

Volume 39, Issue 2

2012

Brief Detailed

Solid Earth

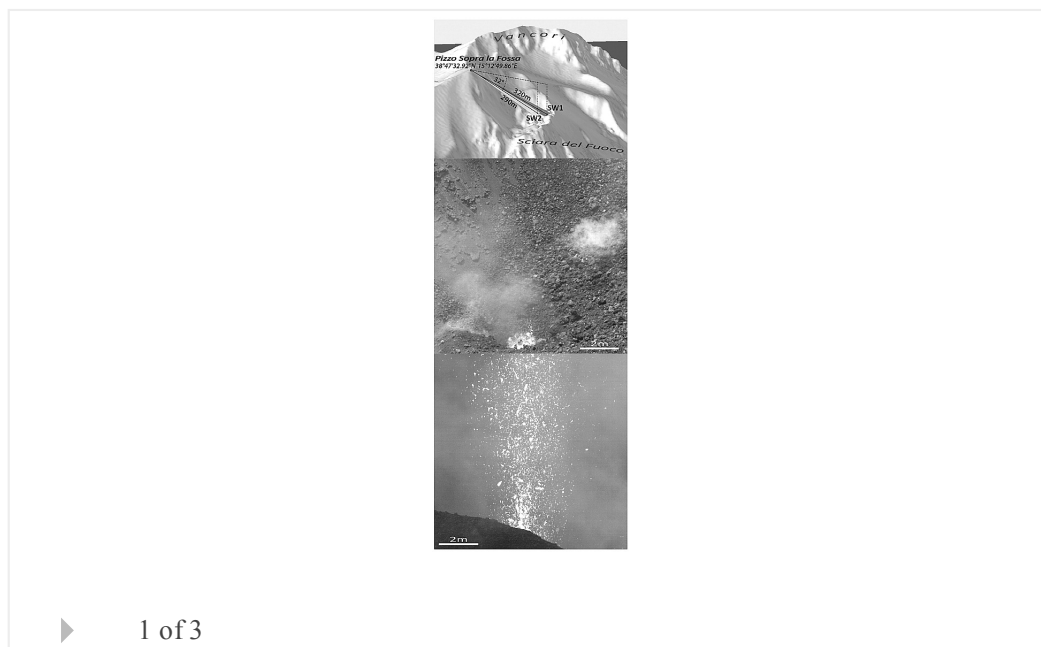
High-speed imaging of Strombolian explosions: The ejection velocity of pyroclasts

J. Taddeucci, P. Scarlato, A. Capponi, E. Del Bello, C. Cimarelli, D. M. Palladino, U. Kueppers

First Published: 18 January 2012 Vol: 39, L02301 | DOI: 10.1029/2011GL050404

KEY POINTS

- High-speed analyses reveal ejecta velocities four times higher than literature
- Strombolian explosions include multiple, sub-second-lasting ejection pulses
- Ejecta velocity decay within pulses reveals the size of exploding gas pockets



▶ 1 of 3

Atmospheric Science

Association of U.S. tornado occurrence with monthly environmental parameters

Michael K. Tippett, Adam H. Sobel, Suzana J. Camargo

First Published: 18 January 2012 Vol: 39, L02801 | DOI: 10.1029/2011GL050368

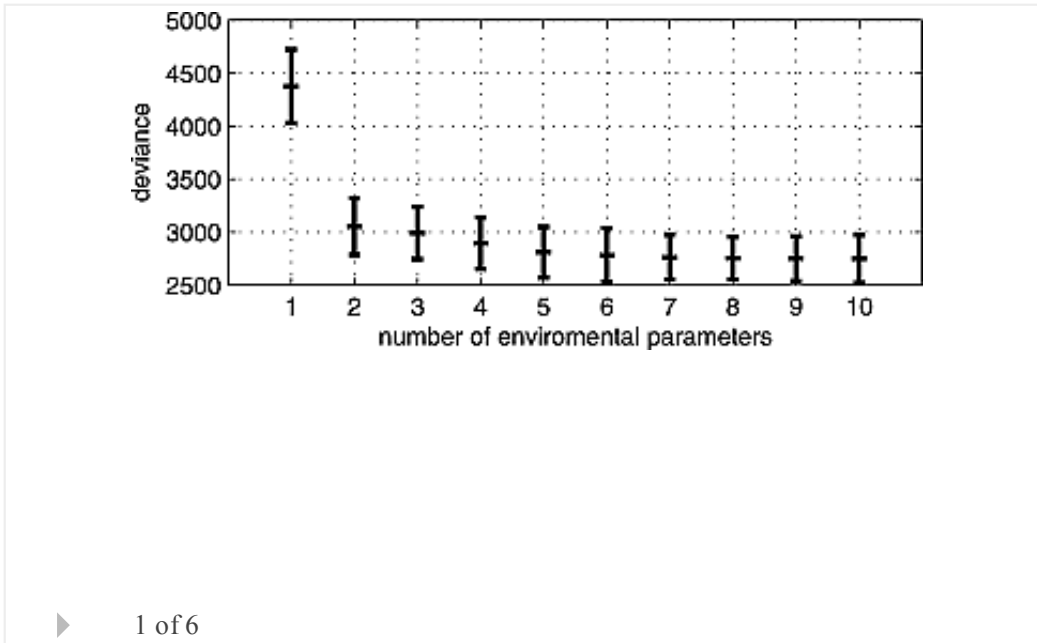
KEY POINTS

- We construct a monthly tornado activity index depending on atmospheric

variables

- The index captures aspects of climatological and year-to-year variability
- The index provides a framework for extended-range tornado activity prediction

Highlight



▶ 1 of 6

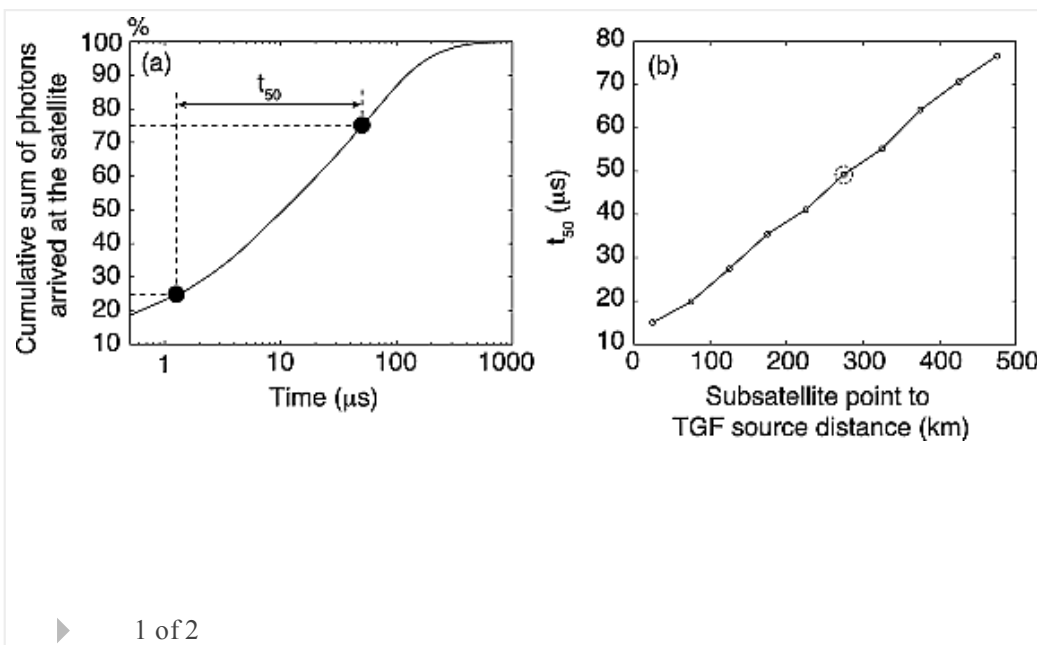
Compton scattering effects on the duration of terrestrial gamma-ray flashes

Sebastien Celestin, Victor P. Pasko

First Published: 18 January 2012 Vol: 39, L02802 | DOI: 10.1029/2011GL050342

KEY POINTS

- Short TGF pulses observed from satellites correspond to sources < 10 microseconds
- TGFs can be produced by a sequence of very fast lightning processes



▶ 1 of 2

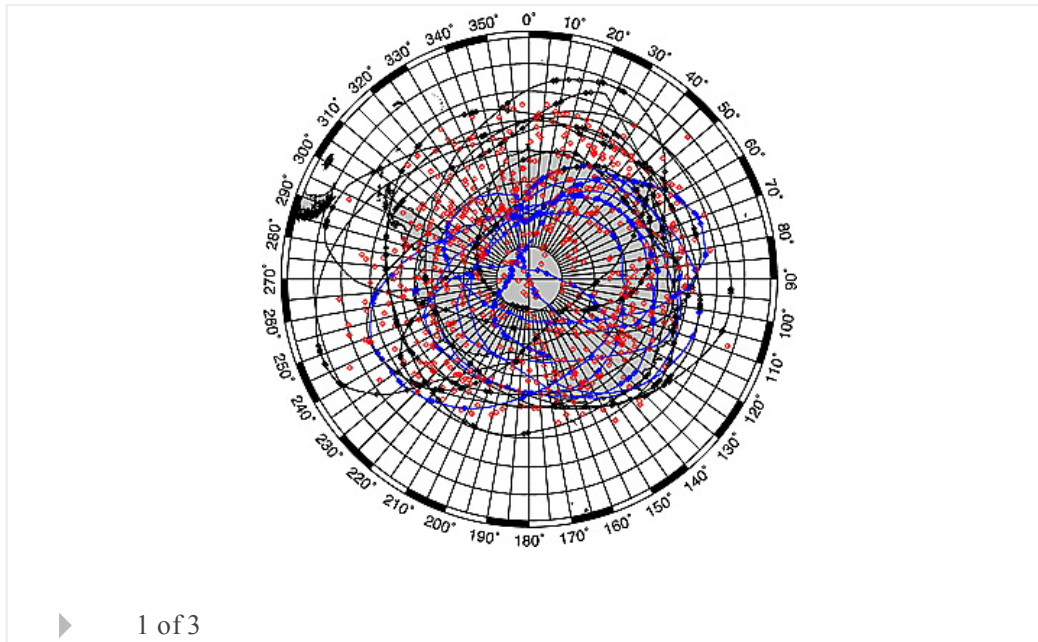
A proof-of-concept balloon-borne Global Positioning System radio occultation profiling instrument for polar studies

