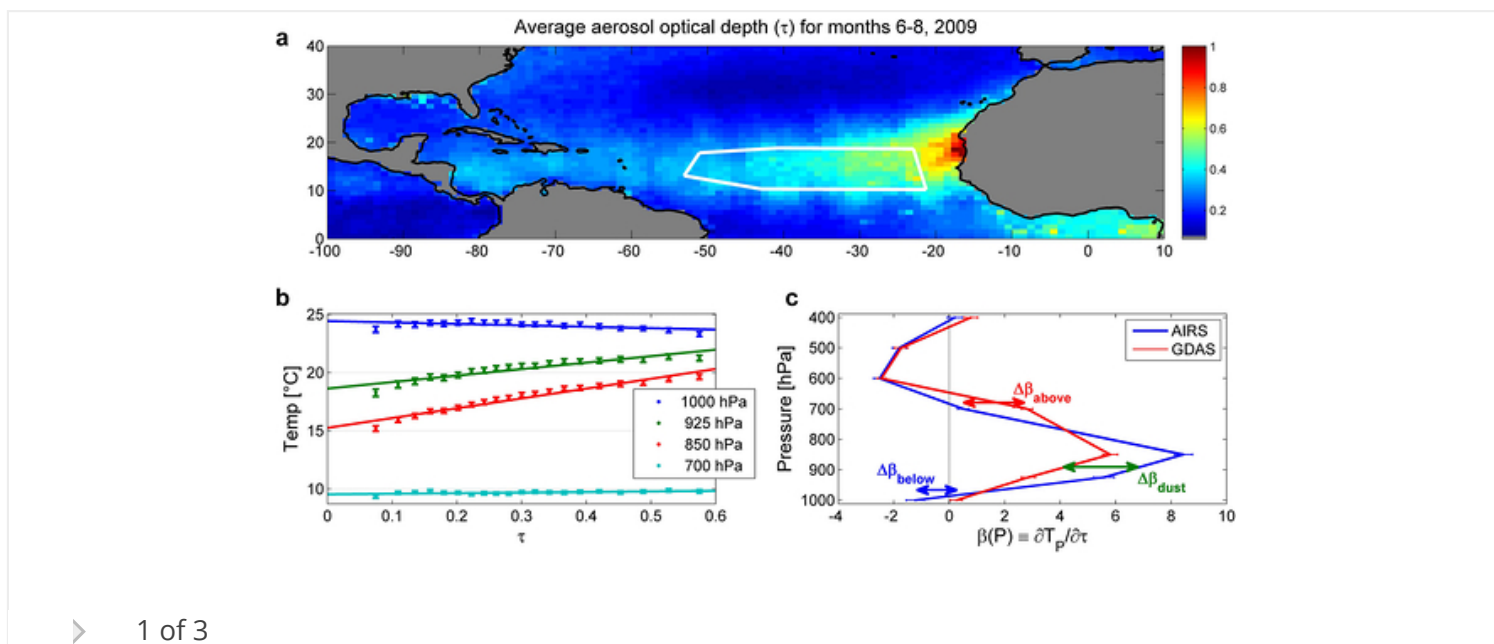
Observational bounds on atmospheric heating by aerosol absorption: Radiative signature of transatlantic dust

Amit Davidi, Alex B. Kostinski, Ilan Koren, Yoav Lehahn

First Published: 17 February 2012 Vol: 39, L04803 | DOI: 10.1029/2011GL050358

KEY POINTS

- We show a robust radiative heating signal of 2-4K within the dust layer
- We introduce new heating term and decouple aerosol and meteorological signals
- The heating peaks as a result of 2 opposing trends: origin



Solid Earth

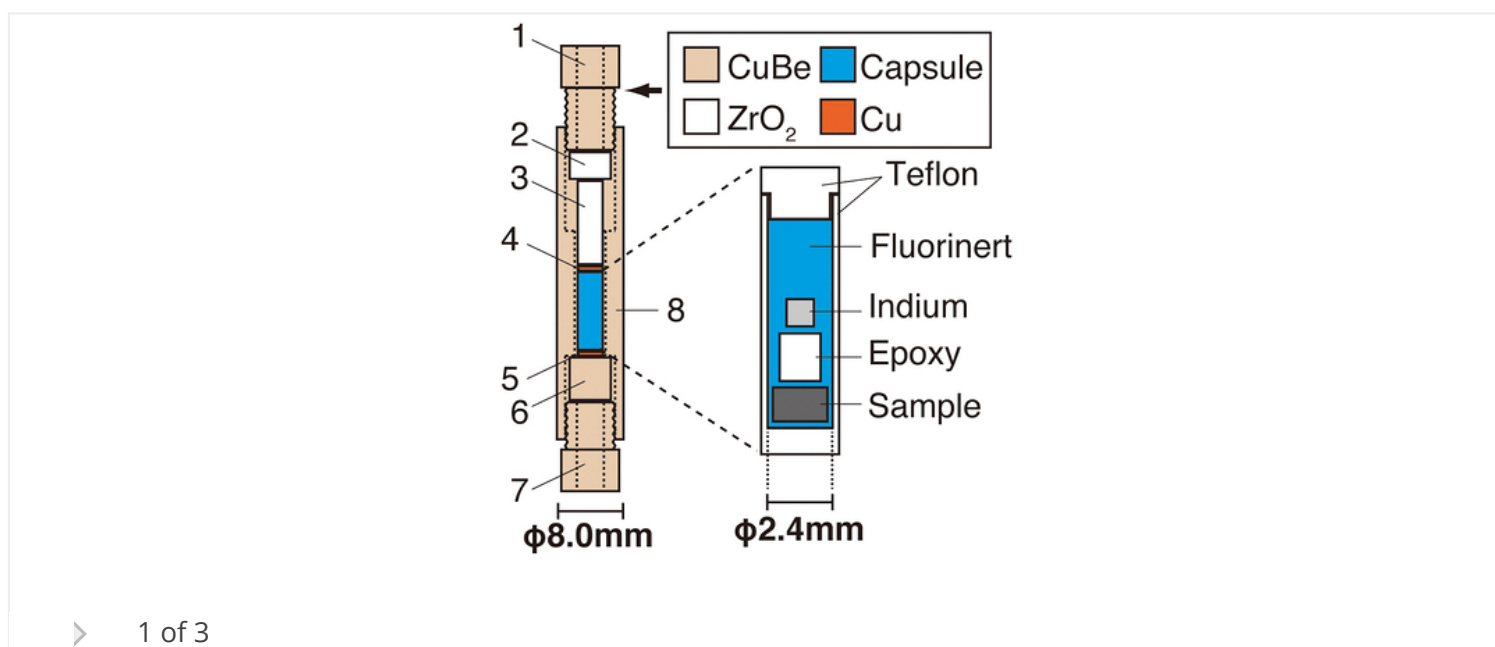
Pressure effect on low-temperature remanence of multidomain magnetite: Change in demagnetization temperature

