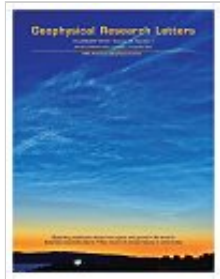


Issue Contents



Volume 39, Issue 1

January 2012

Brief Detailed

Atmospheric Science

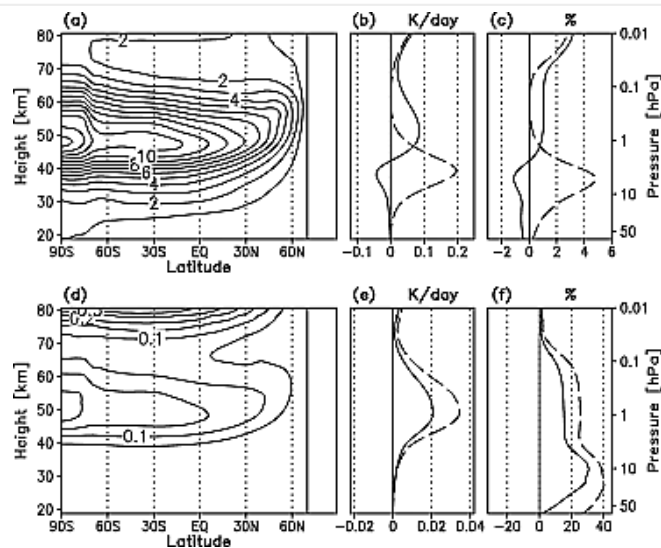
The influence of spectral solar irradiance data on stratospheric heating rates during the 11 year solar cycle

S. Oberländer, U. Langematz, K. Matthes, M. Kunze, A. Kubin, J. Harder, N. A. Krivova, S. K. Solanki, J. Paganan, M. Weber

First Published: 4 January 2012 Vol: 39, L01801 | DOI: 10.1029/2011GL049539

KEY POINTS

- Solar minimum and solar cycle differences in SW heating rates and temperature
- Comparison of three spectral solar input data sets for solar cycle 22
- Comparison of the newly compiled SORCE-data with the commonly used NRLSSI-data

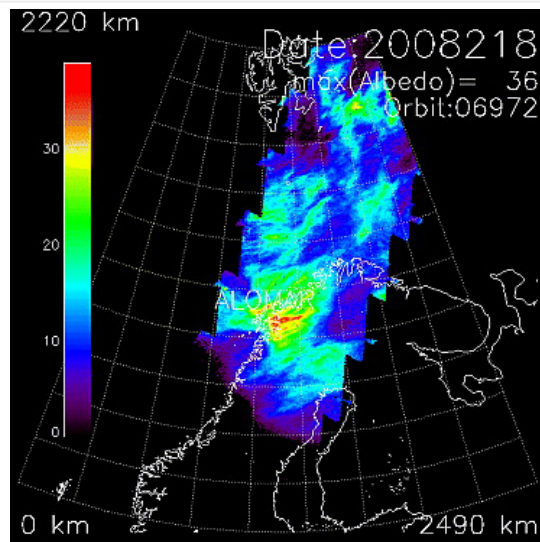


> 1 of 3

KEY POINTS

- Simultaneous observations of NLC from ground and space
- Optical model applied to combine observations with different instruments
- Advection model used to compare temporal and horizontal structures

Highlight



> 1 of 4

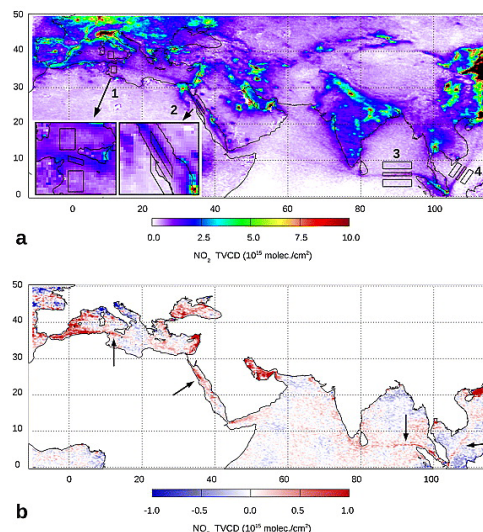
The global economic cycle and satellite-derived NO₂ trends over shipping lanes

Martijn de Ruyter de Wildt, Henk Eskes, K. Folkert Boersma

First Published: 5 January 2012 Vol: 39, L01802 | DOI: 10.1029/2011GL049541

KEY POINTS

- A method is presented for detecting short-term shipping trends in satellite NO₂
- Global shipping trends are detected, independent of region and instrument
- These trends correspond to shipping and trade statistics and the crisis of '08



> 1 of 4

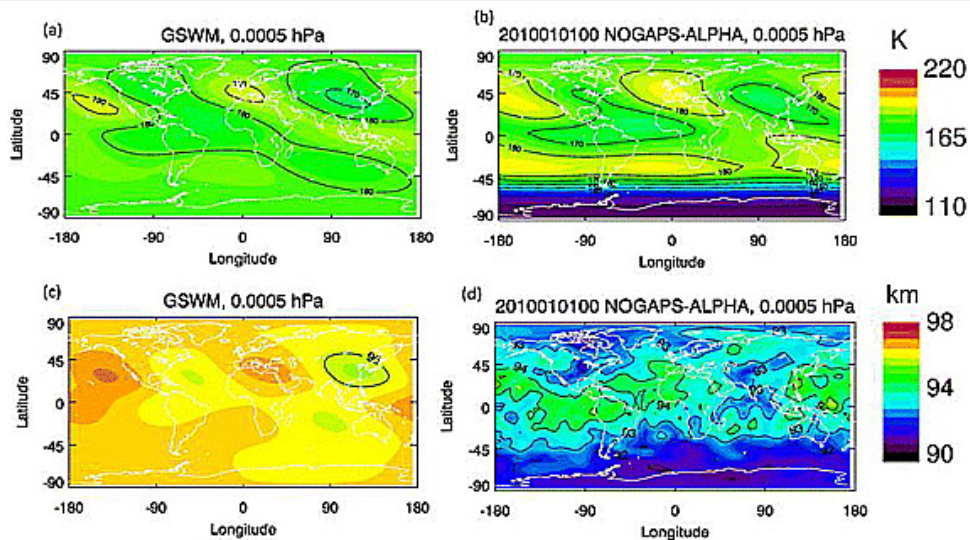
Linkages between the cold summer mesopause and thermospheric zonal mean circulation

David E. Siskind, Douglas P. Drob, John T. Emmert, Michael H. Stevens, Patrick E. Sheese, Edward J. Llewellyn, Mark E. Hervig, Rick Niciejewski, Andrew J. Kochenash

First Published: 6 January 2012 Vol: 39, L01804 | DOI: 10.1029/2011GL050196

KEY POINTS

- The mesopause affects the thermospheric circulation
- Mesopause temperature variability is reflected by thermospheric wind changes
- The stratospheric polar vortex may be linked to thermospheric circulation



> 1 of 5

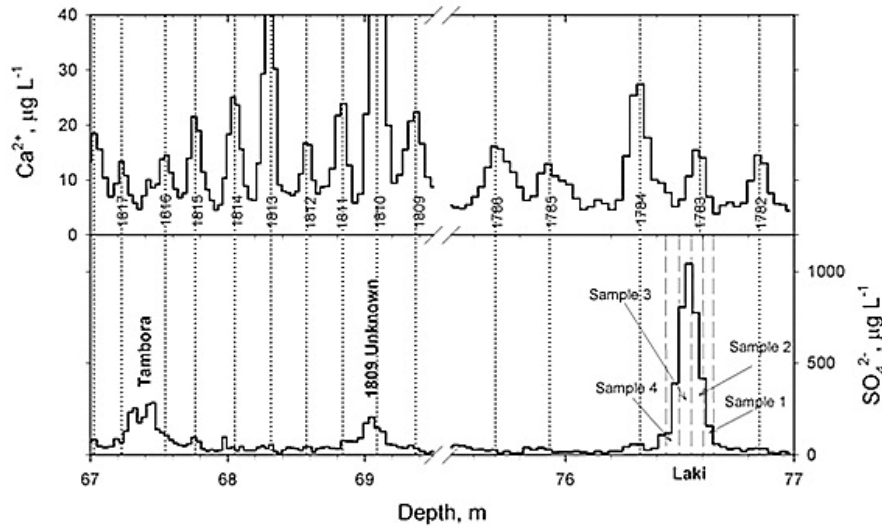
Sulfur isotope evidence of little or no stratospheric impact by the 1783 Laki volcanic eruption

Alyson Lanciki, Jihong Cole-Dai, Mark H. Thiemens, Joël Savarino

First Published: 10 January 2012 Vol: 39, L01806 | DOI: 10.1029/2011GL050075

KEY POINTS

- Laki was not stratospheric in nature and therefore had limited climatic impact
- Sulfur-MIF excess from stratospheric volcanism occurs worldwide
- Other weather patterns are possibly to blame for that anomalously cold winter



> 1 of 2

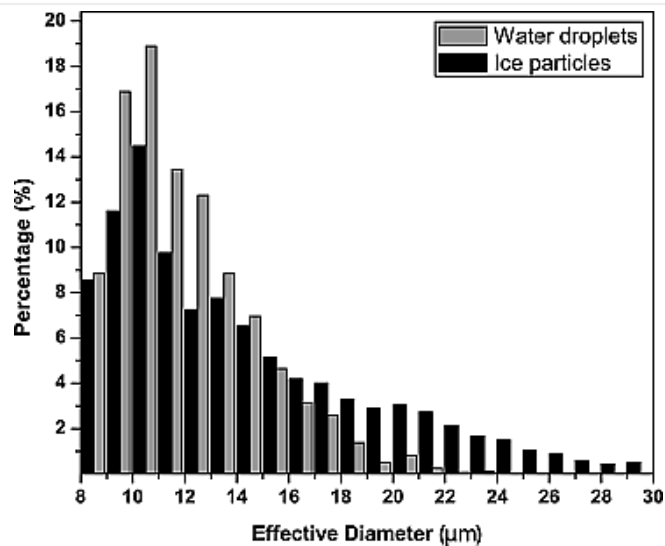
Deformations of frozen droplets formed at -40°C