J. S. Haase, J. Maldonado-Vargas, F. Rabier, P. Cocquerez, M. Minois, V. Guidard, P. Wyss, A. V. Johnson

First Published: 21 January 2012 Vol: 39, L02803 | DOI: 10.1029/2011GL049982

KEY POINTS

- The first time radio occultation measurements have been made from a balloon
- Allows continuous monitoring of an air mass
- Potential for significant improvement of reanalyses in the Antarctic



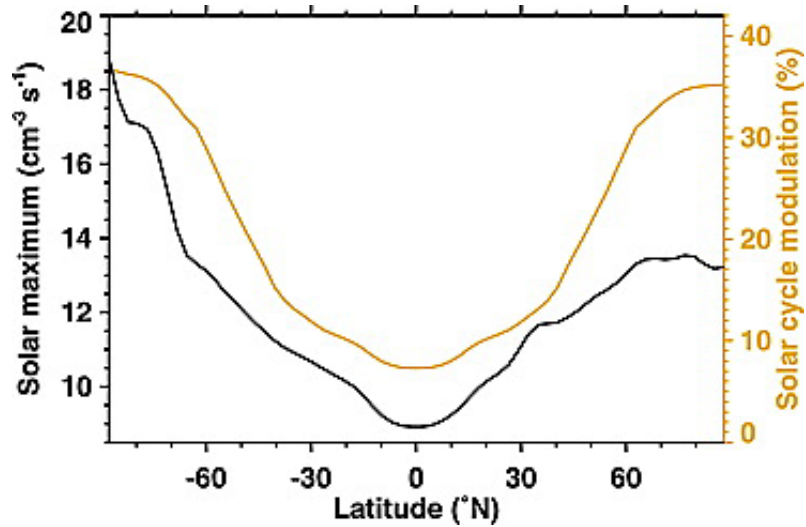
The present-day decadal solar cycle modulation of Earth's radiative forcing via charged H₂SO₄/H₂O aerosol nucleation

J. Kazil, K. Zhang, P. Stier, J. Feichter, U. Lohmann, K. O'Brien

First Published: 24 January 2012 Vol: 39, L02805 | DOI: 10.1029/2011GL050058

KEY POINTS

- The solar cycle modulation of clouds is quantified with a climate model
- The resulting solar cycle signal in Earth's radiative forcing is small



▶ 1 of 2

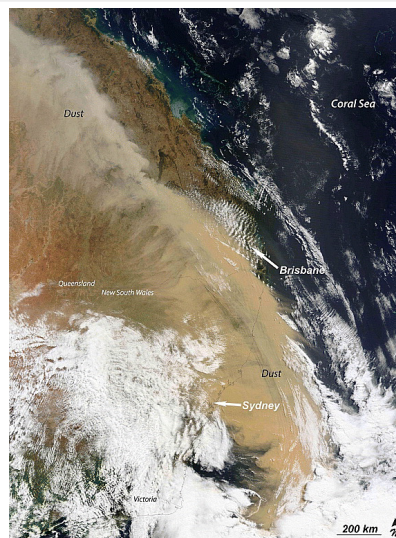
Laser ceilometer measurements of Australian dust storm highlight need for reassessment of atmospheric dust plume loads

Hamish A. McGowan, Joshua Soderholm

First Published: 24 January 2012 Vol: 39, L02804 | DOI: 10.1029/2011GL050319

KEY POINTS

- Identified cause of error in previous dust load estimates
- Highlights need for different approaches to dust load measurements
- Confirms urgent need for new atmospheric dust load research



▶ 1 of 4

Importance of the upper-level warm core in the rapid intensification of a tropical cyclone

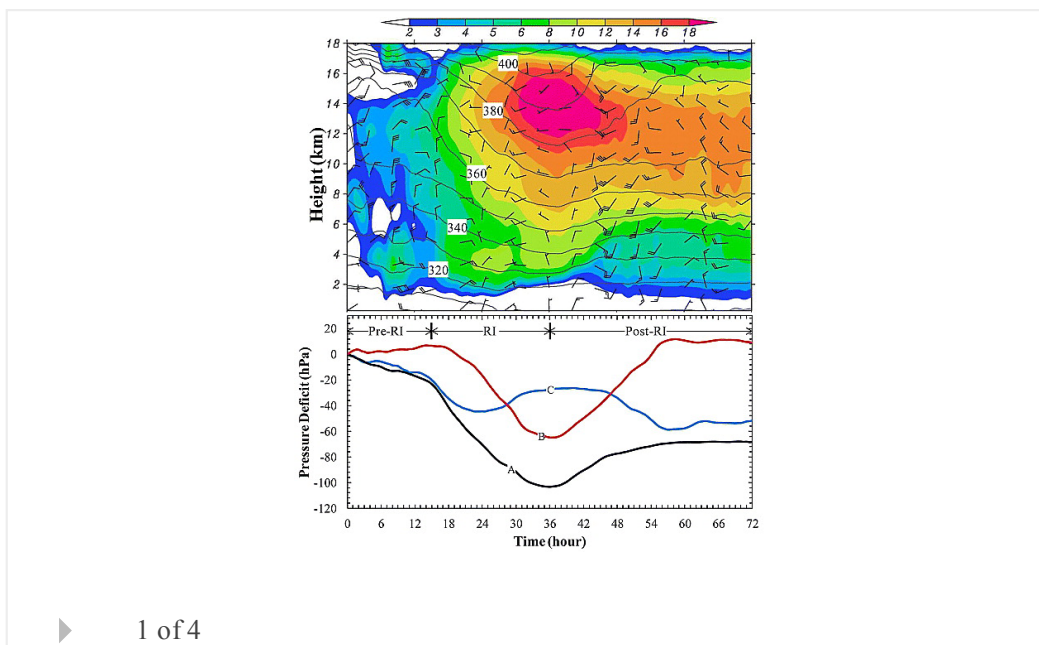
Da-Lin Zhang, Hua Chen

First Published: 28 January 2012 Vol: 39, L02806 | DOI: 10.1029/2011GL050578

KEY POINTS

- Upper-level warming is more effective in reducing surface pressure
- Upper-level outflow layer favors forming a warm core
- Convective bursts play important roles in RI of hurricanes

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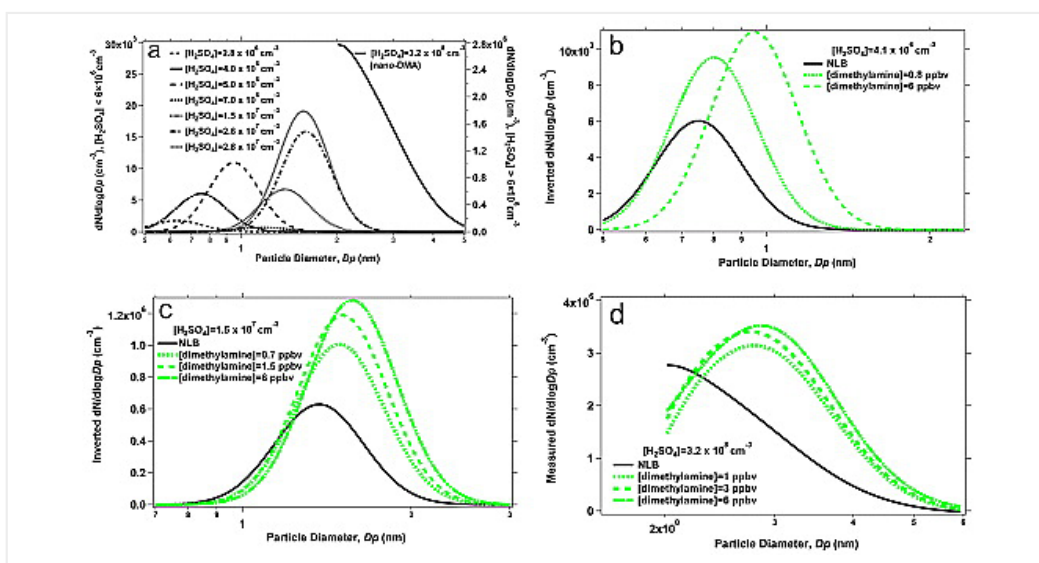
Effects of amines on formation of sub-3 nm particles and their subsequent growth

Huan Yu, Robert McGraw, Shan-Hu Lee

First Published: 28 January 2012 Vol: 39, L02807 | DOI: 10.1029/2011GL050099

KEY POINTS

- Our laboratory results show that amines affect formation of sub-3 nm particles
- The enhancement of amines is related to their basicity
- Our lab study has measured aerosol precursors and sub-3 nm particles



Climate

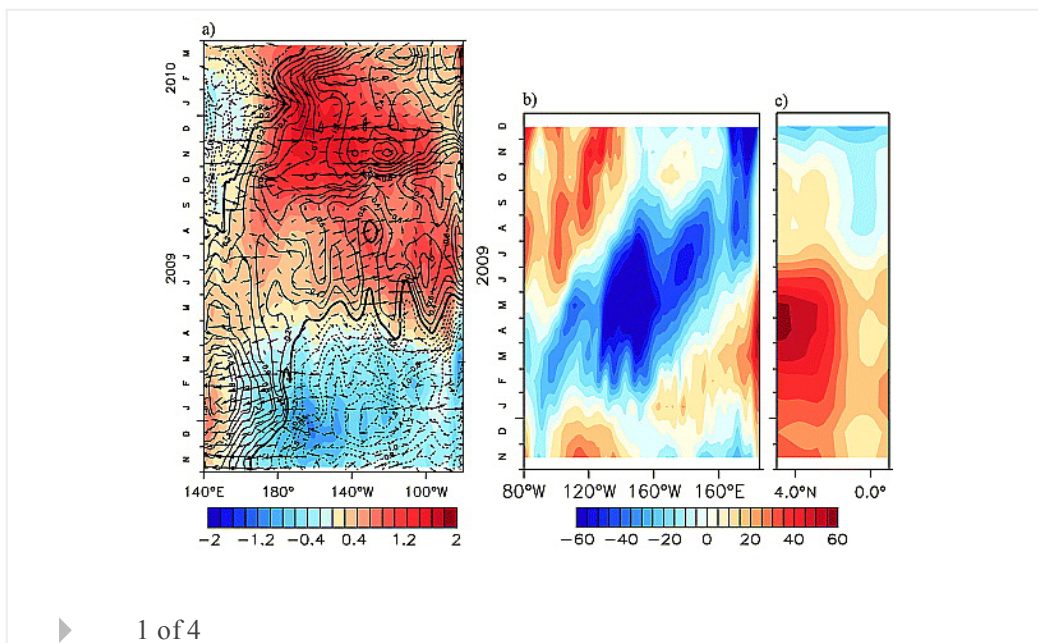
Is a global warming signature emerging in the tropical Pacific?