Masahiko Sato, Yuhji Yamamoto, Takashi Nishioka, Kazuto Kodama, Nobutatsu Mochizuki, Hideo Tsunakawa

First Published: 24 February 2012 Vol: 39, L04305 | DOI: 10.1029/2011GL050402

KEY POINTS

- Low-temperature remanences demagnetized due to the Verwey transition
- First report on the demagnetization of low-temperature remanence under pressure
- Behavior of the demagnetization correlates with that of the Verwey transition



Oceans

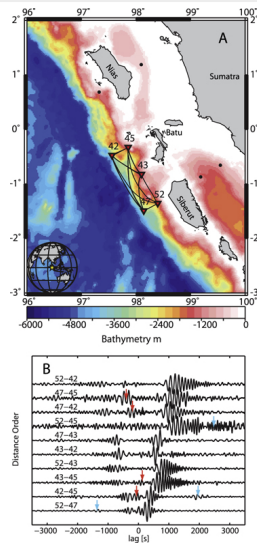
Infragravity wave source regions determined from ambient noise correlation

Nicholas Harmon, Timothy Henstock, Meric Srokosz, Frederik Tilmann, Andreas Rietbrock, Penny Barton

First Published: 24 February 2012 Vol: 39, L04604 | DOI: 10.1029/2011GL050414

KEY POINTS

- OBS data can be used to understand infragravity/tsunami waves
- Noise cross correlation is used to locate the source of infragravity waves
- In Sumatra, the dominant source region is from the S. Indian Ocean or the coast



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Space Sciences

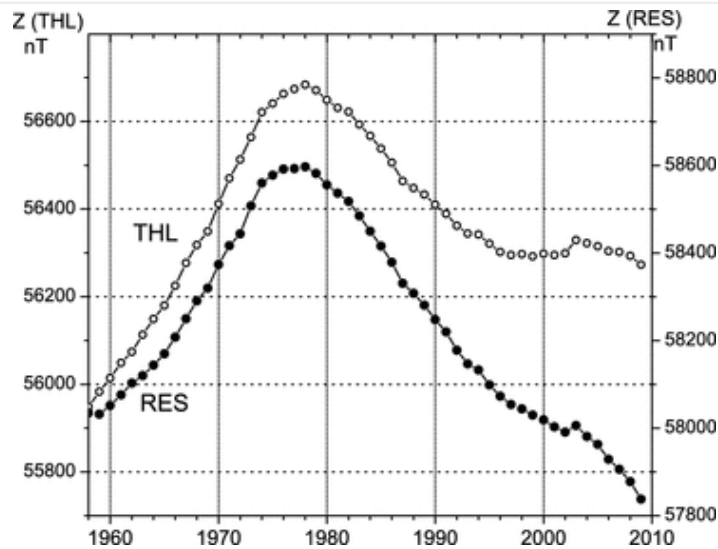
Response of the polar magnetic field intensity to the exceptionally high solar wind streams in 2003

Renata Lukianova, Kalevi Mursula, Alexander Kozlovsky

First Published: 21 February 2012 Vol: 39, L04101 | DOI: 10.1029/2011GL050420

KEY POINTS

- The HSS effect in 2003 is visible in the polar observatory annual means
- The quiet and disturbed time westward electrojet is enhanced in the HSS years
- Effect is important for separation the internal and external (MI) field signals



> 1 of 5

Climate

Reconciling two approaches to attribution of the 2010 Russian heat wave

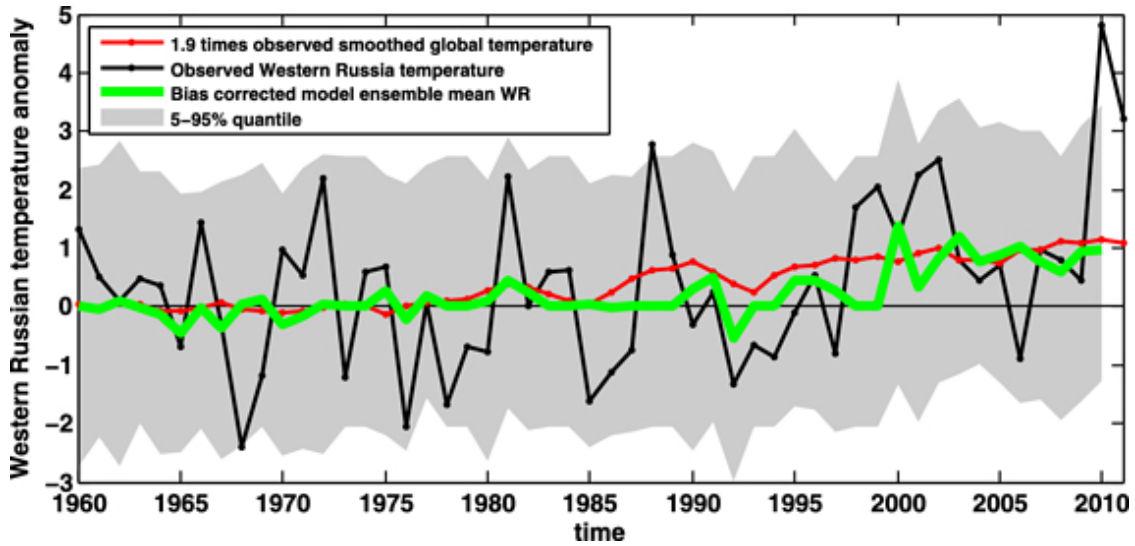
F. E. L. Otto, N. Massey, G. J. van Oldenborgh, R. G. Jones, M. R. Allen

First Published: 22 February 2012 Vol: 39, L04702 | DOI: 10.1029/2011GL050422

KEY POINTS

- Former studies on the Russian heat wave 2010 are not contradictory
- Russian heat wave 2010 likely attributable to anthropogenic climate change

Highlight



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Solid Earth

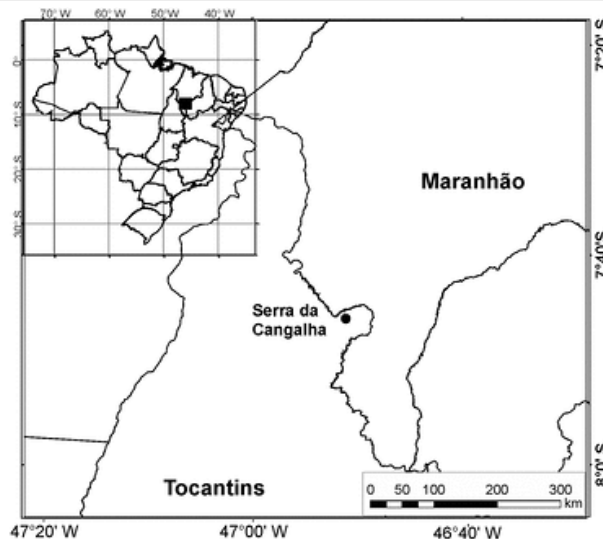
Contributions of gamma-ray spectrometry to terrestrial impact crater studies: The example of Serra da Cangalha, northeastern Brazil