María Laura López, Eldo E. Ávila

First Published: 10 January 2012 Vol: 39, L01805 | DOI: 10.1029/2011GL050185

KEY POINTS

- Report the first measurements of the deformation of small ice crystals
- The results are relevant in the estimation of optical properties
- The experiments resemble the conditions that occur in anvil cirrus clouds



> 1 of 4

The role of the ocean in the global atmospheric budget of acetone

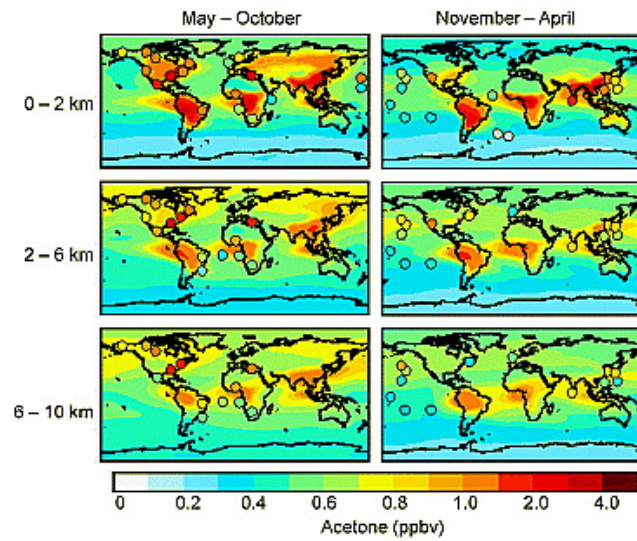
E. V. Fischer, D. J. Jacob, D. B. Millet, R. M. Yantosca, J. Mao

First Published: 13 January 2012 Vol: 39, L01807 | DOI: 10.1029/2011GL050086

KEY POINTS

- We updated the global atmospheric acetone budget using a global model
- We can reproduce observed marine atmospheric concentrations and air-sea fluxes

- The ocean plays a major role in controlling atmospheric acetone



➤ 1 of 2

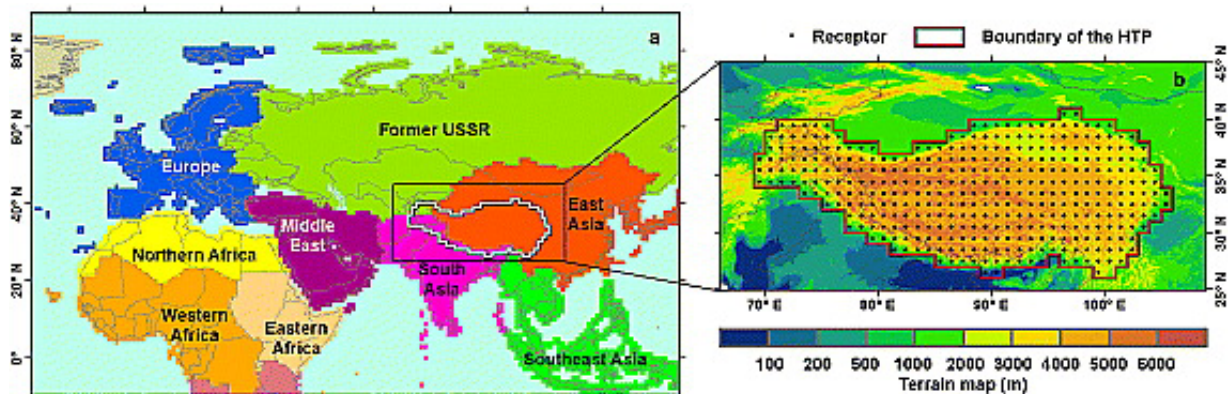
A novel back-trajectory analysis of the origin of black carbon transported to the Himalayas and Tibetan Plateau during 1996–2010

Zifeng Lu, David G. Streets, Qiang Zhang, Siwen Wang

First Published: 14 January 2012 Vol: 39, L01809 | DOI: 10.1029/2011GL049903

KEY POINTS

- A novel back-trajectory method is developed to quantify BC source contributions
- BC received by the third pole increased by 41% from 1996 to 2010
- Spatial distributions of BC source regions of the third pole are shown by season



➤ 1 of 4

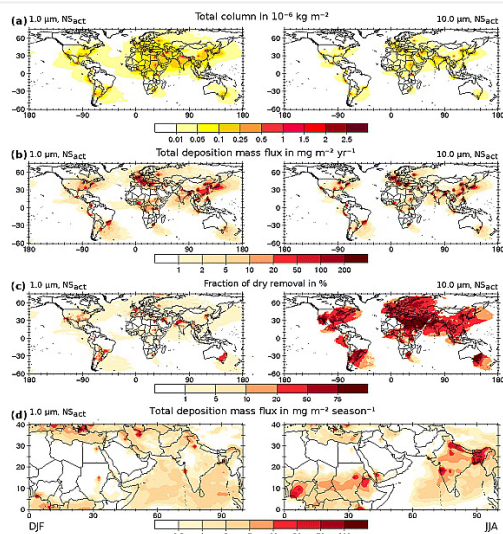
Urban emission hot spots as sources for remote aerosol deposition

D. Kunkel, M. G. Lawrence, H. Tost, A. Kerkweg, P. Jöckel, S. Borrmann

First Published: 14 January 2012 Vol: 39, L01808 | DOI: 10.1029/2011GL049634

KEY POINTS

- Outflow and deposition of aerosols from urban centers using tracer simulations
- Substantial remote deposition potential of fine aerosol tracers
- Highest remote deposition potential for tracers originating in arid regions



> 1 of 2

Climate

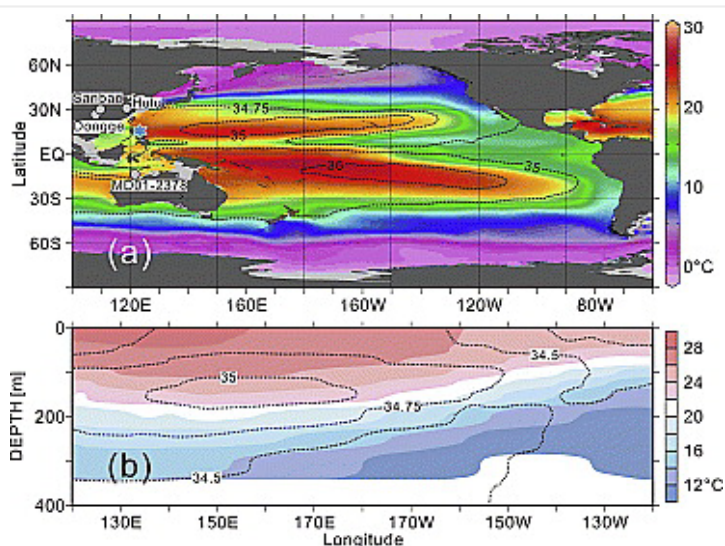
Decoupled Holocene variability in surface and thermocline water temperatures of the Indo-Pacific Warm Pool

Haowen Dang, Zhimin Jian, Franck Bassinot, Peijun Qiao, Xinrong Cheng

First Published: 4 January 2012 Vol: 39, L01701 | DOI: 10.1029/2011GL050154

KEY POINTS

- IPWP's TWT showed significant differences from SST during the Holocene
- IPWP's TWT closely followed the insolation forcing
- IPWP's TWT could also be correlated with low-latitude climate changes



> 1 of 3

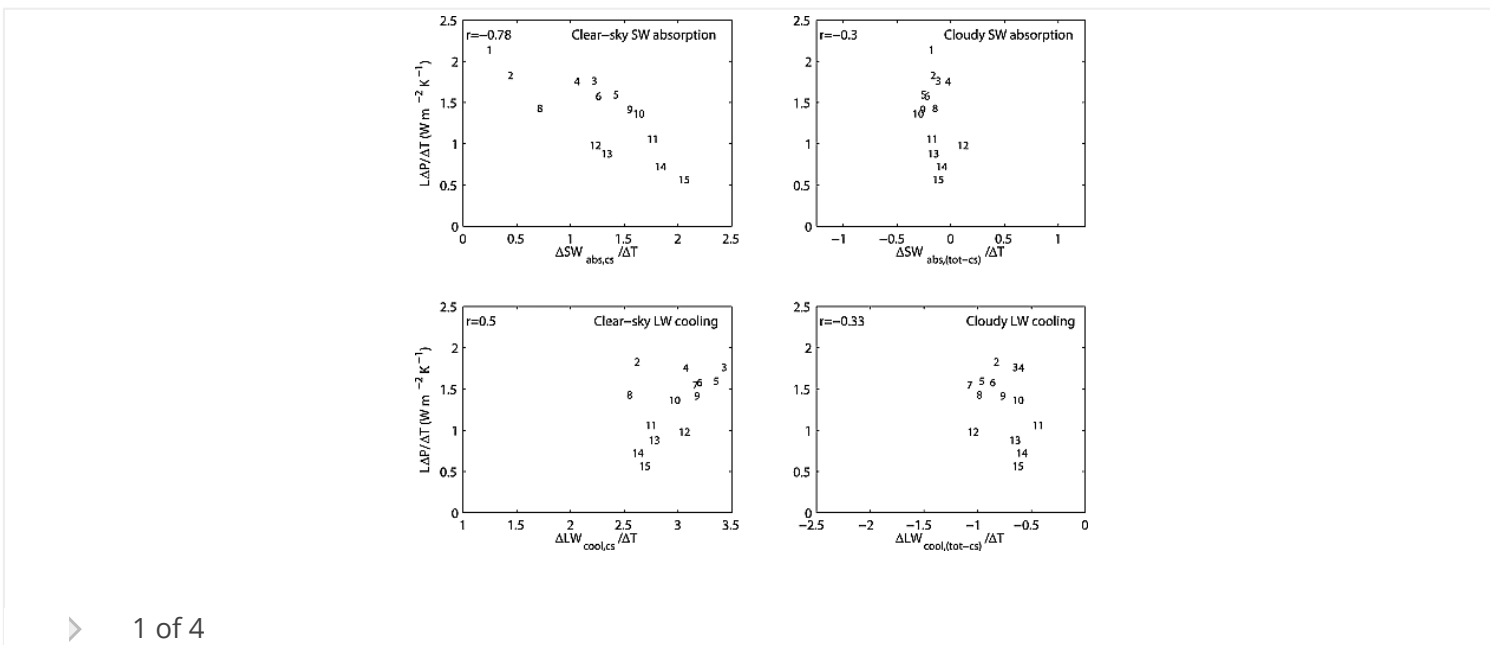
Global-mean precipitation and black carbon in AR4 simulations