K. Ashok, T. P. Sabin, P. Swapna, R. G. Murtugudde

First Published: 18 January 2012 Vol: 39, L02701 | DOI: 10.1029/2011GL050232

KEY POINTS

- Basin-wide warm event over tropical Pacific during the boreal summer of 2009
- Evolution of the tropical Pacific SST and potential role of global warming
- Global warming may result in more basin-wide warm events



A recent and abrupt decline in the East African long rains

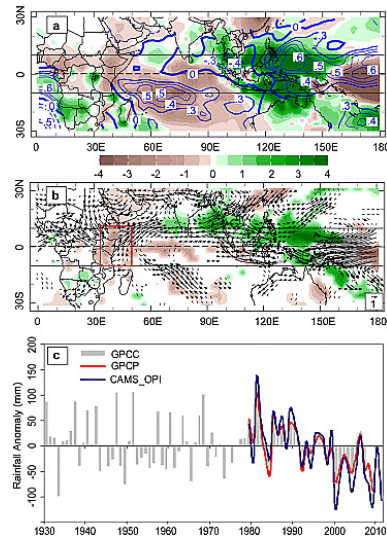
Bradfield Lyon, David G. DeWitt

First Published: 18 January 2012 Vol: 39, L02702 | DOI: 10.1029/2011GL050337

KEY POINTS

- There has been an abrupt decline in East African rainfall
- The rainfall decline is associated with abrupt changes in the tropical Pacific
- The Indian Ocean does not appear to be a primary factor as previously suggested

Highlight



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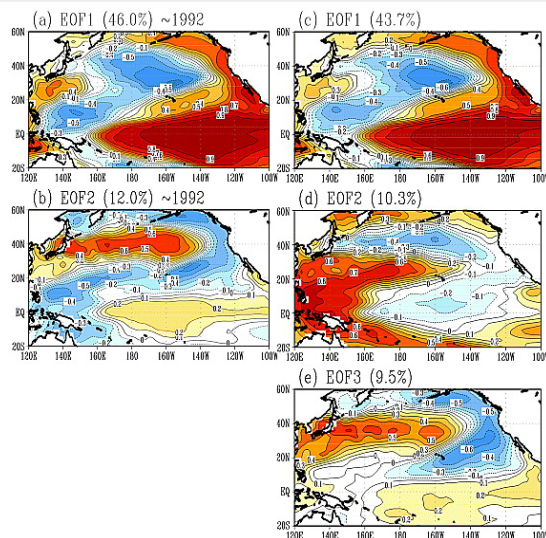
Revisited relationship between tropical and North Pacific sea surface temperature variations

Jong-Yeon Park, Sang-Wook Yeh, Jong-Seong Kug

First Published: 19 January 2012 Vol: 39, L02703 | DOI: 10.1029/2011GL050005

KEY POINTS

- A new SST relationship in the Pacific Ocean
- A new SST mode due to global warming
- Understanding of SST teleconnections



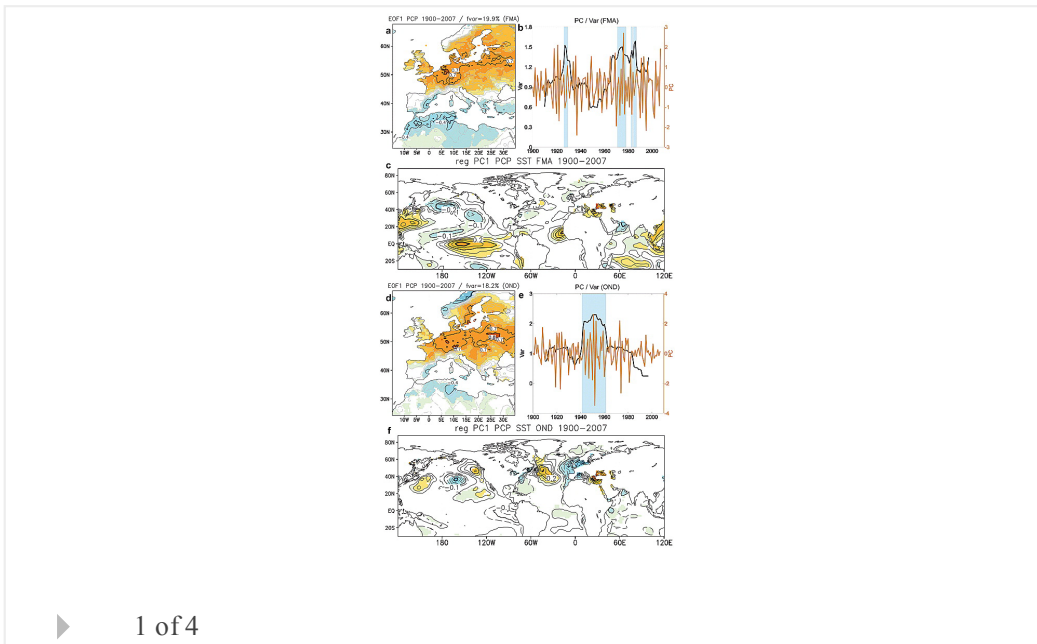
▶ 1 of 4

Multidecadal modulation of El Niño influence on the Euro-Mediterranean rainfall

Jorge López-Parages, Belén Rodríguez-Fonseca

KEY POINTS

- EMedR as a result of internal variability or forced by El-Nino
- Non stationary relationship between the Euro-Mediterranean rainfall and El Nino
- El Nino impact depends on the sign of AMO (late-winter and spring) or PDO (fall)



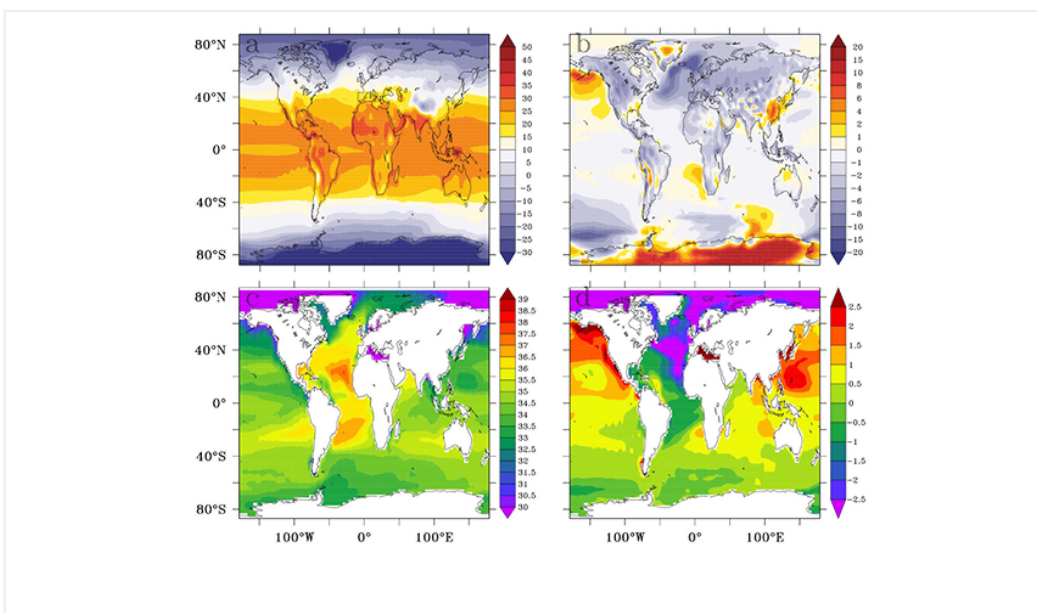
Mountain ranges favour vigorous Atlantic meridional overturning

Bablu Sinha, Adam T. Blaker, Joël J.-M. Hirschi, Sarah Bonham, Matthew Brand, Simon Josey, Robin S. Smith, Jochem Marotzke

First Published: 21 January 2012 Vol: 39, L02705 | DOI: 10.1029/2011GL050485

KEY POINTS

- Mountains favour a strong Atlantic overturning
- Mountains control the magnitude and pattern of freshwater forcing
- We may have to reassess the vulnerability of the AMOC to collapse



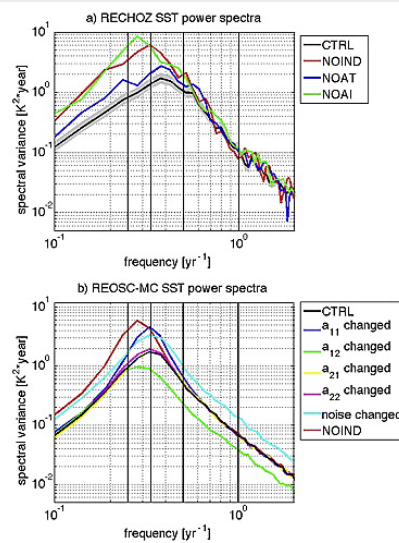
Influences of the tropical Indian and Atlantic Oceans on the predictability of ENSO