Marcos Alberto R. Vasconcelos, Emilson P. Leite, Alvaro P. Crósta

First Published: 25 February 2012 Vol: 39, L04306 | DOI: 10.1029/2011GL050525

KEY POINTS

- This paper presents the gamma-ray signature of Serra da Cangalha impact crater
- We applied a mathematical method in order to enhance the K anomaly
- K anomaly may be indicative of hydrothermal processes inside the crater



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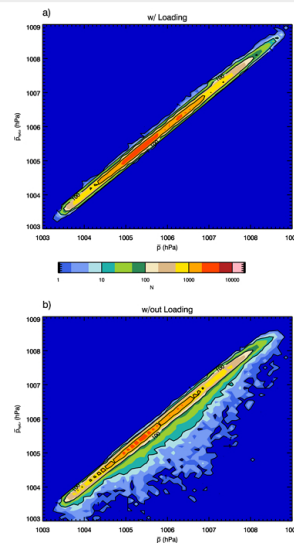
Assessing possible dynamical effects of condensate in high resolution climate simulations

J. T. Bacmeister, P. H. Lauritzen, A. Dai, J. E. Truesdale

First Published: 23 February 2012 Vol: 39, L04806 | DOI: 10.1029/2011GL050533

KEY POINTS

- Condensate loading is significant at resolutions of 25 km and finer
- Loading may reduce the occurrence of extreme precipitation rates
- Parameterized loading may affect longer-term means as well as variability



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Solid Earth

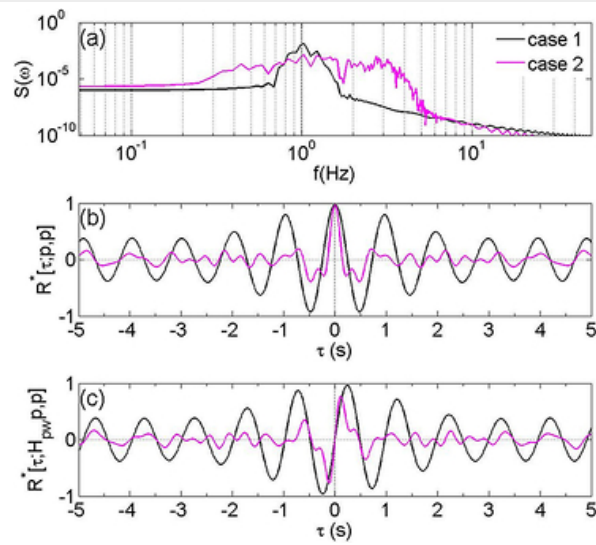
Monitoring volcanic activity using correlation patterns between infrasound and ground motion

M. Ichihara, M. Takeo, A. Yokoo, J. Oikawa, T. Ohminato

First Published: 24 February 2012 Vol: 39, L04304 | DOI: 10.1029/2011GL050542

KEY POINTS

- A new method to detect infrasound using a single microphone and a seismometer
- Infrasonic and eruptive activities of two recent eruptions of volcanoes in Japan
- The method extends possibilities of infrasonic monitoring at active volcanoes



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Atmospheric Science

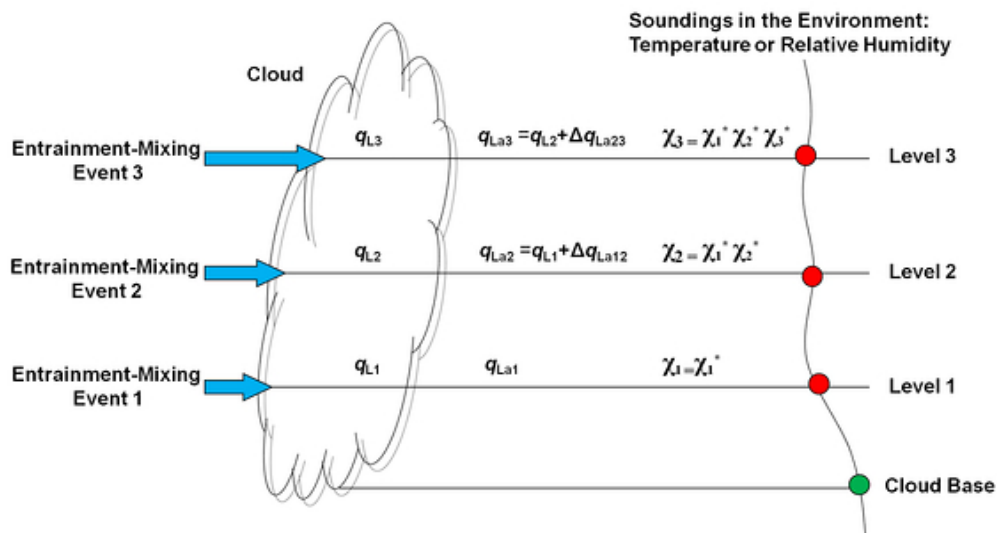
A new approach for estimating entrainment rate in cumulus clouds

Chunsong Lu, Yangang Liu, Seong Soo Yum, Shengjie Niu, Satoshi Endo

First Published: 16 February 2012 Vol: 39, L04802 | DOI: 10.1029/2011GL050546

KEY POINTS

- A new approach is presented to estimate entrainment rate in cumulus clouds
- The uncertainty from this approach is smaller than that from the traditional one
- This approach has three advantages compared to most existing approaches



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Solid Earth

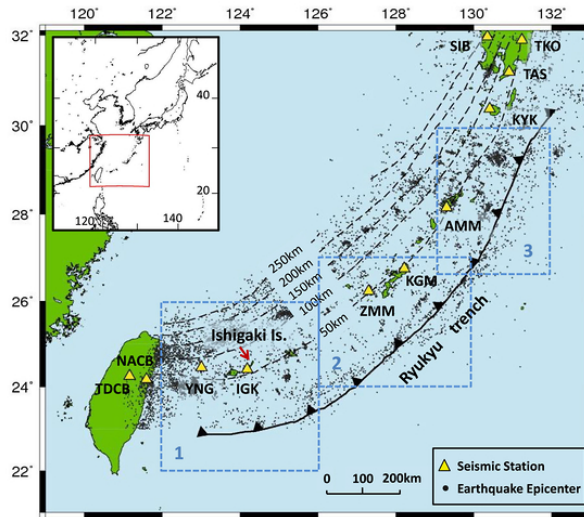
Very low frequency earthquakes along the Ryukyu subduction zone