A. G. Pendergrass, D. L. Hartmann

First Published: 7 January 2012 Vol: 39, L01703 | DOI: 10.1029/2011GL050067

KEY POINTS

- Black carbon forcing explains intermodel spread in global-mean precipitation
- IPCC AR4 models had black carbon forcing ranging from increasing to decreasing
- Model intercomparison studies should document black carbon forcing



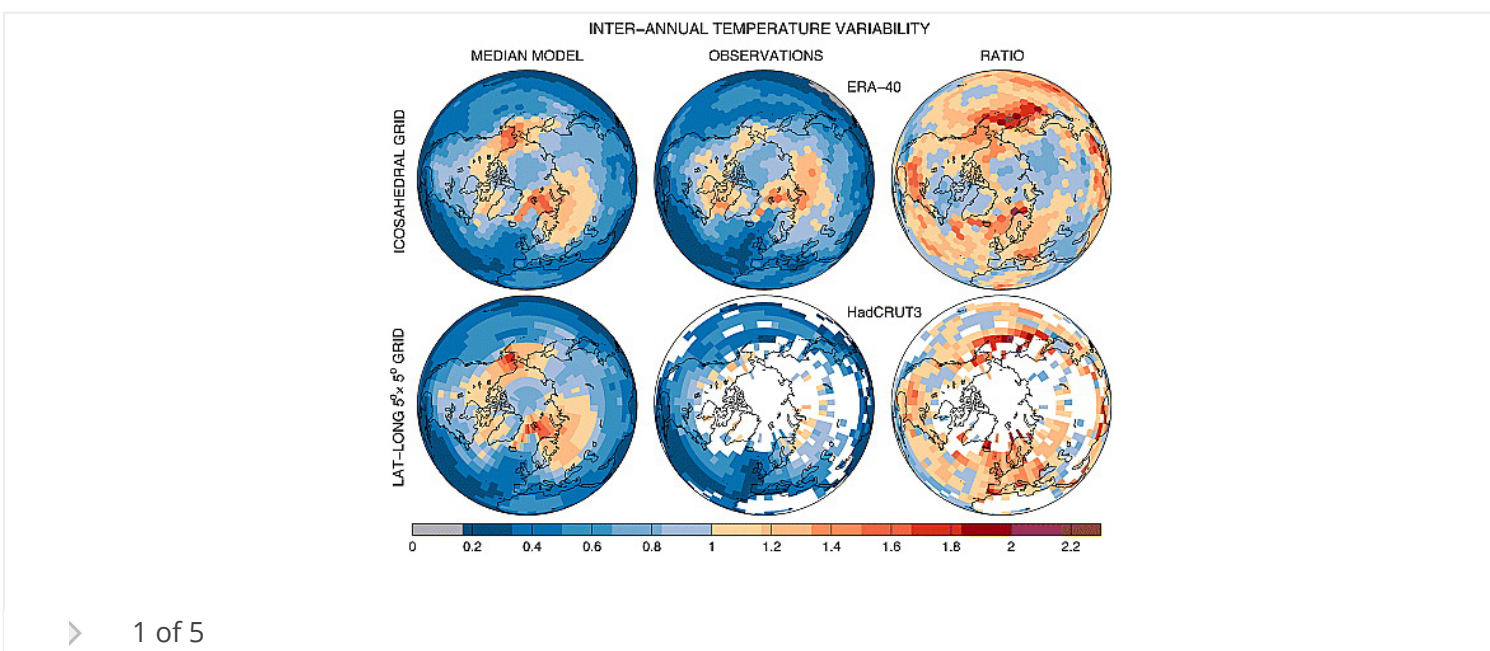
Time of emergence of climate signals

E. Hawkins, R. Sutton

First Published: 7 January 2012 Vol: 39, L01702 | DOI: 10.1029/2011GL050087

KEY POINTS

- Time of Emergence (ToE) of temperature signal above variability is uncertain
- Spread in estimates of ToE due to uncertainty in both signal and variability
- ToE occurs several decades sooner in low latitudes than in mid-latitudes



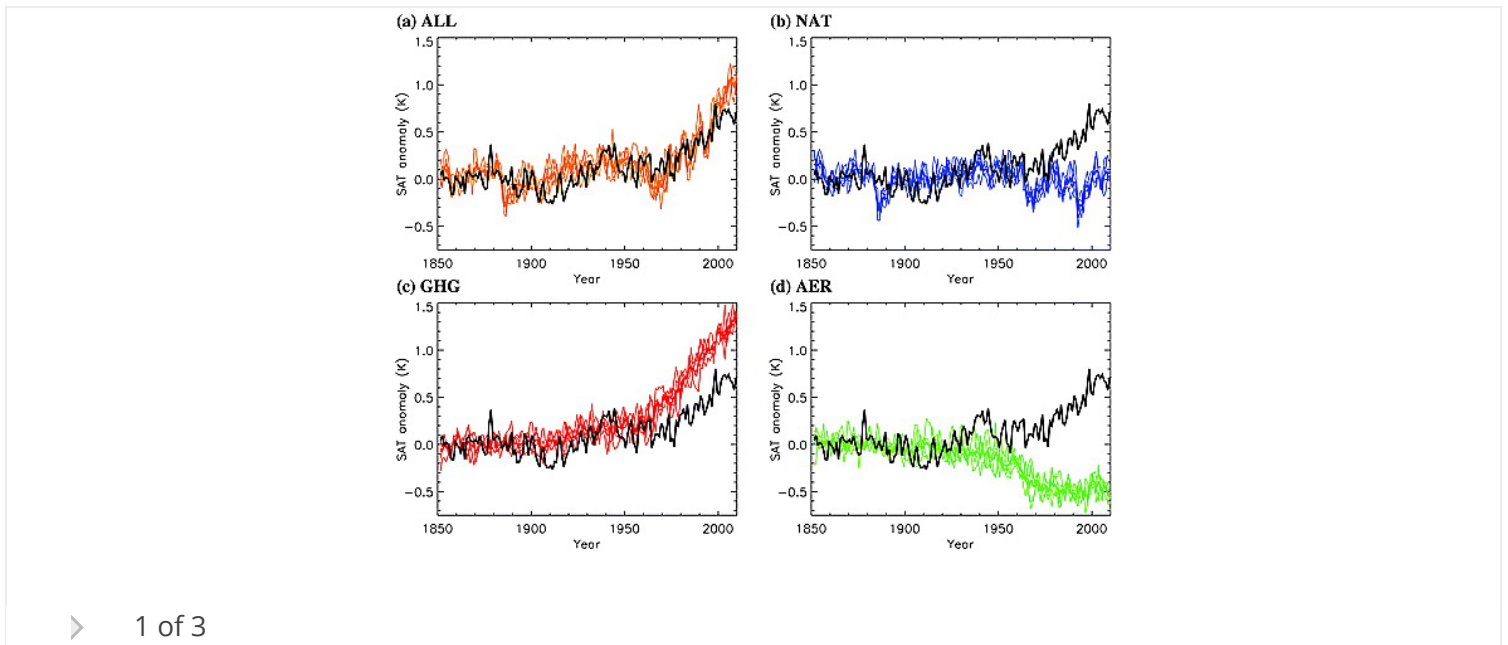
Improved constraints on 21st-century warming derived using 160 years of temperature observations

N. P. Gillett, V. K. Arora, G. M. Flato, J. F. Scinocca, K. von Salzen

First Published: 10 January 2012 Vol: 39, L01704 | DOI: 10.1029/2011GL050226

KEY POINTS

- Estimates of TCR and 21st century warming are sensitive to the analysis period
- Using 1851-2010 observations gives lower and less uncertain projected warming
- The influence of GHGs, aerosols and natural forcings on temperature is detected



The climatic cyclicality in semiarid-arid central Asia over the past 500,000 years

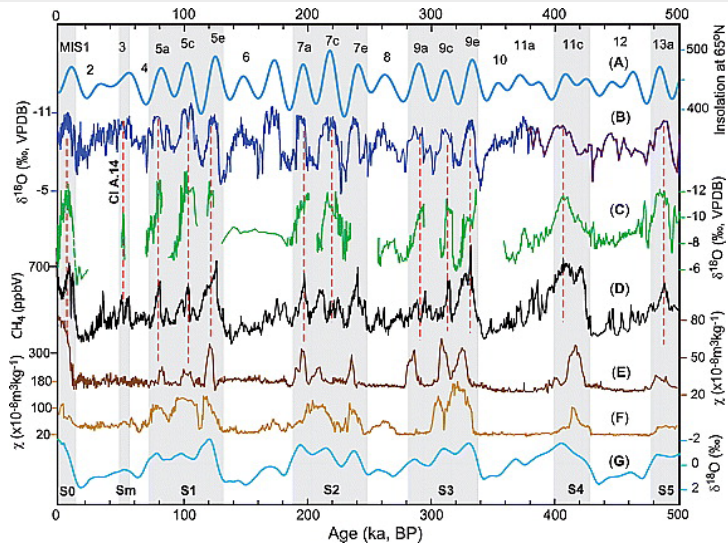
H. Cheng, P. Z. Zhang, C. Spötl, R. L. Edwards, Y. J. Cai, D. Z. Zhang, W. C. Sang, M. Tan, Z. S. An

First Published: 13 January 2012 Vol: 39, L01705 | DOI: 10.1029/2011GL050202

KEY POINTS

- Speleothem records characterize 500 ka precipitation history in Central Asia
- Climatic patterns in the Westerlies region are dominated by a precession rhythm
- Asian Monsoon incursions may explain the hydrological change on precession scale