Claudia Frauen, Dietmar Dommenges

First Published: 24 January 2012 Vol: 39, L02706 | DOI: 10.1029/2011GL050520

KEY POINTS

- Tropical Indian and Atlantic Oceans influence ENSO
- Indian Ocean has strong impact on dynamical aspects of ENSO
- Tropical Atlantic Ocean has strong influence on ENSO predictability



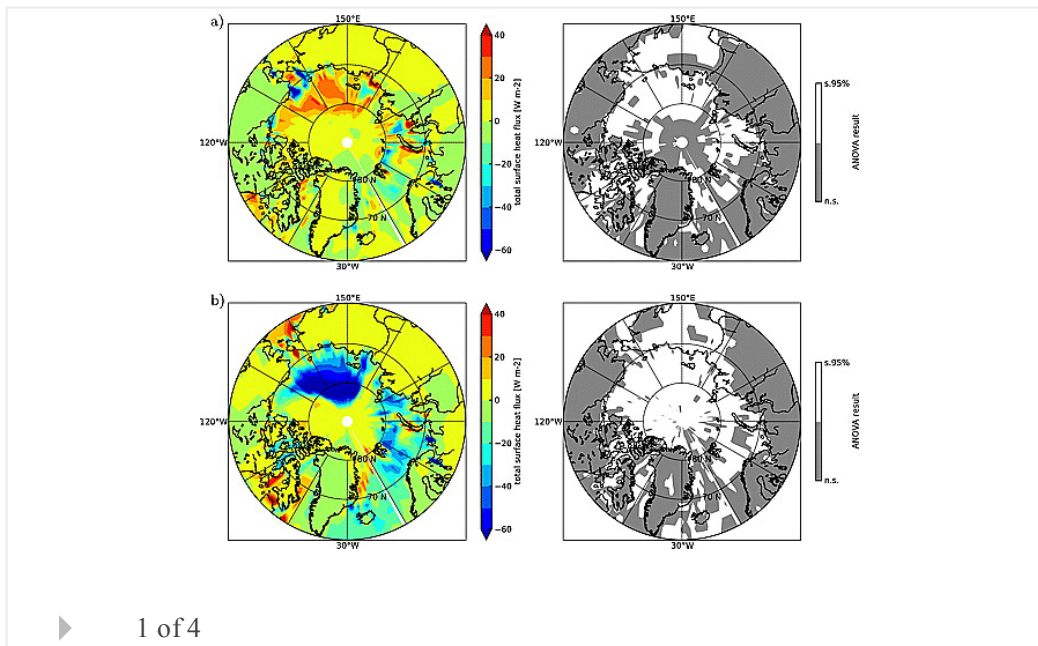
Atmospheric response to the extreme Arctic sea ice conditions in 2007

Jonas Blüthgen, Rüdiger Gerdes, Martin Werner

First Published: 31 January 2012 Vol: 39, L02707 | DOI: 10.1029/2011GL050486

KEY POINTS

- The 2007 Arctic sea ice conditions had a robust atmospheric response
- The results were significant despite the large natural variability in summer
- There is evidence for a positive dynamical atmosphere-sea ice feedback



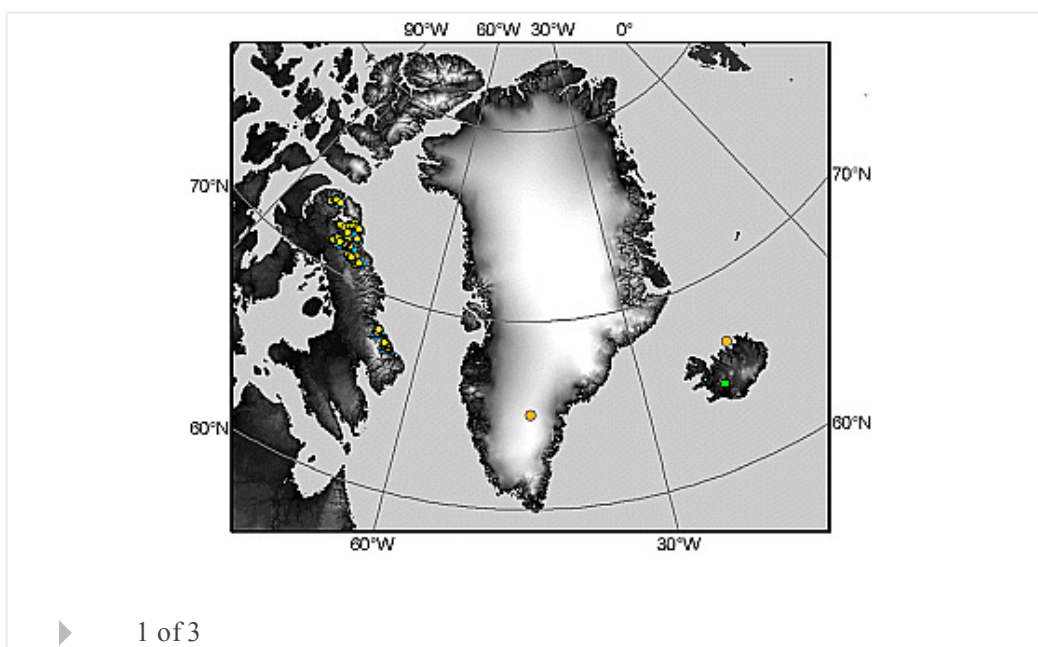
Abrupt onset of the Little Ice Age triggered by volcanism and sustained by sea-ice/ocean feedbacks

Gifford H. Miller, Áslaug Geirsdóttir, Yafang Zhong, Darren J. Larsen, Bette L. Otto-Bliesner, Marika M. Holland, David A. Bailey, Kurt A. Refsnider, Scott J. Lehman, John R. Southon, et al

First Published: 31 January 2012 Vol: 39, L02708 | DOI: 10.1029/2011GL050168

KEY POINTS

- Little Ice Age began abruptly in two steps
- Decadally paced explosive volcanism can explain the onset
- A sea-ice/ocean feedback can sustain the abrupt cooling



Hydrology and Land Surface Studies

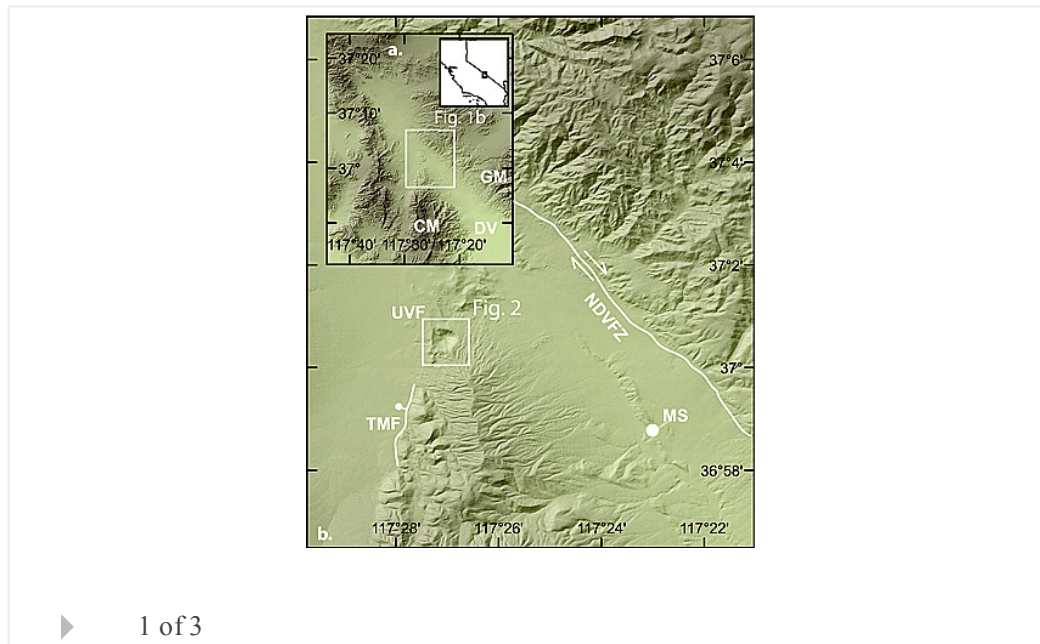
Do phreatomagmatic eruptions at Ubehebe Crater (Death Valley, California) relate to a wetter than present hydro-climate?

Peri Sasnett, Brent M. Goehring, Nicholas Christie-Blick, Joerg M. Schaefer

First Published: 18 January 2012 Vol: 39, L02401 | DOI: 10.1029/2011GL050130

KEY POINTS

- Ubehebe Crater is a young (late Holocene) volcanic feature
- Timing of activity unrelated to climate
- Youthfulness of eruption suggests volcanic hazard



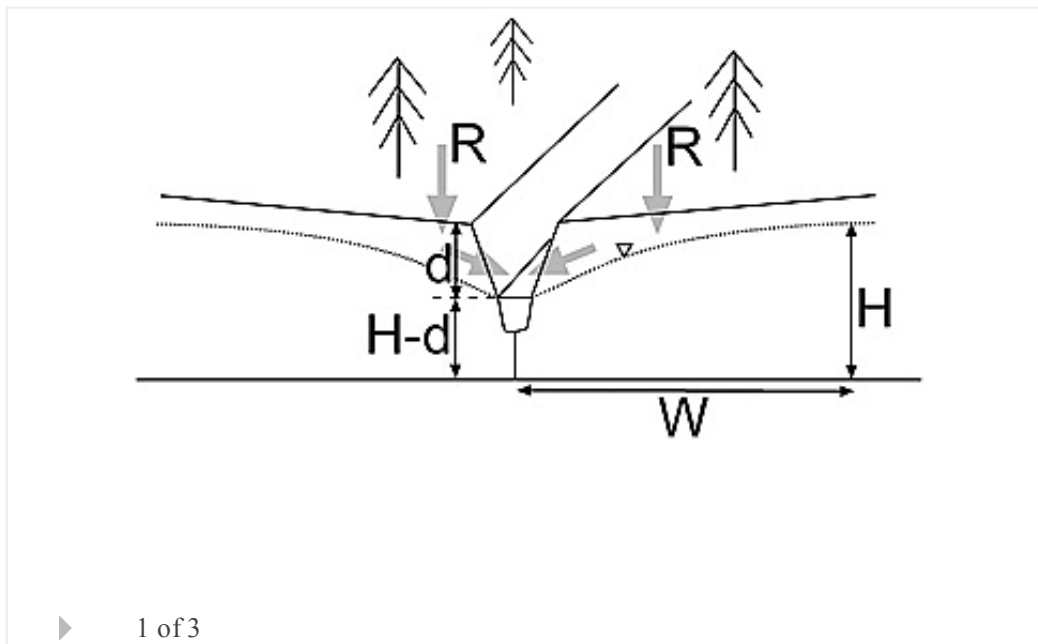
Hydraulic conductivity of the High Plains Aquifer re-evaluated using surface drainage patterns