Masataka Ando, Yoko Tu, Hiroyuki Kumagai, Yoshiko Yamanaka, Cheng-Horng Lin

First Published: 23 February 2012 Vol: 39, L04303 | DOI: 10.1029/2011GL050559

KEY POINTS

- VLFs along the Ryukyu subduction are identified using broadband seismograms
- VLFs occur on thrust faults near the Ryukyu trench axis
- This paper proposes the presence of coupled regions in the Ryukyu trench



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Climate

Asymmetric seasonal temperature trends

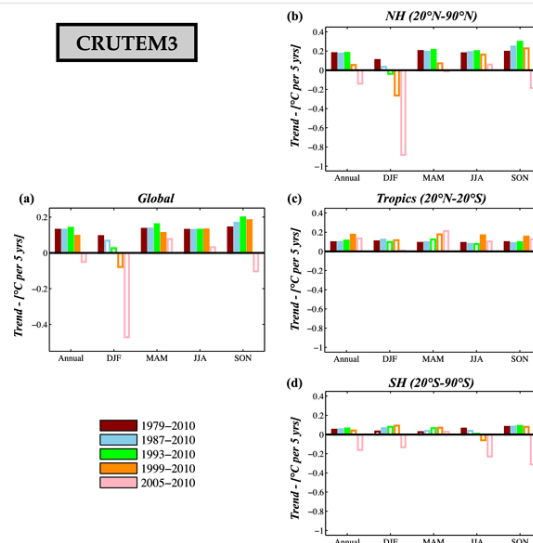
Judah L. Cohen, Jason C. Furtado, Mathew Barlow, Vladimir A. Alexeev, Jessica E. Cherry

First Published: 25 February 2012 Vol: 39, L04705 | DOI: 10.1029/2011GL050582

KEY POINTS

- Global warming has not stopped
- The cessation of an observed warming trend is isolated to winter
- The coupled climate models poorly simulate the observed winter trend

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Solid Earth

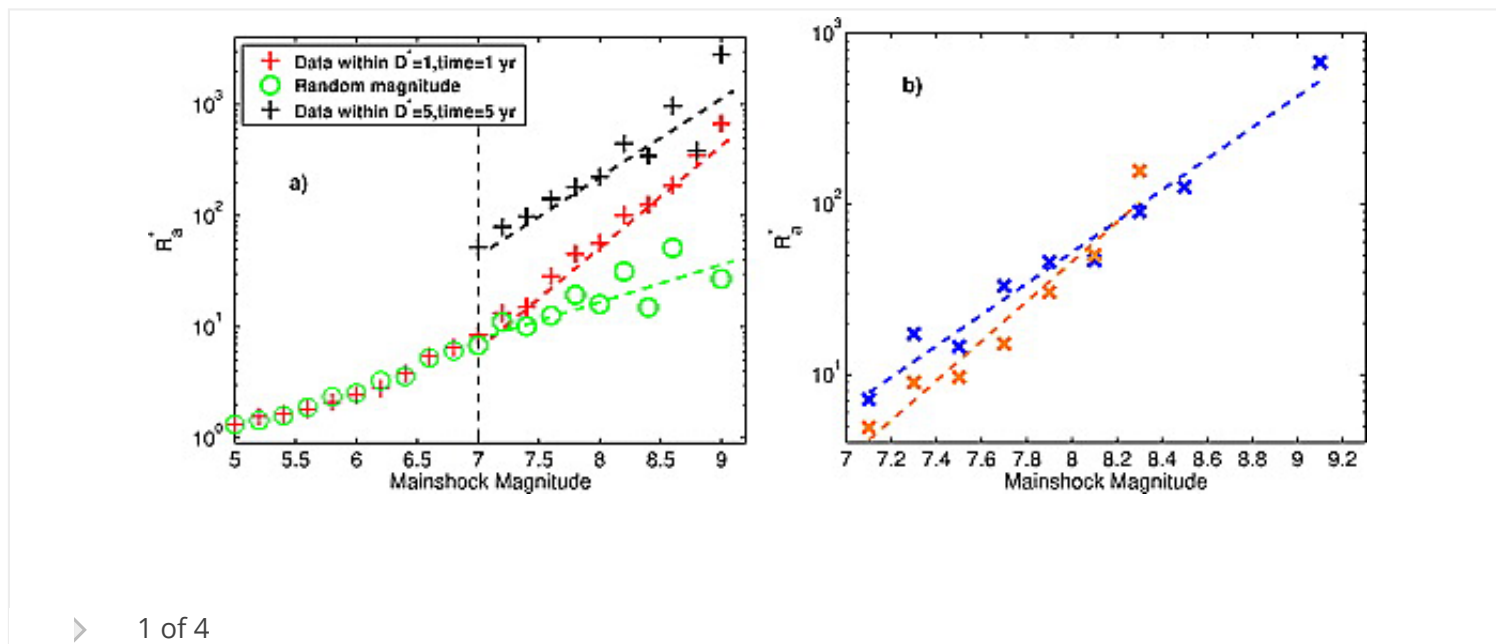
The largest aftershock: How strong, how far away, how delayed?

M. Tahir, J.-R. Grasso, D. Amorèse

First Published: 17 February 2012 Vol: 39, L04301 | DOI: 10.1029/2011GL050604

KEY POINTS

- The largest aftershock is larger in size for reverse than for strike slip event
- The largest aftershock is the closest to the mainshock for reverse events
- Space and size patterns are in agreement with static stress changes



Climate

Long tails in regional surface temperature probability distributions with implications for extremes under global warming

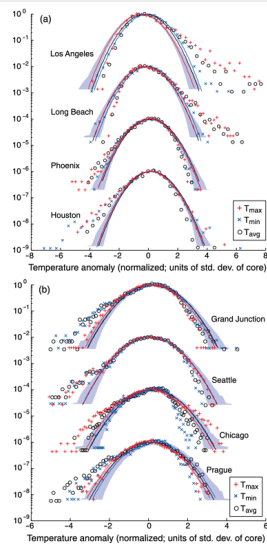
Tyler W. Ruff, J. David Neelin

First Published: 25 February 2012 Vol: 39, L04704 | DOI: 10.1029/2011GL050610

KEY POINTS

- Non-Gaussian tails in surface temperature probability distributions are common
- Probabilities of extreme events under global warming depend on local tail shapes
- Prototypes imply tail formation is dependent on regional flow characteristics

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Hydrology and Land Surface Studies