Highlight



> 1 of 2

Hydrology and Land Surface Studies

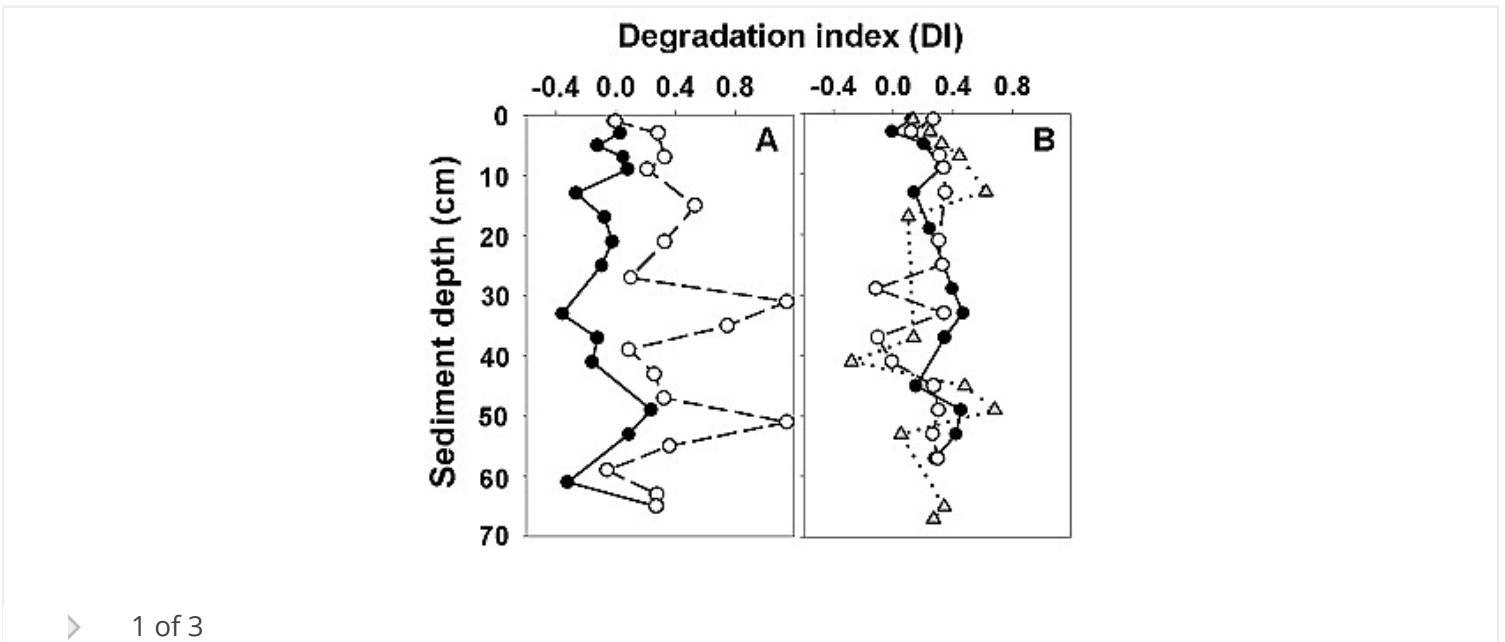
Extreme organic carbon burial fuels intense methane bubbling in a temperate reservoir

Sebastian Sobek, Tonya DelSontro, Nuttakan Wongfun, Bernhard Wehrli

First Published: 4 January 2012 Vol: 39, L01401 | DOI: 10.1029/2011GL050144

KEY POINTS

- High sedimentation fuels extreme methane emission in a temperate reservoir
- The factors leading to extreme methane emission are widespread
- River damming carries the risk of increasing aquatic methane emission



> 1 of 3

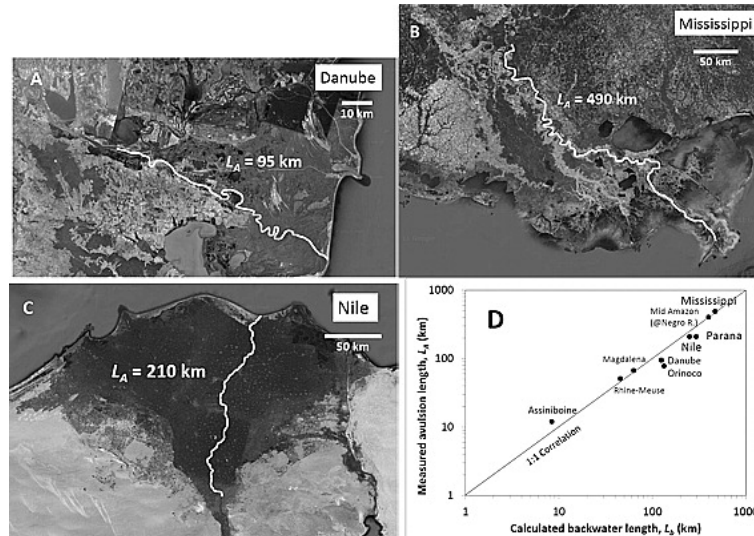
Backwater controls of avulsion location on deltas

Phairot Chatanantavet, Michael P. Lamb, Jeffrey A. Nittrouer

First Published: 12 January 2012 Vol: 39, L01402 | DOI: 10.1029/2011GL050197

KEY POINTS

- The upstream location of river avulsions set by backwater hydrodynamics
- Avulsion is more likely upstream due to rapid channel-fill timescales there
- Avulsion is less likely near river mouths due to drawdown and river-bed scour



> 1 of 3

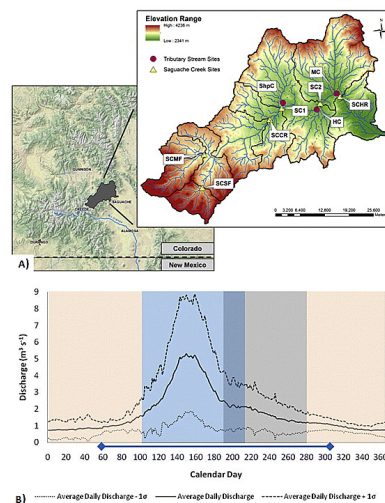
Unraveling the mysteries of the large watershed black box: Implications for the streamflow response to climate and landscape perturbations

Marty D. Frisbee, Fred M. Phillips, Gary S. Weissmann, Paul D. Brooks, John L. Wilson, Andrew R. Campbell, Fengjing Liu

First Published: 12 January 2012 Vol: 39, L01404 | DOI: 10.1029/2011GL050416

KEY POINTS

- Streamflow generation processes are spatially and temporally variable
- This variability plus importance of groundwater suggests internal buffering
- New and geo-holistic models of large watershed processes are critically needed

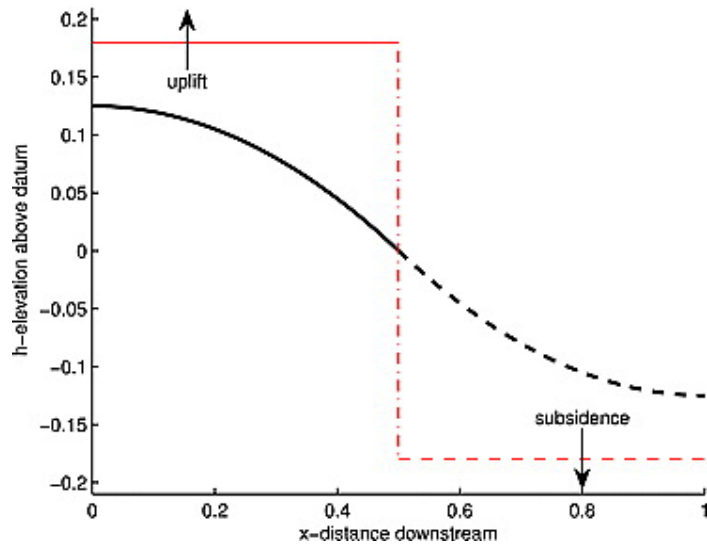


> 1 of 3

KEY POINTS

- The choice of direction in a non-local model has physical consequences
- The flow of information reverses between erosional and depositional landscapes
- Results provide a means of validating fractional calculus landscape models

Highlight



➤ 1 of 2

Oceans

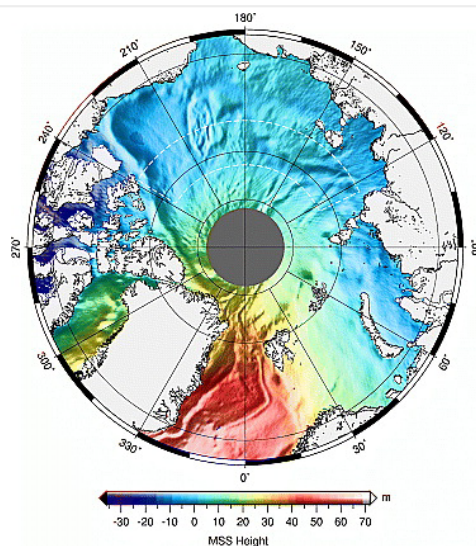
Mean dynamic topography of the Arctic Ocean

Sinéad Louise Farrell, David C. McAdoo, Seymour W. Laxon, H. Jay Zwally, Donghui Yi, Andy Ridout, Katharine Giles

First Published: 6 January 2012 Vol: 39, L01601 | DOI: 10.1029/2011GL050052

KEY POINTS

- We present the new high resolution Mean Sea Surface model of the Arctic Ocean
- We derive a new satellite-only estimate of Arctic Ocean mean dynamic topography
- New GRACE/GOCE GOCO02S geoid is superior to EGM08 for Arctic circulation studies