Wei Luo, Darryll T. Pederson

First Published: 18 January 2012 Vol: 39, L02402 | DOI: 10.1029/2011GL050200

KEY POINTS

- We applied our new method to a large aquifer; result is better than USGS data
- We show close relationship between surface drainage and aquifer property
- Our method can be used in other areas and to help study sedimentation process



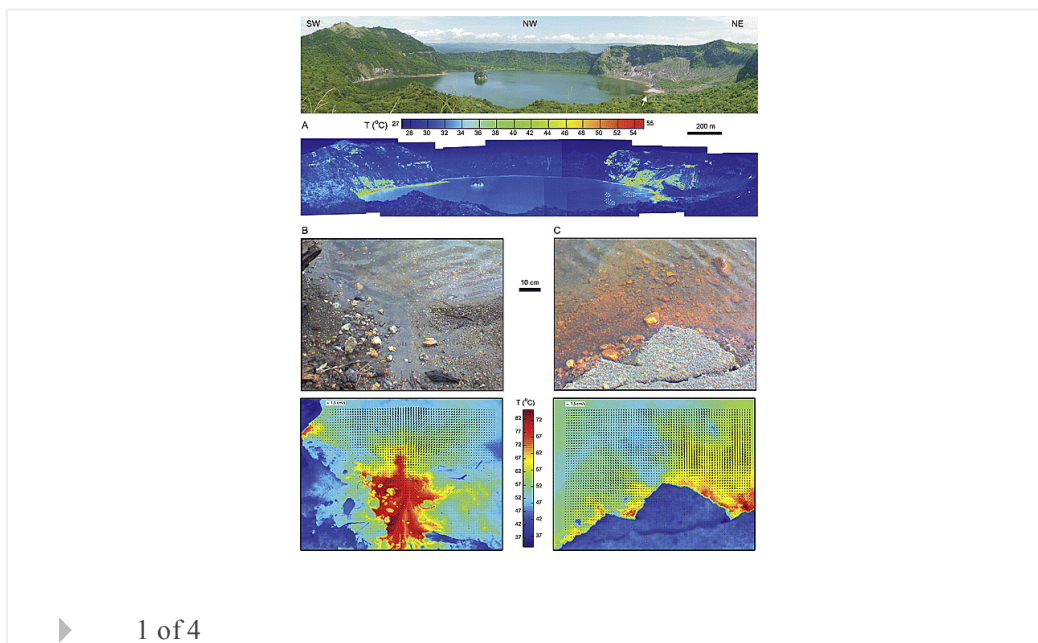
Terrestrial smokers: Thermal springs due to hydrothermal convection of groundwater connected to surface water

M. Bayani Cardenas, Alfredo Mahar F. Lagmay, Benjamin J. Andrews, Raymond S. Rodolfo, Hillel B. Cabria, Peter B. Zamora, Mark R. Lapus

First Published: 21 January 2012 Vol: 39, L02403 | DOI: 10.1029/2011GL050475

KEY POINTS

- Thermal springs are driven by shallow hydrothermal convection of groundwater
- The spring occurs because of tight coupling between surface and ground water
- Direct measurements of free convection of groundwater supported by models



A physical model for seismic noise generation from sediment transport in rivers

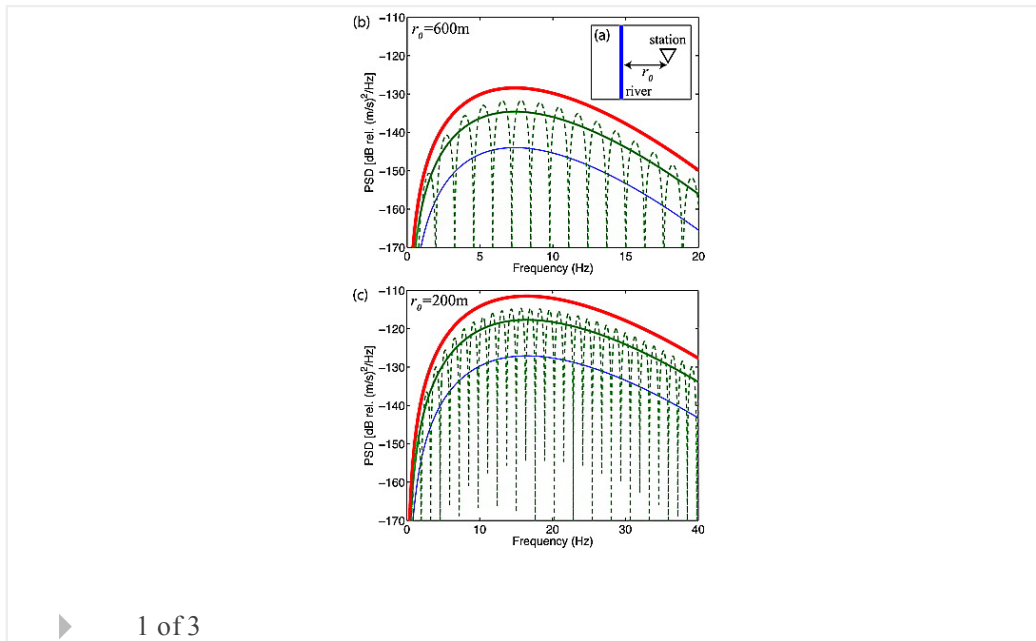
Victor C. Tsai, Brent Minchew, Michael P. Lamb, Jean-Paul Ampuero

First Published: 28 January 2012 Vol: 39, L02404 | DOI: 10.1029/2011GL050255

KEY POINTS

- We develop a model to describe the seismic noise induced by sediment transport
- The model makes predictions consistent with observations of river seismic noise
- The model can be used to invert seismic observations for sediment flux

Highlight



Oceans

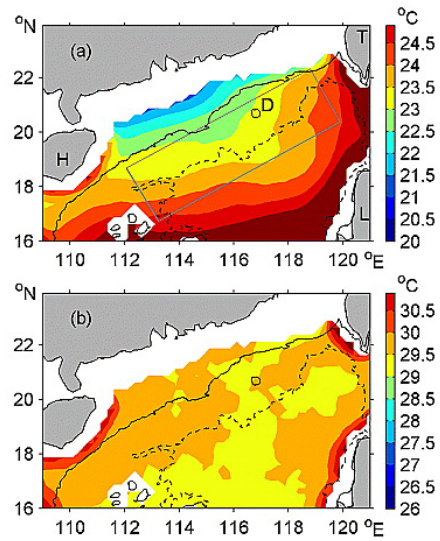
Eddy effects on sea surface temperature and sea surface wind in the continental slope region of the northern South China Sea

Chun Hoe Chow, Qinyu Liu

First Published: 18 January 2012 Vol: 39, L02601 | DOI: 10.1029/2011GL050230

KEY POINTS

- Eddy role in varying the SST and surface wind fields along the continental slope



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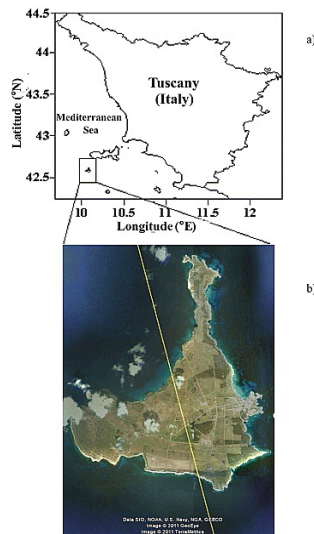
Understanding target-like signals in coastal altimetry: Experimentation of a tomographic imaging technique

A. Scozzari, J. Gómez-Enri, S. Vignudelli, F. Soldovieri

First Published: 20 January 2012 Vol: 39, L02602 | DOI: 10.1029/2011GL050237

KEY POINTS

- Application of a mature reconstruction technique to a new context
- Results coherent with past literature, supported by a new analytical approach



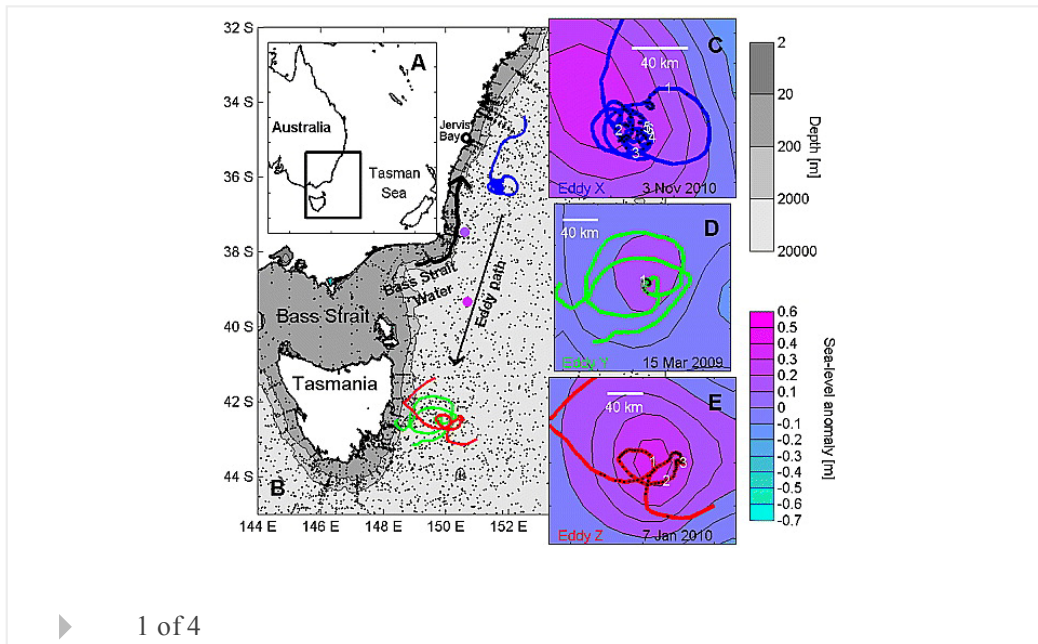
▶ 1 of 5

The southward transport of sub-mesoscale lenses of Bass Strait Water in the centre of anti-cyclonic mesoscale eddies