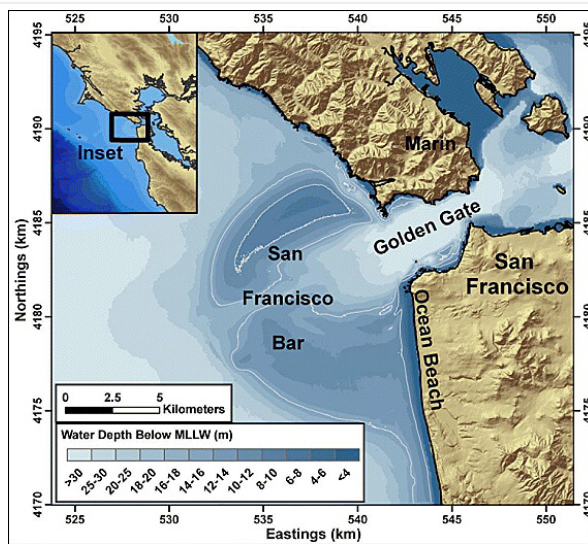
The genesis of an inter-field marine sandwave and the associated anti-asymmetry migration of neighboring crests

Daniel M. Hanes

First Published: 22 February 2012 Vol: 39, L04402 | DOI: 10.1029/2011GL050641

KEY POINTS

- Asymmetric sand waves migrated in the opposite direction than expected
- Migration was accompanied by the formation of a new inter-field sand wave crest
- Results bring into question common understandings regarding bedform dynamics

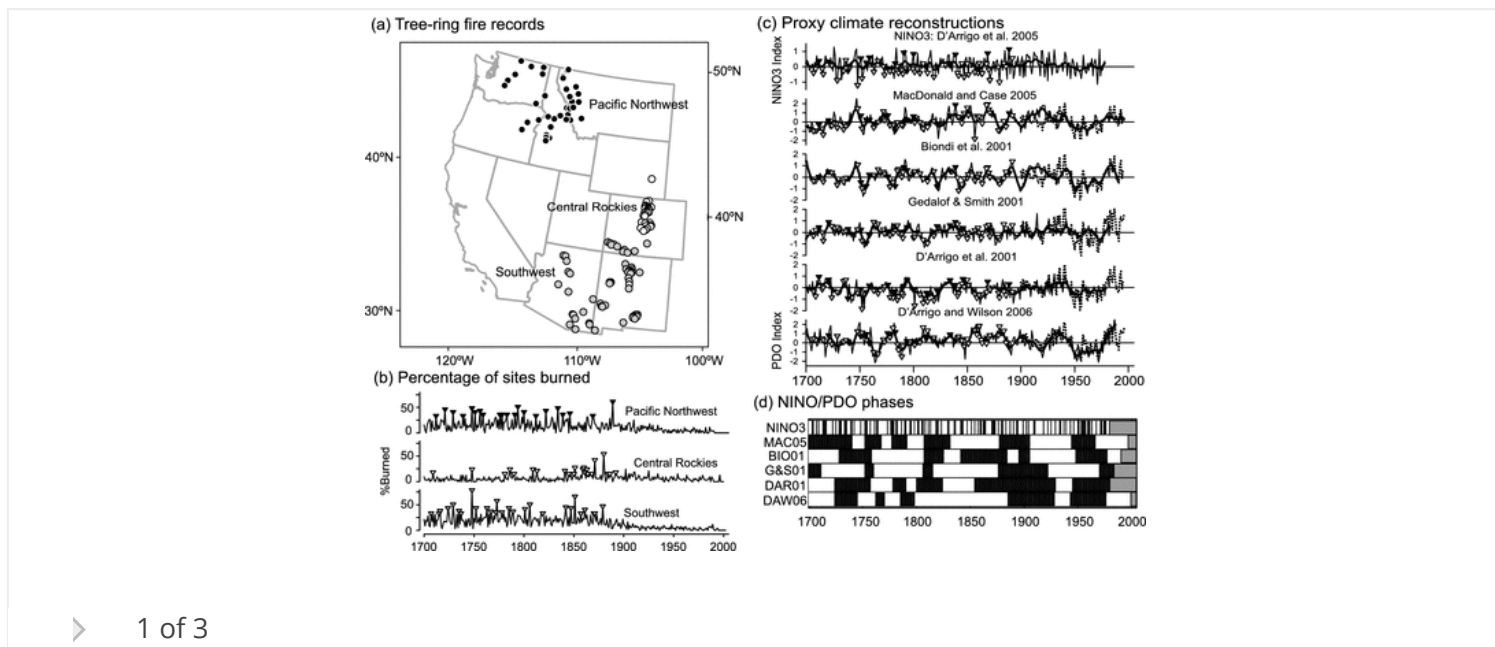


Climate

Does proxy uncertainty affect the relations inferred between the Pacific Decadal Oscillation and wildfire activity in the western United States?

KEY POINTS

- The PDO is believed to influence wildfire activity over one to several decades
- The choice of reconstruction determines the inferred PDO/fire relationship
- Without guidance from paleoclimatology, PDO-fire tests will remain uncertain



Solid Earth

On the threshold of flow in a tight natural rock

P. G. Meredith, I. G. Main, O. C. Clint, L. Li

First Published: 25 February 2012 Vol: 39, L04307 | DOI: 10.1029/2011GL050649

KEY POINTS

- We measure very low permeabilities in an initially crack-free rock
- Permeability is extremely sensitive to very small changes in porosity
- The results validate a continuum percolation model



Hydrology and Land Surface Studies

Assimilation of passive and active microwave soil moisture retrievals

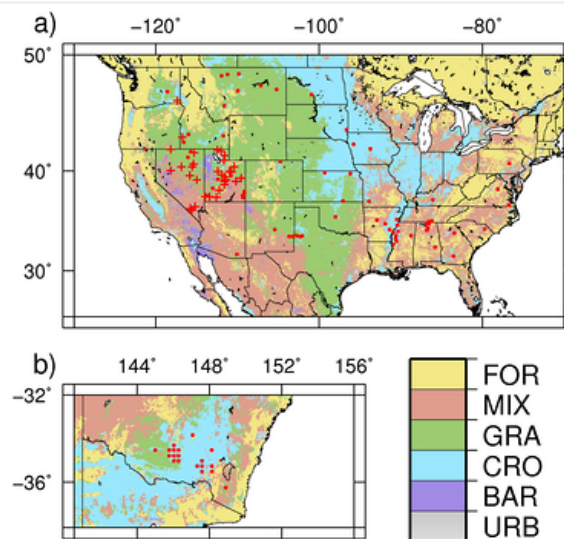
C. S. Draper, R. H. Reichle, G. J. M. De Lannoy, Q. Liu

First Published: 18 February 2012 Vol: 39, L04401 | DOI: 10.1029/2011GL050655

KEY POINTS

- Assimilating ASCAT or AMSR-E SM significantly improves root-zone SM skill
- Assimilating ASCAT or AMSR-E SM yields similar skill, regardless of land cover
- The minimum SM observation skill for positive assimilation impact is quantified