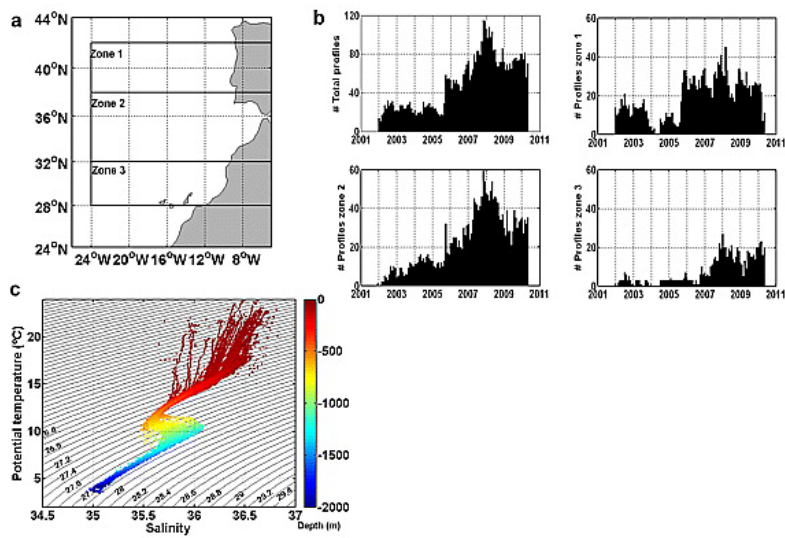
Recent thermohaline trends of the Atlantic waters inflowing to the Mediterranean Sea

Javier Soto-Navarro, Francisco Criado-Aldeanueva, Jose Carlos Sánchez-Garrido, Jesús García-Lafuente

First Published: 13 January 2012 Vol: 39, L01604 | DOI: 10.1029/2011GL049907

KEY POINTS

- We have estimated thermohaline trends of the AW inflowing the Mediterranean
- We have identified the driving mechanisms of the estimated trends
- Our results contrast with previous studies and we analyze the possible causes



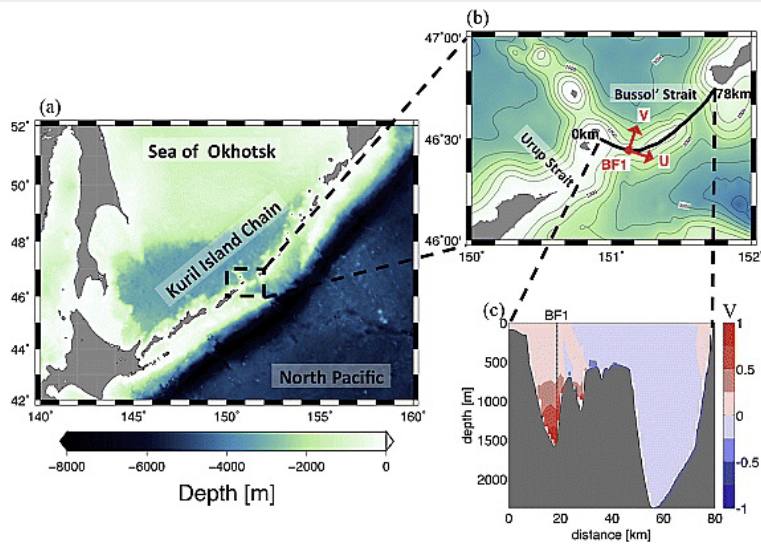
Deep intense vertical mixing in the Bussol' Strait

Masahiro Yagi, Ichiro Yasuda

First Published: 13 January 2012 Vol: 39, L01602 | DOI: 10.1029/2011GL050349

KEY POINTS

- Deep intense mixing was observed in the Bussol' Strait in the Kuril Straits
- Diurnal tide can be explained by a low-mode topographically trapped wave
- The dissipation rate and the shear has the relationship of $\epsilon \sim S^{2.16}$



> 1 of 4

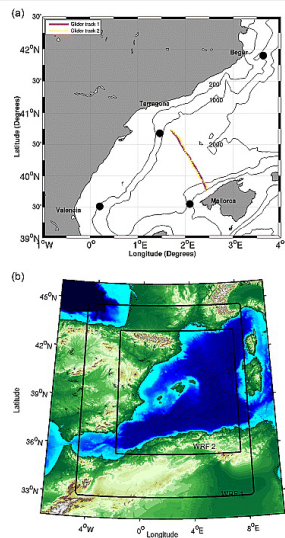
Underwater glider observations and modeling of an abrupt mixing event in the upper ocean

Simón Ruiz, Lionel Renault, Bartolomé Garau, Joaquín Tintoré

First Published: 13 January 2012 Vol: 39, L01603 | DOI: 10.1029/2011GL050078

KEY POINTS

- Description of abrupt mixing in the upper ocean and air-sea energy exchanges
- Comparison between high-resolution glider observations and ship-emulated data
- Heat content analysis and modeling of atmospheric forcing and validation



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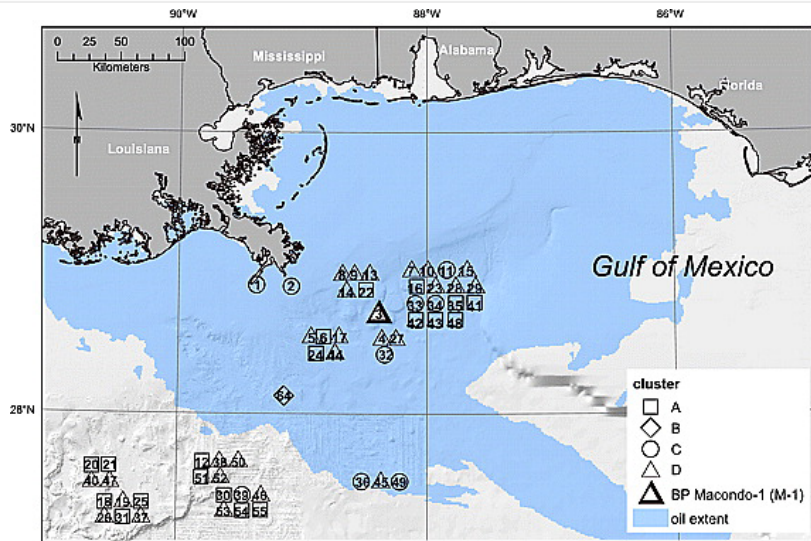
Macondo-1 well oil-derived polycyclic aromatic hydrocarbons in mesozooplankton from the northern Gulf of Mexico

Siddhartha Mitra, David G. Kimmel, Jessica Snyder, Kimberly Scalise, Benjamin D. McGlaughon, Michael R. Roman, Ginger L. Jahn, James J. Pierson, Stephen B. Brandt, Joseph P. Montoya, et al

First Published: 14 January 2012 Vol: 39, L01605 | DOI: 10.1029/2011GL049505

KEY POINTS

- A PAH signature of the DWH spill was determined
- Mesozooplankton in the Northern Gulf of Mexico accumulated DWH-derived PAHs
- Spatial and temporal extent of ecosystem impacts from the spill were patchy



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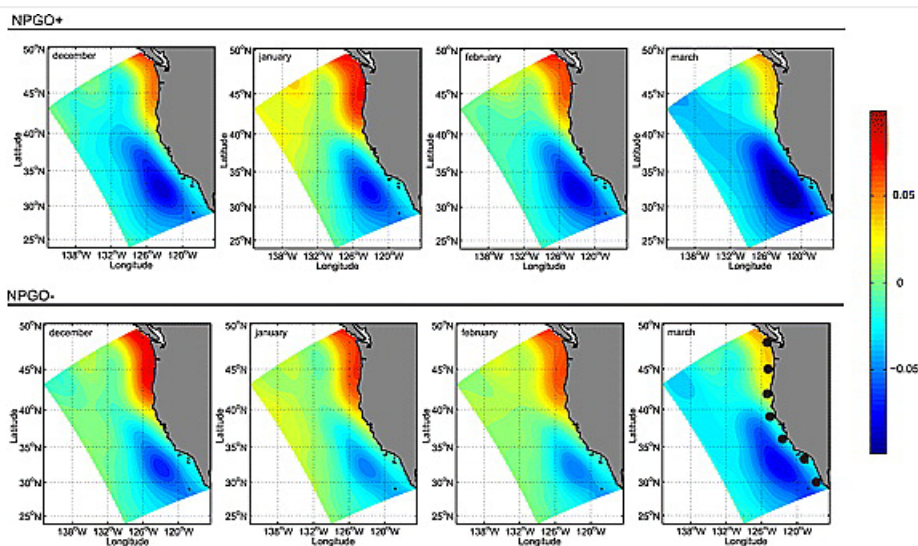
North Pacific Gyre Oscillation modulates seasonal timing and ecosystem functioning in the California Current upwelling system

F. Chenillat, P. Rivière, X. Capet, E. Di Lorenzo, B. Blanke

First Published: 14 January 2012 Vol: 39, L01606 | DOI: 10.1029/2011GL049966

KEY POINTS

- NPGO is related to statistically significant wind variability off California
- In particular, NPGO has a strong signature on upwelling onset timing
- Change in upwelling onset timing have year-round consequences for the ecosystem



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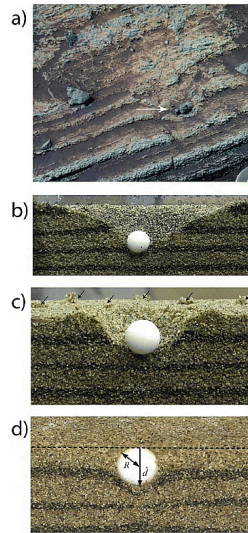
Wet surface and dense atmosphere on early Mars suggested by the bomb sag at Home Plate, Mars

Michael Manga, Ameeta Patel, Josef Dufek, Edwin S. Kite

First Published: 5 January 2012 Vol: 39, L01202 | DOI: 10.1029/2011GL050192

KEY POINTS

- The morphology of the Home Plate bomb sag favors impact on a wet surface
- The penetration depth of the bomb implies higher atmosphere density than at present
- Attributes of bomb sags provide constraints of their impact velocity