Mark E. Baird, Ken R. Ridgway

KEY POINTS

- Dense shelf water forms lenses in the centre of anti-cyclonic eddies
- Bass Strait Water is advected south, not dispersed east as in literature
- This phenomena is likely to be found in other western boundary currents

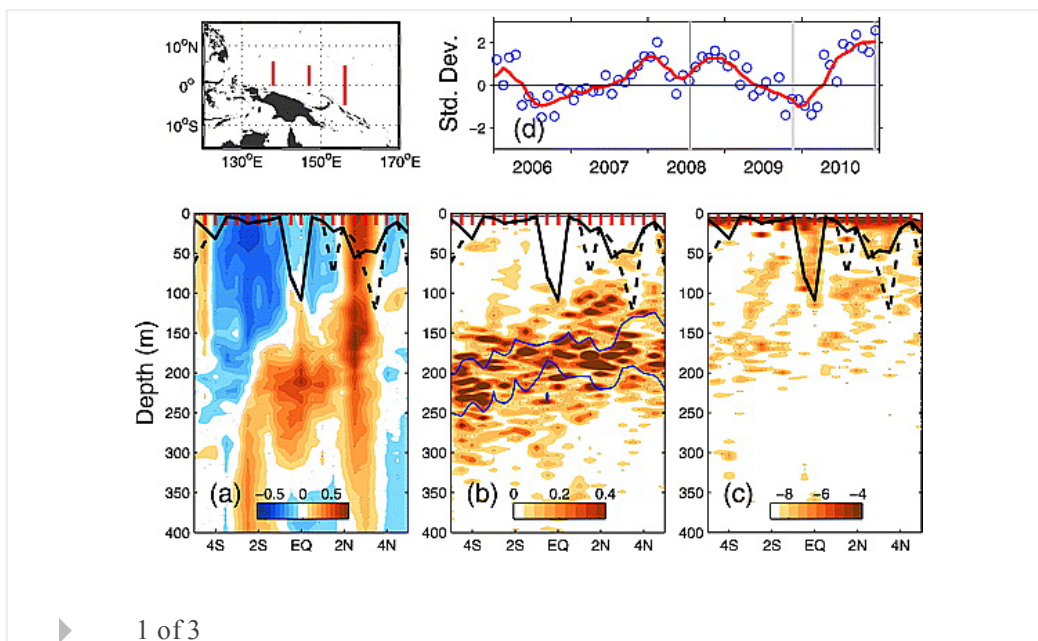
**Mixing in the western equatorial Pacific and its modulation by ENSO**

K. J. Richards, Y. Kashino, A. Natarov, E. Firing

First Published: 31 January 2012 Vol: 39, L02604 | DOI: 10.1029/2011GL050439

KEY POINTS

- Mixing is controlled by small scale features
- Mixing is strongly modulated by ENSO
- Conventional mixing parameterizations are inappropriate



Planets

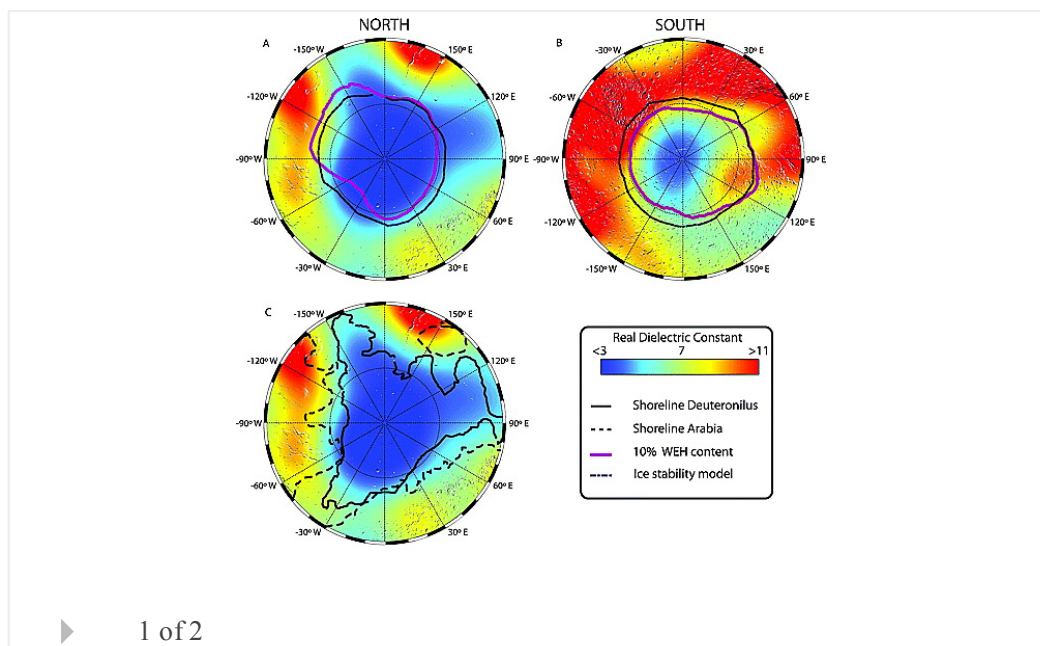
Dielectric map of the Martian northern hemisphere and the nature of plain filling materials

J r mie Mougint, Antoine Pommerol, Pierre Beck, Wlodek Kofman, Stephen M. Clifford

First Published: 19 January 2012 Vol: 39, L02202 | DOI: 10.1029/2011GL050286

KEY POINTS

- We present an analysis of the first comprehensive dielectric map of Mars
- Results give insights on the subsurface properties at unprecedented depth
- We conclude that the northern plains are filled with remnants of an ocean



Gravity waves, cold pockets and CO₂ clouds in the Martian mesosphere

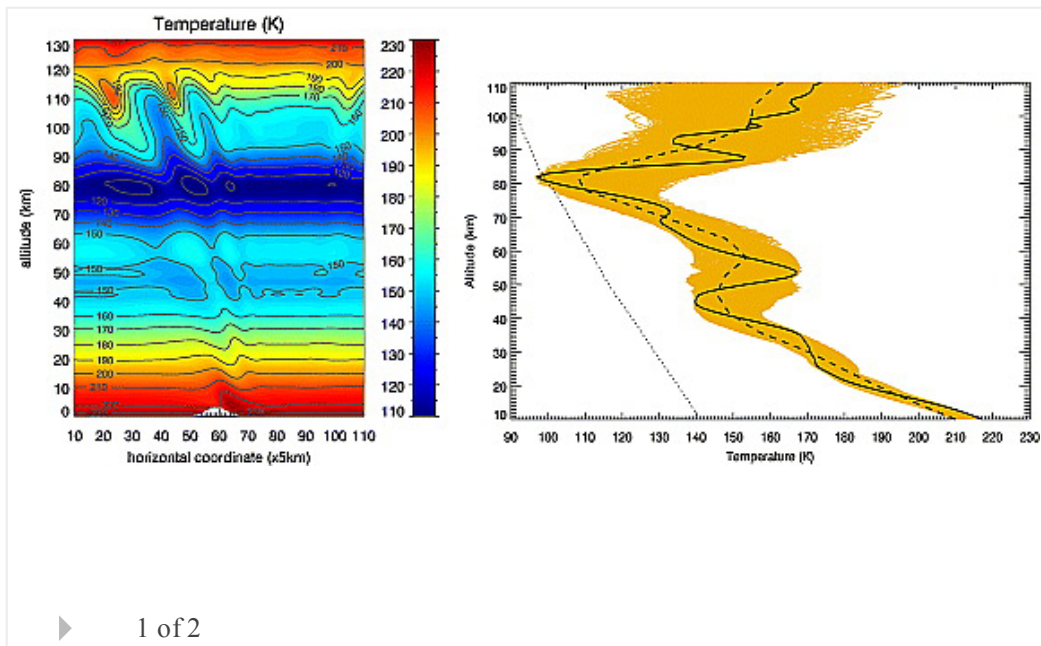
A. Spiga, F. Gonz lez-Galindo, M.- . L pez-Valverde, F. Forget

First Published: 20 January 2012 Vol: 39, L02201 | DOI: 10.1029/2011GL050343

KEY POINTS

- Mesoscale gravity waves permit subcondensation mesospheric cold pockets
- Regions with observed CO₂ clouds feature propitious conditions for GW activity
- Mesoscale modeling appears as a necessary complement to global scale models