Highlight



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Climate

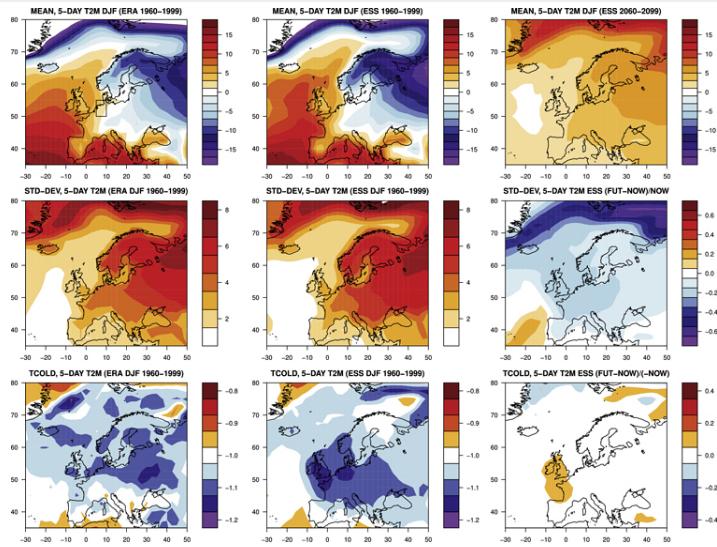
Western European cold spells in current and future climate

Hylke de Vries, Reindert J. Haarsma, Wilco Hazeleger

First Published: 28 February 2012 Vol: 39, L04706 | DOI: 10.1029/2011GL050665

KEY POINTS

- Cold spells when viewed relatively do hardly change statistics
- Important role of temperature gradient in determining stand dev. of temp
- Intermodel spread in cold-spell stats mostly caused by diffs in mean and stdev



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Oceans

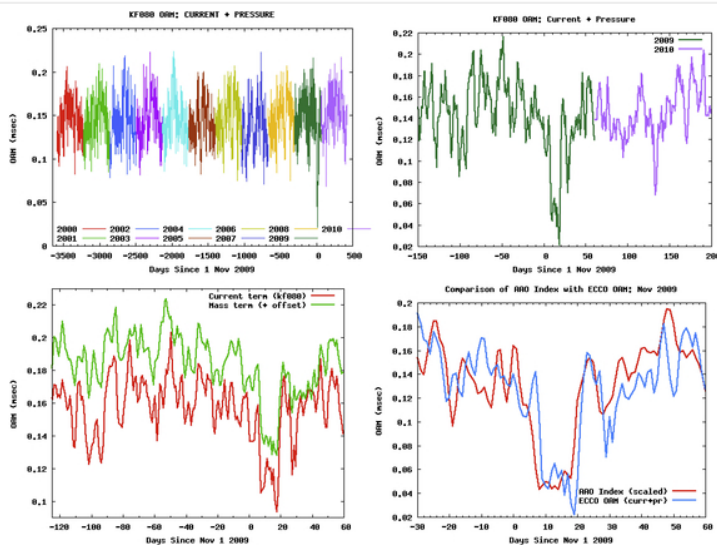
Detection of the Earth rotation response to a rapid fluctuation of Southern Ocean circulation in November 2009

S. L. Marcus, J. O. Dickey, I. Fukumori, O. de Viron

First Published: 28 February 2012 Vol: 39, L04605 | DOI: 10.1029/2011GL050671

KEY POINTS

- A rapid drop and recovery in the Antarctic Circumpolar Current occurred in 2009
- The resulting anomaly in oceanic angular momentum changed the length of day
- This unique LOD signature highlights the unusual Southern Ocean state in 2009



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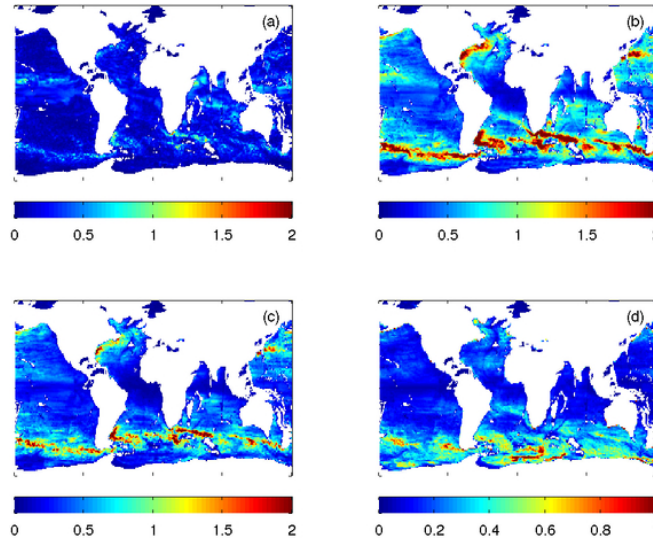
An assessment of deep steric height variability over the global ocean

Rui M. Ponte

First Published: 17 February 2012 Vol: 39, L04601 | DOI: 10.1029/2011GL050681

KEY POINTS

- Substantial deep steric height variability, particularly associated with eddies
- Strong thermal contributions, tightly correlated with salinity contributions
- Difficult to infer deep steric variability from information about upper ocean



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Atmospheric Science

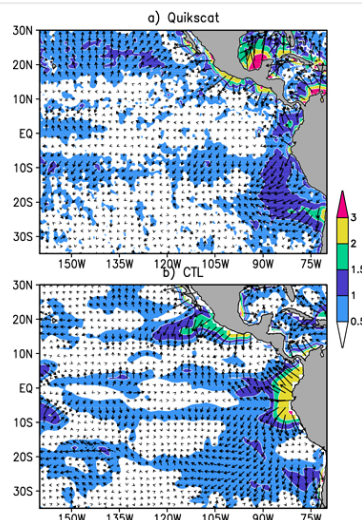
Thermodidal and land-heating forcing of the diurnal cycle of oceanic surface winds in the eastern tropical Pacific

Ken Takahashi

First Published: 22 February 2012 Vol: 39, L04805 | DOI: 10.1029/2011GL050692

KEY POINTS

- Atmospheric shortwave absorption drives the diurnal cycle away from coasts
- Diurnal cycle in winds is a thermal tide, in precipitation it is a local effect
- Near the coast, land heating is as important. Andes modulate the response