> 1 of 3

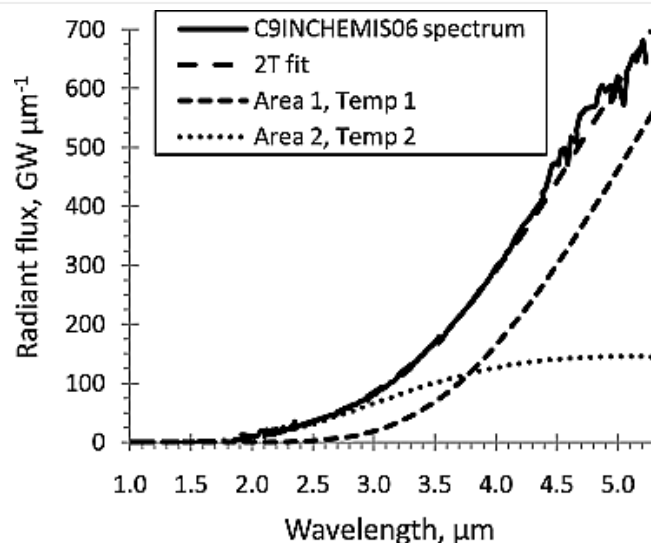
Io: Charting thermal emission variability with the *Galileo* NIMS Io Thermal Emission Database (NITED): Loki Patera

A. G. Davies, G. J. Veeder, D. L. Matson, T. V. Johnson

First Published: 5 January 2012 Vol: 39, L01201 | DOI: 10.1029/2011GL049999

KEY POINTS

- We quantify thermal emission from all hot spots in all NIMS observations
- We revise upwards estimates of heat flow from Loki Patera from NIMS data
- Max observed thermal emission is 17000 GW, consistent with ground observations



Solid Earth

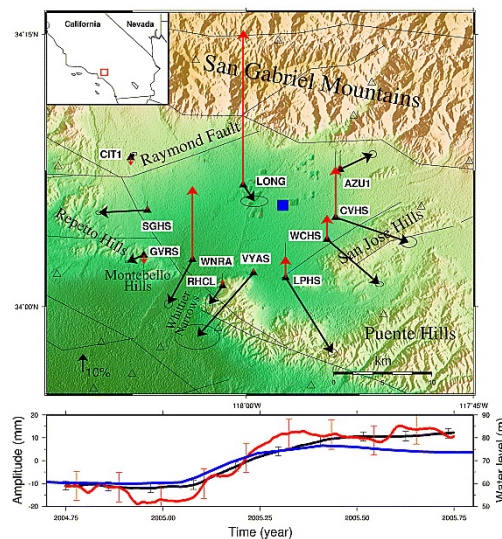
Correlation between changes in groundwater levels and surface deformation from GPS measurements in the San Gabriel Valley, California

Kang Hyeun Ji, Thomas A. Herring

First Published: 5 January 2012 Vol: 39, L01301 | DOI: 10.1029/2011GL050195

KEY POINTS

- Surface deformation and groundwater level changes are highly correlated
- Principal axes allow heterogeneity and anisotropy of surface deformation field
- The projection method can be a real-time monitoring system for deformation



➤ 1 of 2

Identifying bubble collapse in a hydrothermal system using hidden Markov models

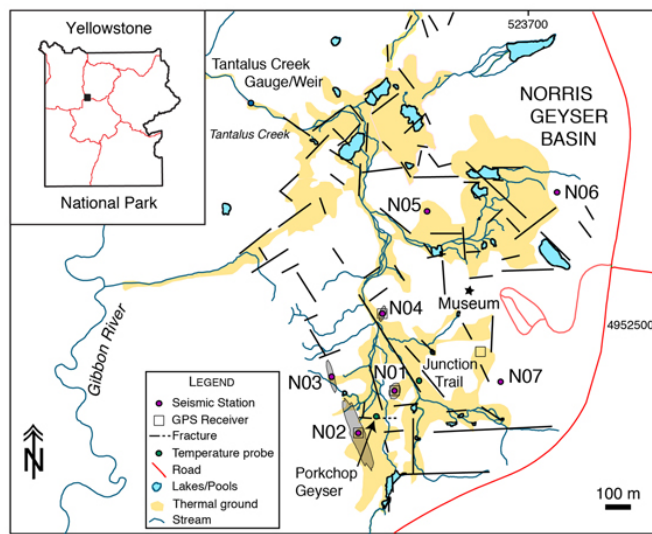
Phillip B. Dawson, M. C. Benítez, Jacob B. Lowenstern, Bernard A. Chouet

First Published: 6 January 2012 Vol: 39, L01304 | DOI: 10.1029/2011GL049901

KEY POINTS

- Identify hydrothermal steam bubble collapse
- Constrain shallow geothermal processes
- Demonstrate the capability of hidden Markov models

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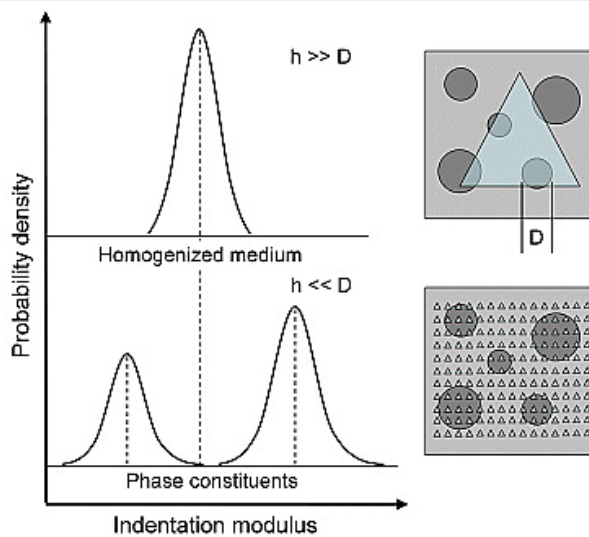
A novel approach for micro-scale characterization and modeling of geomaterials incorporating actual material heterogeneity

O. K. Mahabadi, N. X. Randall, Z. Zong, G. Grasselli

First Published: 6 January 2012 Vol: 39, L01303 | DOI: 10.1029/2011GL050411

KEY POINTS

- Role of heterogeneity and micro-structure on mechanical response of rocks
- Characterization of mineral properties at micro-scale
- Quantification of heterogeneity and micro-structure and model integration



➤ 1 of 4

Topography correlated atmospheric delay correction in radar interferometry using wavelet transforms

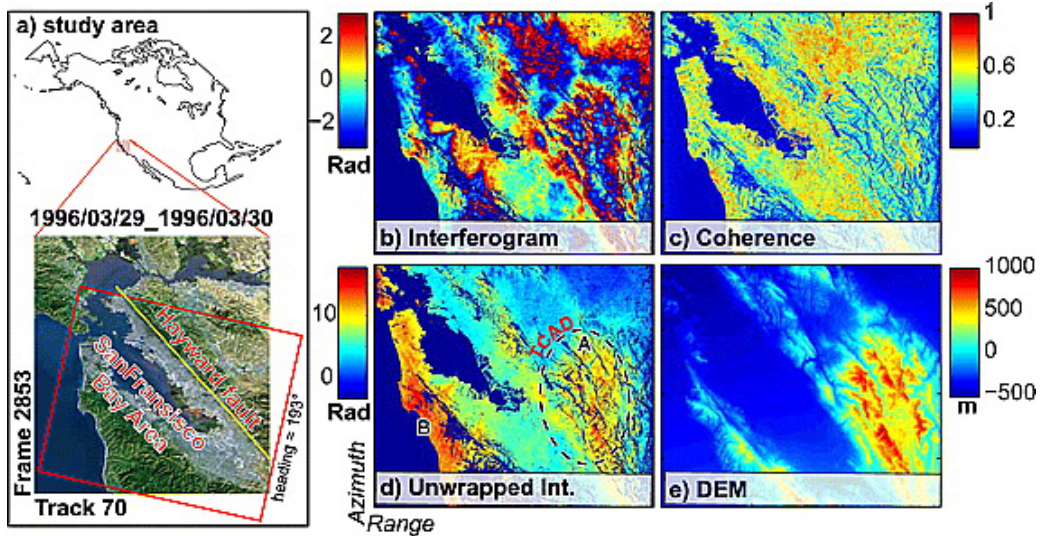
M. Shirzaei, R. Bürgmann

First Published: 6 January 2012 Vol: 39, L01305 | DOI: 10.1029/2011GL049971

KEY POINTS

- Wavelet transforms are adapted for improving accuracy of deformation data

- A new method for correcting atmospheric delay in InSAR is presented
- This approach overcomes limitation of multitemporal InSAR methods



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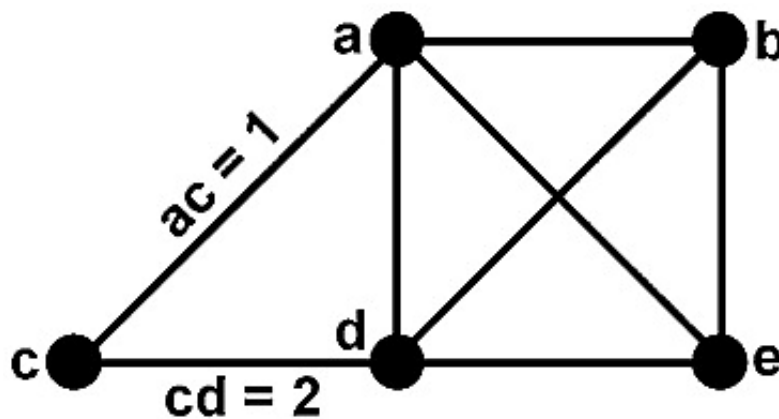
Using remotely-sensed fuel connectivity patterns as a tool for fire danger monitoring

G. Caccamo, L. A. Chisholm, R. A. Bradstock, M. L. Puotinen

First Published: 6 January 2012 Vol: 39, L01302 | DOI: 10.1029/2011GL050125

KEY POINTS

- Variations in dry fuel connectivity can be highly dynamic
- Remotely sensed patterns of fuel connectivity can be used to monitor fire danger
- Patterns of area burnt and dry fuel connectivity closely matched