Highlight



Solid Earth

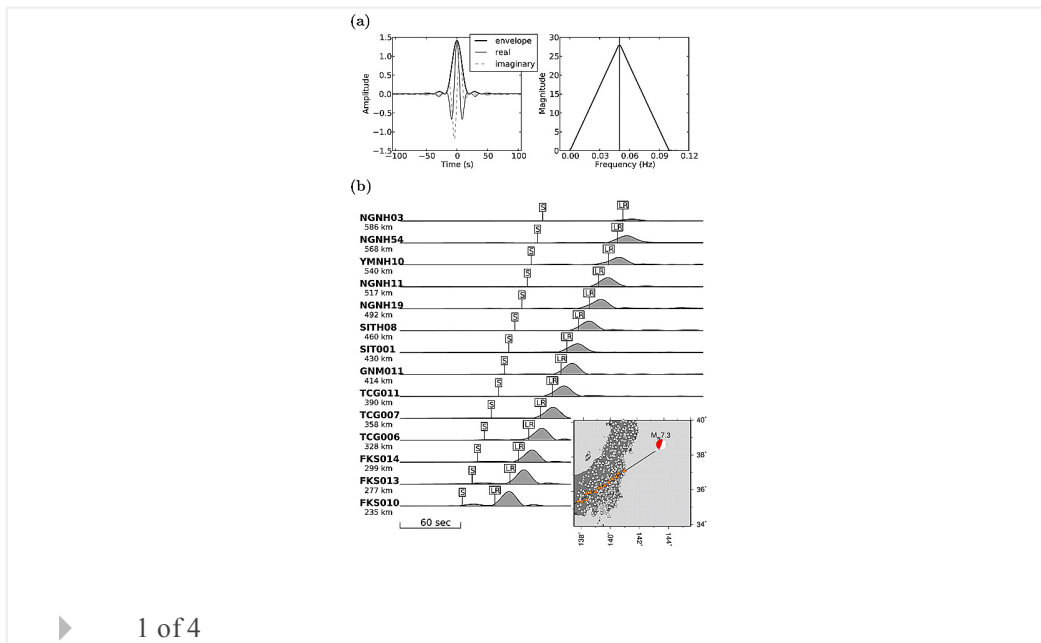
A Rayleigh wave back-projection method applied to the 2011 Tohoku earthquake

Daniel Roten, Hiroe Miyake, Kazuki Koketsu

First Published: 18 January 2012 Vol: 39, L02302 | DOI: 10.1029/2011GL050183

KEY POINTS

- A back-projection method of Rayleigh waves is introduced and validated
- We characterize the Tohoku rupture process from the identified emitters
- Long-period (13-100 s) LR waves were emitted from within 100 km of the trench



Correction to “Thermal equation of state of lower-mantle ferropericlase across the spin crossover”

Zhu Mao, Jung-Fu Lin, Jin Liu, Vitali B. Prakapenka

First Published: 19 January 2012 Vol: 39, L02399 | DOI: 10.1029/2011GL050814

Free

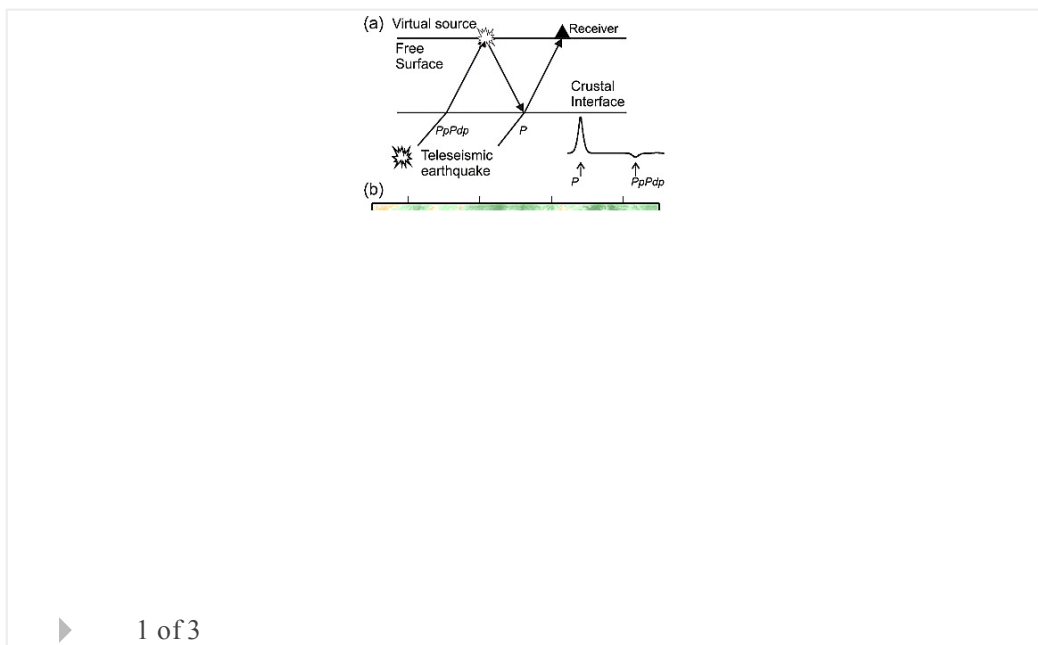
Imaging basin structure with teleseismic virtual source reflection profiles

Zhaohui Yang, Anne F. Sheehan, William L. Yeck, Kate C. Miller, Eric A. Erslev, Lindsay L. Worthington, Steven H. Harder

First Published: 19 January 2012 Vol: 39, L02303 | DOI: 10.1029/2011GL050035

KEY POINTS

- Successfully constructing teleseismic virtual source reflection (TVR) profiles
- V_p/V_s ratio can be estimated by joining phases PpPdp and Ps
- TVR technique give complementary results to active source experiments



▶ 1 of 3

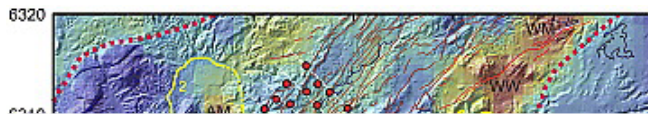
Magnetotelluric imaging of upper-crustal convection plumes beneath the Taupo Volcanic Zone, New Zealand

E. A. Bertrand, T. G. Caldwell, G. J. Hill, E. L. Wallin, S. L. Bennie, N. Cozens, S. A. Onacha, G. A. Ryan, C. Walter, A. Zaino, et al

First Published: 21 January 2012 Vol: 39, L02304 | DOI: 10.1029/2011GL050177

KEY POINTS

- 2-D and 3-D resistivity models are generated from ~200 MT sites in the SE TVZ
- Low-resistivity plumes (3-8km) connect geothermal fields to deep heat source
- MT models support hydrothermal convection in the brittle crust



▶ 1 of 4

Mineral, Virginia, earthquake illustrates seismicity of a passive-aggressive margin

Emily Wolin, Seth Stein, Frank Pazzaglia, Anne Meltzer, Alan Kafka, Claudio Bertì

First Published: 24 January 2012 Vol: 39, L02305 | DOI: 10.1029/2011GL050310

KEY POINTS

- Passive continental margins sometimes have large earthquakes
- They pose hazards due to both tsunamis and shaking
- Progress on these issues requires integrating seismic, geodetic, and geological

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[Highlight](#)



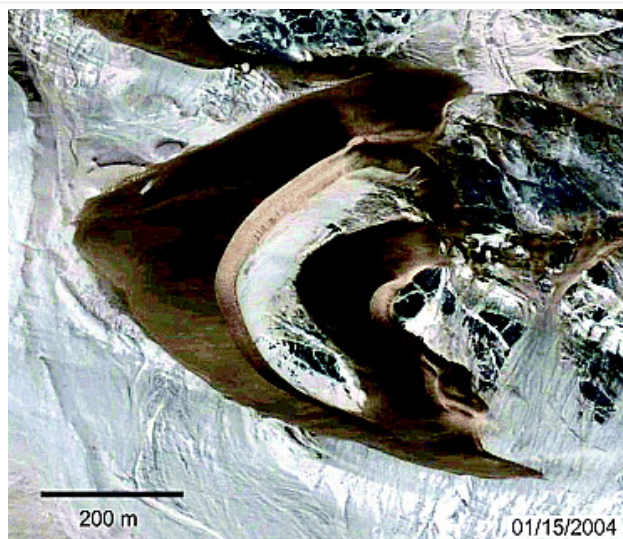
▶ 1 of 7

Real barchan dune collisions and ejections

Chris H. Hugenholtz, Thomas E. Barchyn

KEY POINTS

- Collisions can that result in the ejection of a barchan from the wake of another
- Previous explanations are either unproven or unnecessary to explain the outcome
- Turbulent flow in the wake can erode a downwind barchan, ejecting a new one



▶ 1 of 4

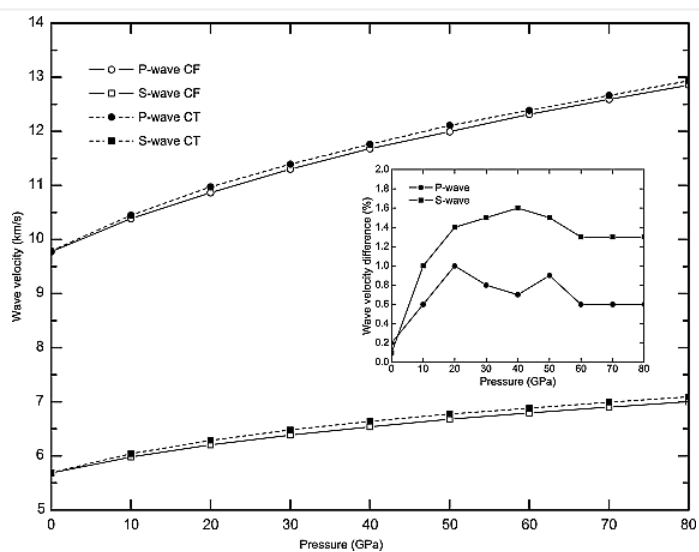
First-principles study of high-pressure elasticity of CF- and CT-structure MgAl_2O_4

Kun Yin, Huiqun Zhou, Qian Huang, Yicheng Sun, Shijin Xu, Xiancai Lu

First Published: 27 January 2012 Vol: 39, L02307 | DOI: 10.1029/2011GL050229

KEY POINTS

- Elastic constants of CF and CT structure MgAl_2O_4
- Shear wave velocity change reaches maximum at CF to CT transition pressure
- Elastic anisotropy of CF and/or CT is probably related to mid-mantle anisotropy



Real time monitoring of moment magnitude by waveform inversion

J. Lee, W. Friederich, T. Meier

First Published: 28 January 2012 Vol: 39, L02309 | DOI: 10.1029/2011GL050210

KEY POINTS

- Estimates of the moment magnitude in real-time
- Determined moment rate function using full waveform inversion
- Rapid assessment of earthquake damage potential