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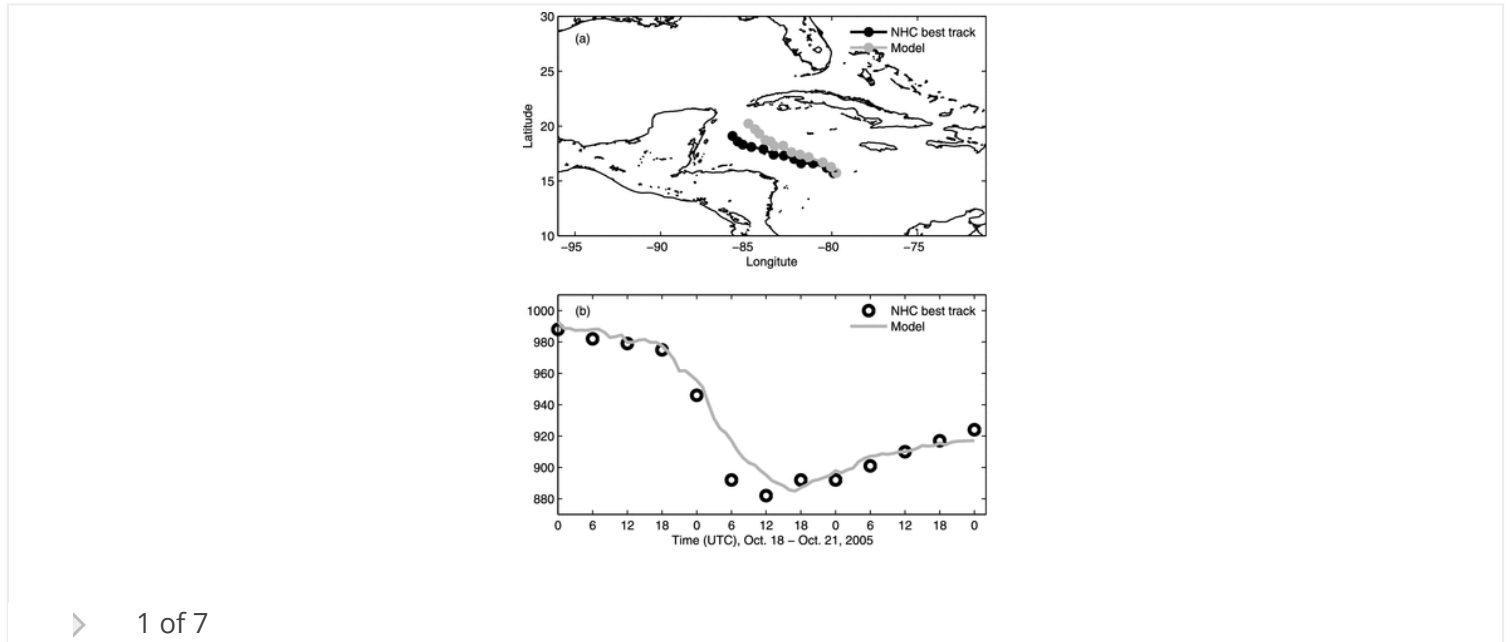
On the dynamics of the secondary eyewall genesis in Hurricane Wilma (2005)

K. Menelaou, M. K. Yau, Y. Martinez

First Published: 16 February 2012 Vol: 39, L04801 | DOI: 10.1029/2011GL050699

KEY POINTS

- Simulation of Wilma to study the genesis and the replacement cycle
- Empirical normal mode analysis conducted to examine the propagation of VRWs
- Wave-mean flow interaction is shown to be a mechanism for secondary eyewall



Space Sciences

Geomagnetic detection of the sectorial solar magnetic field and the historical peculiarity of minimum 23-24

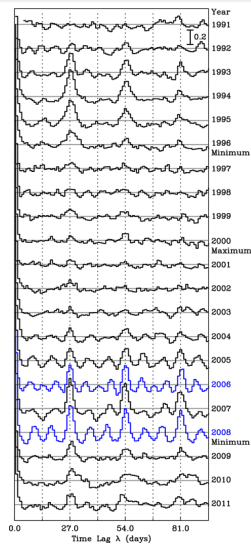
Jeffrey J. Love, E. Joshua Rigler, Sarah E. Gibson

First Published: 28 February 2012 Vol: 39, L04102 | DOI: 10.1029/2011GL050702

KEY POINTS

- Minimum 23-24 showed recurrence intervals of 9.0 and 6.7-d
- Historical geomagnetic activity data show that minimum 23-24 was unusual
- The heliosphere during minimum 23-24 had unusual sectorial structure

Highlight



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The Cryosphere

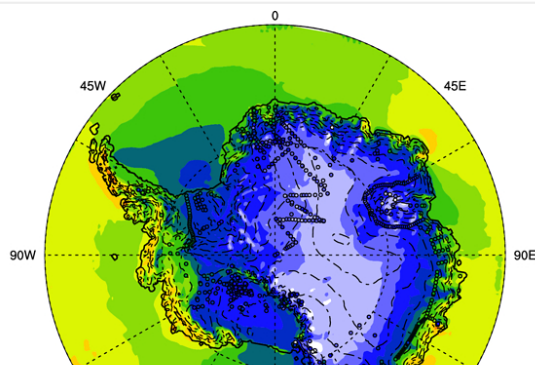
A new, high-resolution surface mass balance map of Antarctica (1979–2010) based on regional atmospheric climate modeling

J. T. M. Lenaerts, M. R. van den Broeke, W. J. van de Berg, E. van Meijgaard, P. Kuipers Munneke

First Published: 21 February 2012 Vol: 39, L04501 | DOI: 10.1029/2011GL050713

KEY POINTS

- Good agreement of modeled SMB field with observations
- Very high accumulation in West Antarctica is confirmed
- No significant SMB trend on Antarctica in period 1979–2010



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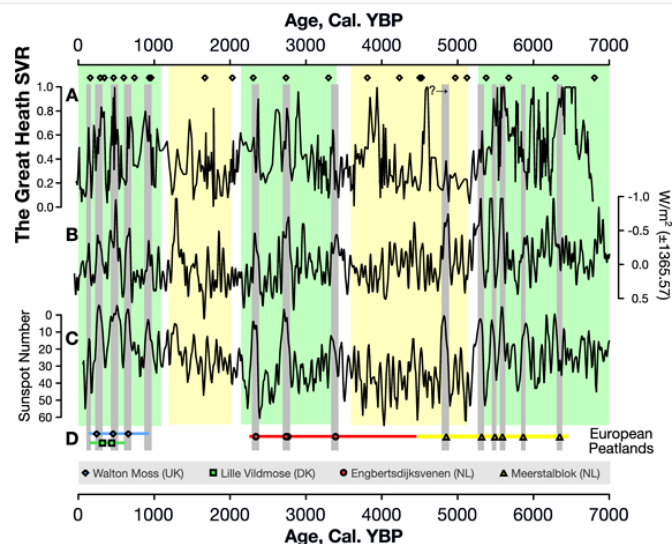
Climate

Hydroclimate of the northeastern United States is highly sensitive to solar forcing