> 1 of 3

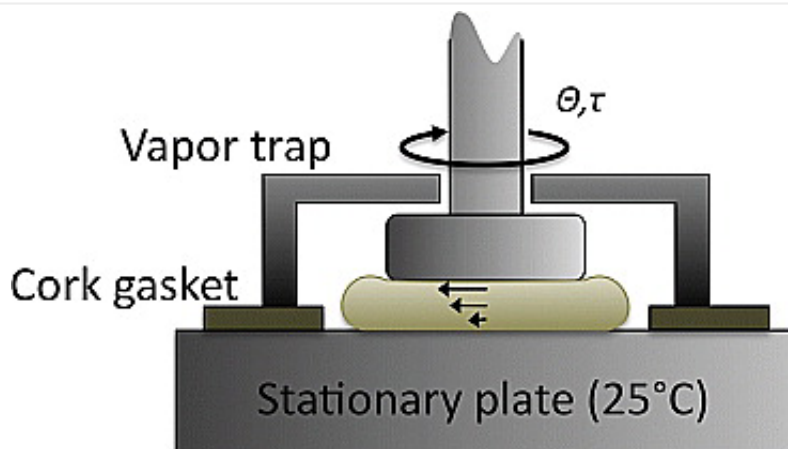
Rheologic testing of wet kaolin reveals frictional and bi-viscous behavior typical of crustal materials

Michele L. Cooke, Nicholas J. van der Elst

First Published: 11 January 2012 Vol: 39, L01308 | DOI: 10.1029/2011GL050186

KEY POINTS

- Wet kaolin is an appropriate analog material for crustal faulting
- Wet kaolin deforms as a Burger's material before failure
- Wet kaolin shows aspects of frictional failure including rate and state behavior



➤ 1 of 4

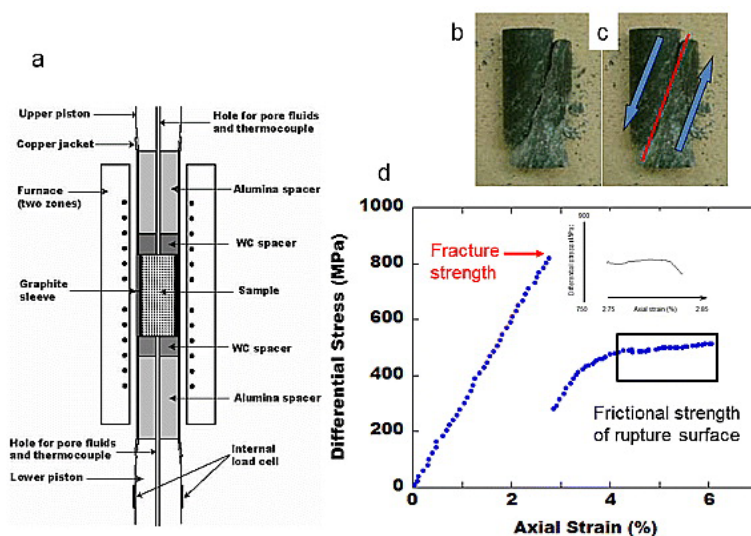
Effect of water on weakening preceding rupture of laboratory-scale faults: Implications for long-term weakening of crustal faults

Koji Masuda, Takashi Arai, Koichiro Fujimoto, Miki Takahashi, Norio Shigematsu

First Published: 11 January 2012 Vol: 39, L01307 | DOI: 10.1029/2011GL050493

KEY POINTS

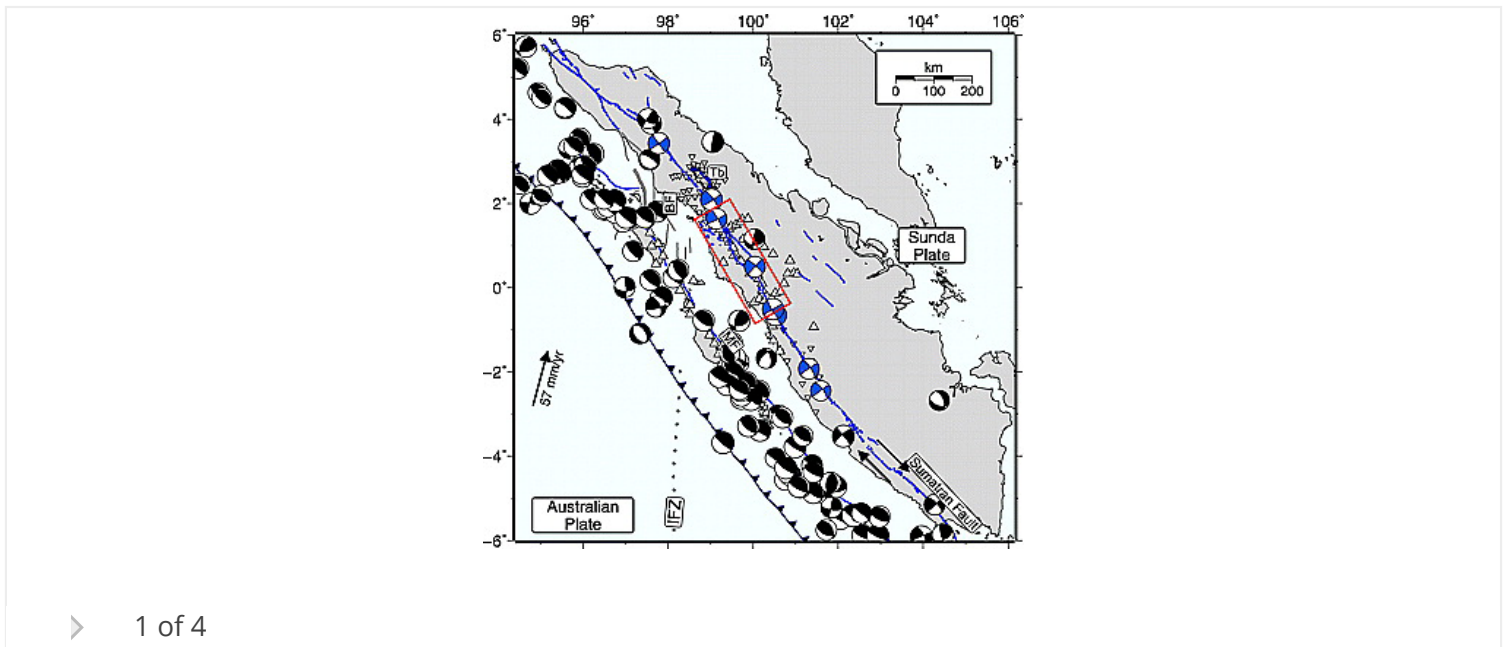
- Frictional strength of wet rocks decreased as temperature increased
- Long-term weakening of faults is caused by microfracturing at asperity contacts
- The presence of fluids has an important influence on changes of fault strength



➤ 1 of 4

KEY POINTS

- Relative hypocenter locations reveal the structure of the Sumatran Fault
- The equatorial bifurcation is interpreted as a strike-slip duplex system
- Seismicity is found beneath volcanoes Malintang, Sibualbuali and Sarik-Gajah



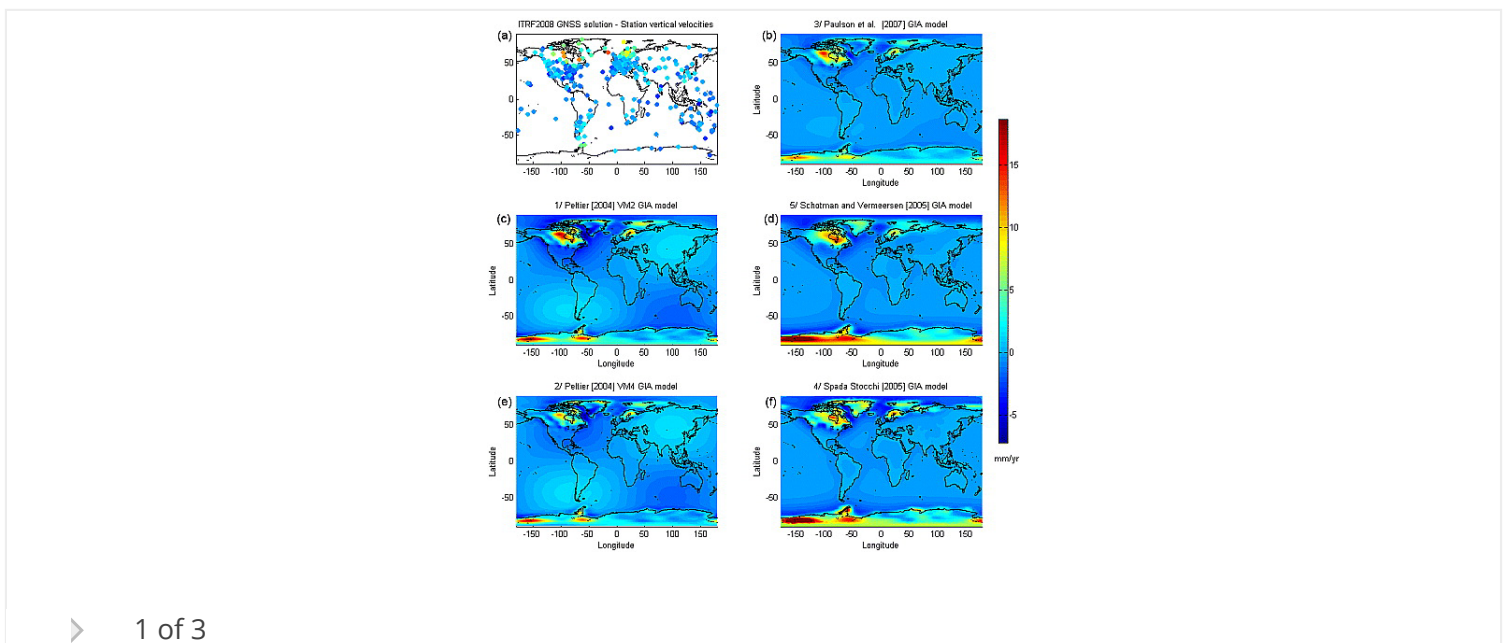
ITRF2008 contribution to glacial isostatic adjustment and recent ice melting assessment

Laurent Métivier, Xavier Collilieux, Zuheir Altamimi

First Published: 14 January 2012 Vol: 39, L01309 | DOI: 10.1029/2011GL049942

KEY POINTS

- A present J_2 rate close to zero
- GIA rotational feedback negligible or counteracted by recent ice melting
- ITRF2008 degree-2 spherical harmonics of the Earth's figure change