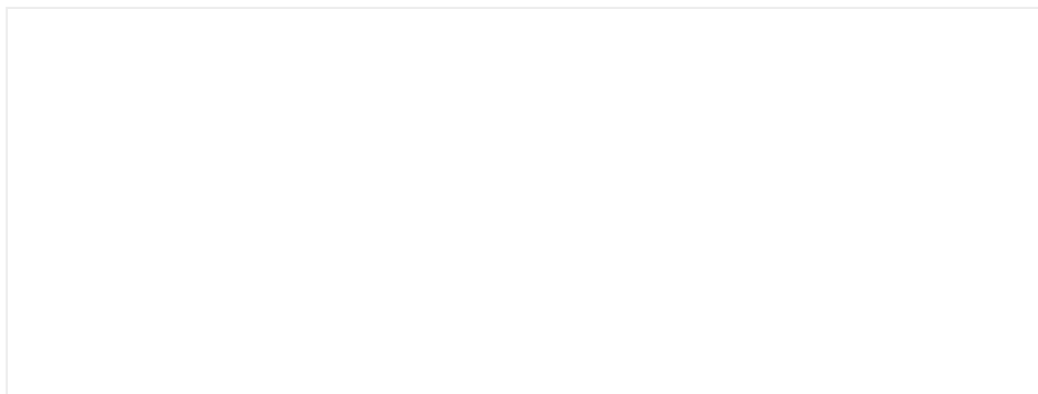
Latitude dependency of the geomagnetic secular variation S parameter: A mathematical artifact

Julia Linder, Stuart A. Gilder

First Published: 28 January 2012 Vol: 39, L02308 | DOI: 10.1029/2011GL050330

KEY POINTS

- The typical method to quantify secular variation is erroneous
- Quantifying secular variation should be based on directions, not poles



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Shear wave reflectivity imaging of the Nazca-South America subduction zone: Stagnant slab in the mantle transition zone?

Sean Contenti, Yu Jeffrey Gu, Ahmet Ökeler, Mauricio D. Sacchi

First Published: 31 January 2012 Vol: 39, L02310 | DOI: 10.1029/2011GL050064

KEY POINTS

- Nazca slab potentially stagnates at the base of the transition zone
- A reflection gap near 410 km is evidence of compositional variations
- Strong slab deformation is detected near the base of the upper mantle

▶ 1 of 3

Space Sciences

Observational evidence of ionospheric migrating tide modification during the 2009 stratospheric sudden warming

J. T. Lin, C. H. Lin, L. C. Chang, H. H. Huang, J. Y. Liu, A. B. Chen, C. H. Chen, C. H. Liu

First Published: 19 January 2012 Vol: 39, L02101 | DOI: 10.1029/2011GL050248

KEY POINTS

- Day-to-day variations of ionospheric tidal signatures during SSW
- The migrating tides are major drivers responsible to ionospheric variation
- The nonmigrating tides account for ~20% of ionospheric variation

▶ 1 of 4

Electron acceleration in a geomagnetic Field Line Resonance

P. A. Damiano, J. R. Johnson

First Published: 25 January 2012 Vol: 39, L02102 | DOI: 10.1029/2011GL050264

KEY POINTS

- First dipolar kinetic simulation of an FLR with a realistic electron temperature
- Mirror force effects can accelerate electrons to keV energies within an FLR
- Electron acceleration is a major sink of FLR wave energy

▶ 1 of 5

Ionospheric disturbances observed coincident with the 2006 and 2009 North Korean underground nuclear tests

Yu-Ming Yang, James L. Garrison, See-Chen Lee

KEY POINTS

- Traveling ionospheric disturbances (TIDs) coincident to North Korean nuclear tests
- These TIDs were detected from a far-field GPS Network
- Two different types of TIDs were detected and identified

▶ 1 of 5

The Cryosphere

Atmospheric forcing on the drift of Arctic sea ice in 1989–2009

Timo Vihma, Priit Tisler, Petteri Uotila

First Published: 18 January 2012 Vol: 39, L02501 | DOI: 10.1029/2011GL050118

KEY POINTS

- A new index explains inter-annual variations in Arctic sea ice drift speed
- The index is the pressure difference across the Transpolar Drift Stream
- Atmospheric forcing did not explain the increasing trend in ice drift speed

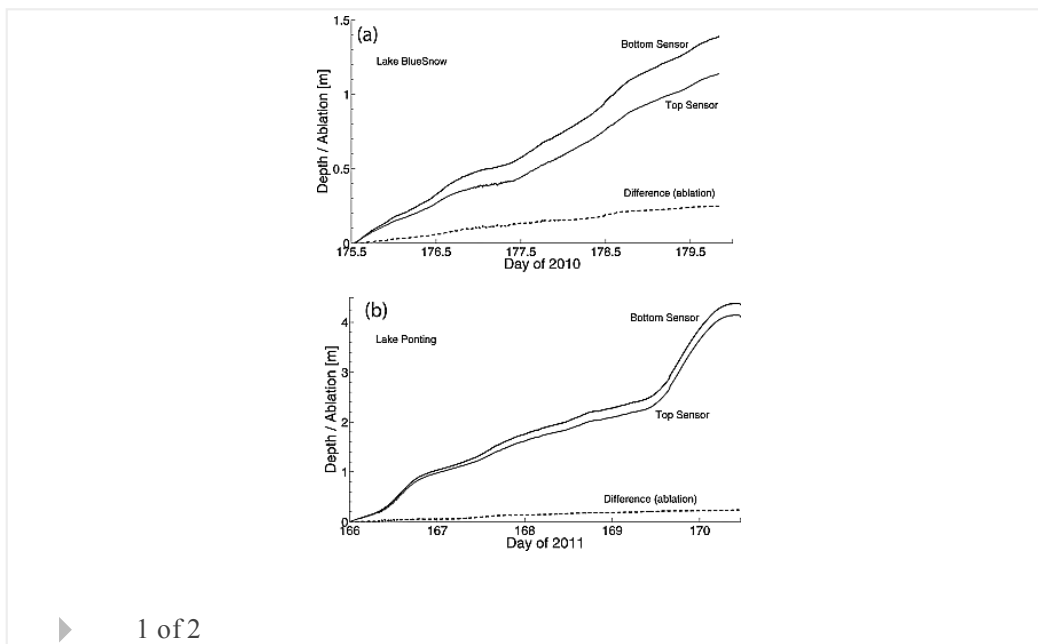
Measurement and modeling of ablation of the bottom of supraglacial lakes in western Greenland

M. Tedesco, M. Lüthje, K. Steffen, N. Steiner, X. Fettweis, I. Willis, N. Bayou, A. Banwell

First Published: 18 January 2012 Vol: 39, L02502 | DOI: 10.1029/2011GL049882

KEY POINTS

- Ablation of bottom of supraglacial lake obtained from pressure transducers data
- Ablation rate at the bottom of a lake is about double that of bare ice
- The ablation rate and temperature in the lake can be satisfactorily modeled



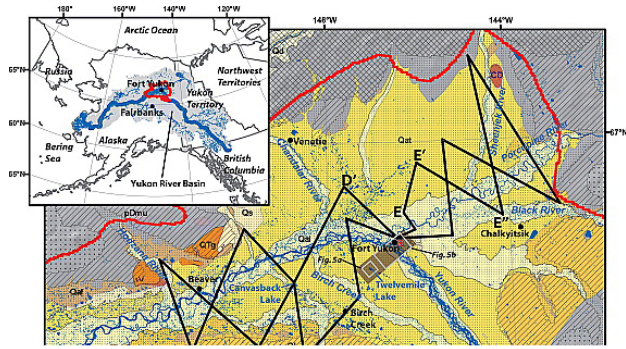
Airborne electromagnetic imaging of discontinuous permafrost

Burke J. Minsley, Jared D. Abraham, Bruce D. Smith, James C. Cannia, Clifford I. Voss, M. Torre Jorgenson, Michelle A. Walvoord, Bruce K. Wylie, Lesleigh Anderson, Lyndsay B. Ball, et al

First Published: 20 January 2012 Vol: 39, L02503 | DOI: 10.1029/2011GL050079

KEY POINTS

- Remote sensing of subsurface permafrost
- Thermal legacy of river migration recorded in permafrost



▶ 1 of 5

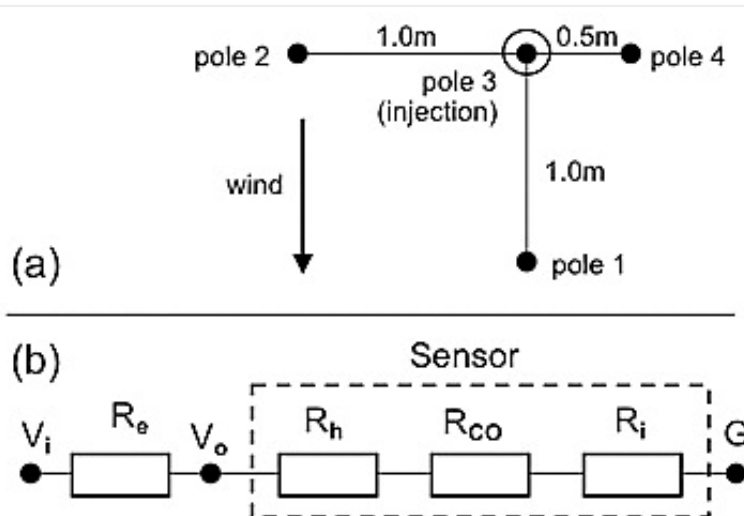
Carbon monoxide as a tracer of gas transport in snow and other natural porous media

Hendrik Huwald, John S. Selker, Scott W. Tyler, Marc Calaf, Nick C. van de Giesen, Marc B. Parlange

First Published: 26 January 2012 Vol: 39, L02504 | DOI: 10.1029/2011GL050247

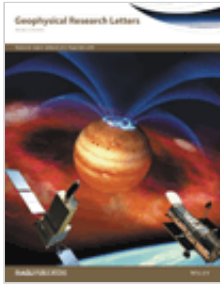
KEY POINTS

- Novel, efficient, low-cost method using a new tracer for gas dispersion
- Method of potentially large impact in different settings and media
- Enables in situ study of advective-diffusive processes in porous media



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