Jonathan E. Nichols, Yongsong Huang

KEY POINTS

- Holocene northeast US hydrological change is consistent with solar forcing
- Small changes in solar forcing are amplified in our region by Arctic Oscillation
- Leaf-wax abundances in peatlands provide high-resolution climate information



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Atmospheric Science

On the information content of surface meteorology for downward atmospheric long-wave radiation synthesis

Gab Abramowitz, Laure Pouyanné, Hoori Ajami

First Published: 28 February 2012 Vol: 39, L04808 | DOI: 10.1029/2011GL050726

KEY POINTS

- Demonstration of inadequacy of existing long-wave down synthesis techniques
- Show that temperature and humidity provide enough information for improvement
- Propose better performing and extremely simple solution

Planets

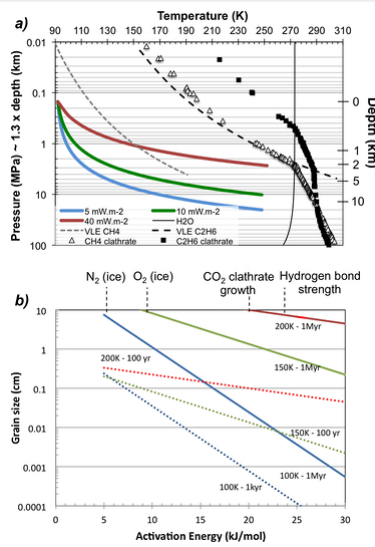
Is Titan's shape caused by its meteorology and carbon cycle?

M. Choukroun, C. Sotin

First Published: 29 February 2012 Vol: 39, L04201 | DOI: 10.1029/2011GL050747

KEY POINTS

- Ethane can substitute methane in clathrate hydrates on Titan
- The densification of clathrates by this exchange induces subsidence
- The subsidence is consistent with Titan's shape as measured by the Cassini probe



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Hydrology and Land Surface Studies

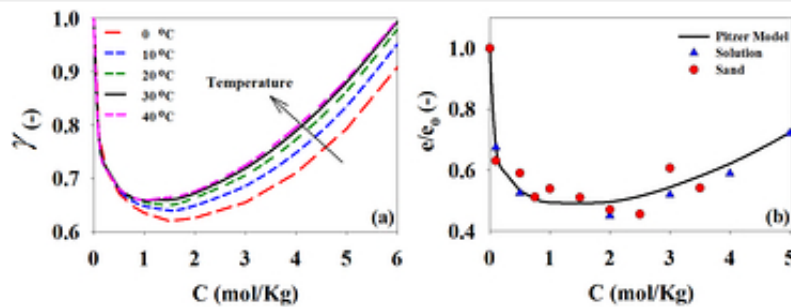
Nonlinear effects of salt concentrations on evaporation from porous media

Mansoureh Norouzi Rad, Nima Shokri

First Published: 24 February 2012 Vol: 39, L04403 | DOI: 10.1029/2011GL050763

KEY POINTS

- In certain condition higher salt concentration may cause higher evaporation rate
- Onset of efflorescence is a nonlinear function of salt concentration
- Maximum salt coverage rate at surface coincide with end of stage-1 evaporation



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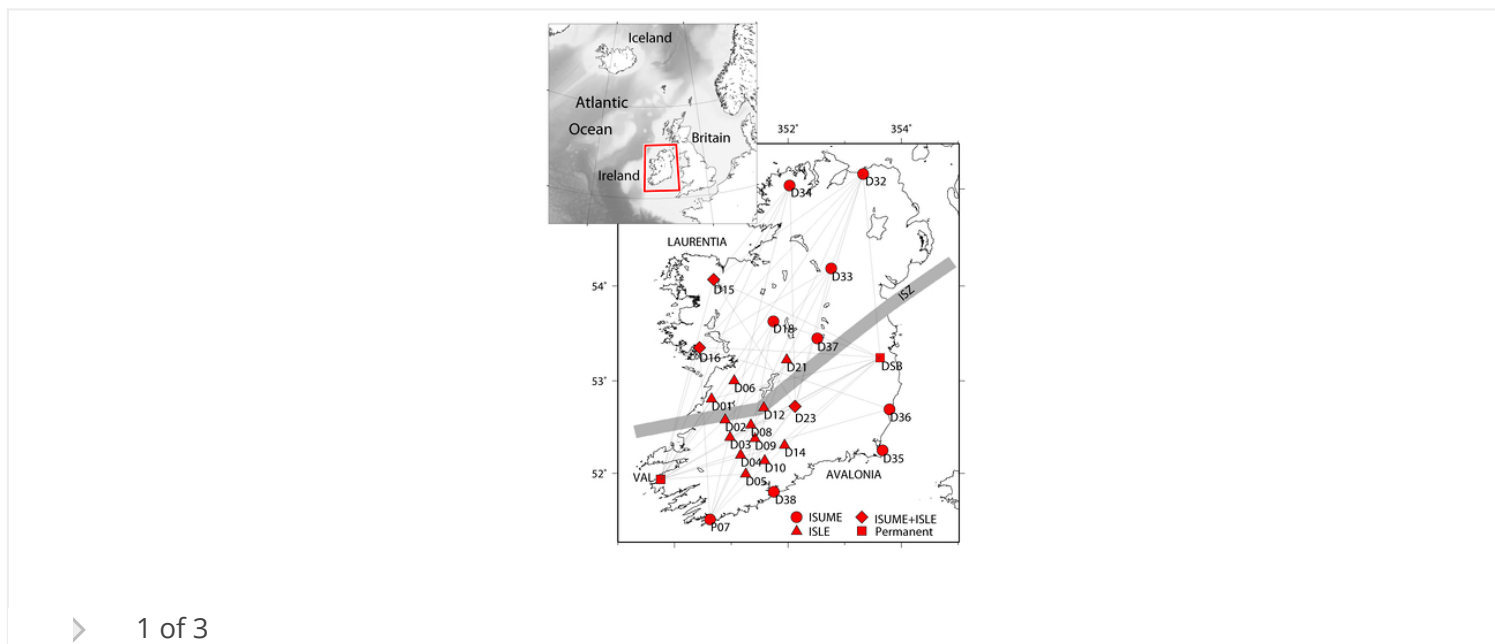
Solid Earth

Anisotropic Rayleigh-wave tomography of Ireland's crust: Implications for crustal accretion and evolution within the Caledonian Orogen

G. Polat, S. Lebedev, P. W. Readman, B. M. O'Reilly, F. Hauser

KEY POINTS

- Suture-parallel flow in the middle and lower crust in the Caledonian Orogen
- Limited effect of post-Caledonian stretching or underplating on Ireland's crust
- No regional-scale effect of the Variscan Orogeny on middle and lower Irish crust



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