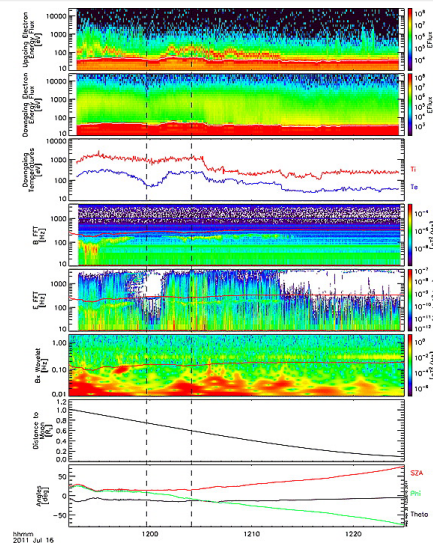
A comparison of ARTEMIS observations and particle-in-cell modeling of the lunar photoelectron sheath in the terrestrial magnetotail

A. R. Poppe, J. S. Halekas, G. T. Delory, W. M. Farrell, V. Angelopoulos, J. P. McFadden, J. W. Bonnell, R. E. Ergun

First Published: 4 January 2012 Vol: 39, L01102 | DOI: 10.1029/2011GL050321

KEY POINTS

- ARTEMIS has observed the dayside lunar plasma environment in the magnetotail
- We observe non-monotonic potentials and plasma waves
- Modeling shows a critical role for the ion distribution



➤ 1 of 4

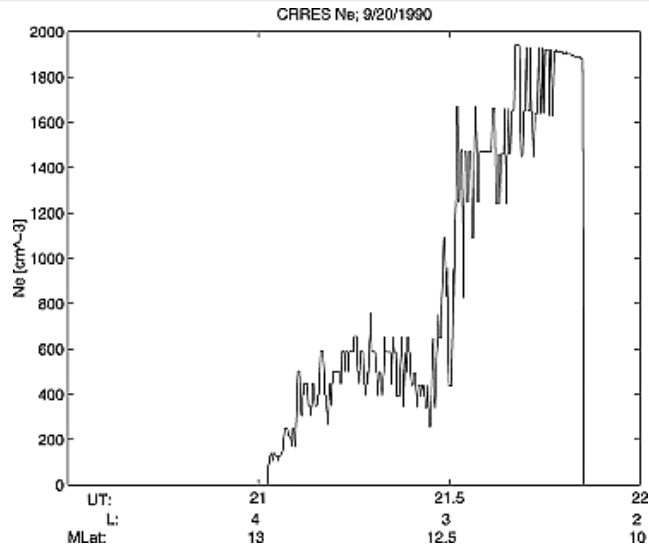
On structuring of the plasmopause

M. C. Kelley, J. Franz, A. Jacobson

First Published: 4 January 2012 Vol: 39, L01101 | DOI: 10.1029/2011GL050048

KEY POINTS

- The origin of irregularities in the plasmopause is discussed
- Alfvén waves could lead to the fluctuations
- The plasmopause could be Kelvin-Helmholtz unstable



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Accelerated magnetosheath flows caused by IMF draping: Dependence on latitude

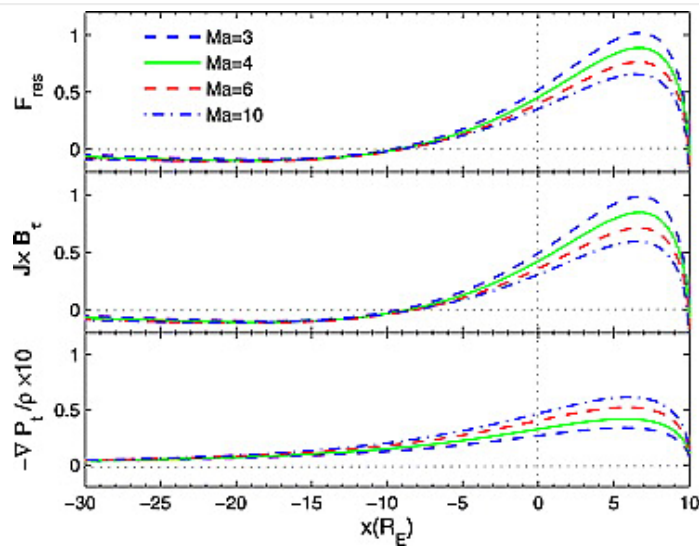
N. V. Erkaev, C. J. Farrugia, A. V. Mezentsev, R. B. Torbert, H. K. Biernat

First Published: 6 January 2012 Vol: 39, L01103 | DOI: 10.1029/2011GL050209

KEY POINTS

- The approach is semi-analytical
- Away from the equatorial plane the accelerated flows bifurcate
- Asymptotic limits are reached which are higher than the solar wind speed

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> 1 of 5

Bursty escape fluxes in plasma sheets of Mars and Venus

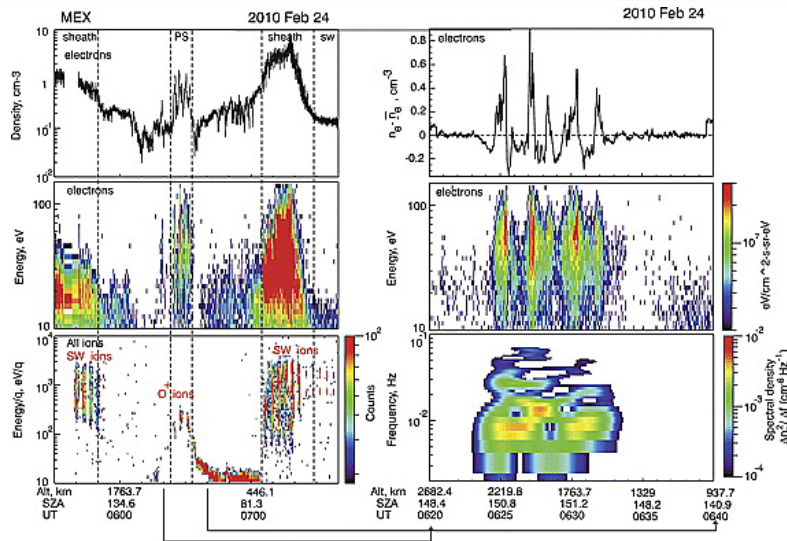
E. Dubinin, M. Fraenz, J. Woch, T. L. Zhang, J. Wei, A. Fedorov, S. Barabash, R. Lundin

First Published: 11 January 2012 Vol: 39, L01104 | DOI: 10.1029/2011GL049883

KEY POINTS

- Bursty ion fluxes in the tails of Mars and Venus are observed

- Period of bursts is close to of 1-2 min and related to the oxygen gyrofrequency
- Similar periodic oscillations are also typical for the magnetosheath plasma



➤ 1 of 5

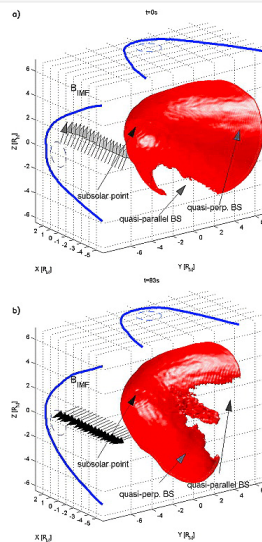
Dynamic Martian magnetosphere: Transient twist induced by a rotation of the IMF

R. Modolo, G. M. Chanteur, E. Dubinin

First Published: 11 January 2012 Vol: 39, L01106 | DOI: 10.1029/2011GL049895

KEY POINTS

- The BS adjusts almost instantaneously to the new IMF orientation
- MPB and the magnetic lobes require up to 2 minutes to recover a stationary stat



➤ 1 of 3

Auroral evidence of Io's control over the magnetosphere of Jupiter

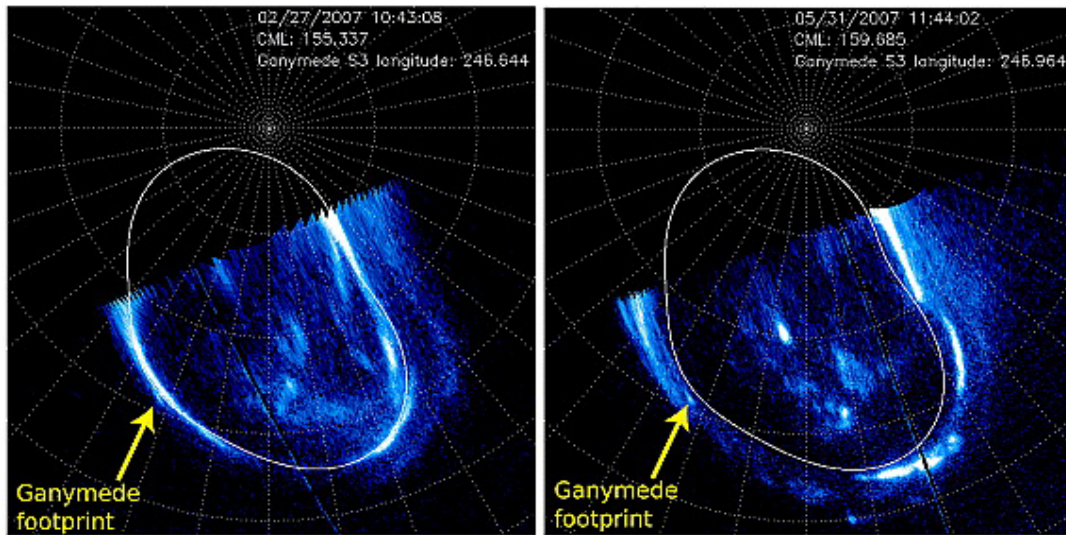
B. Bonfond, D. Grodent, J.-C. Gérard, T. Stallard, J. T. Clarke, M. Yoneda, A. Radioti, J. Gustin

First Published: 11 January 2012 Vol: 39, L01105 | DOI: 10.1029/2011GL050253

KEY POINTS

- The Ganymede footprint can be engulfed into the Jovian main emissions
- The main oval expanded and the outer emissions brightened from 02 to 06/2007
- The Io auroral footprint momentarily disappeared on June 7th 2007

Highlight



> 1 of 4

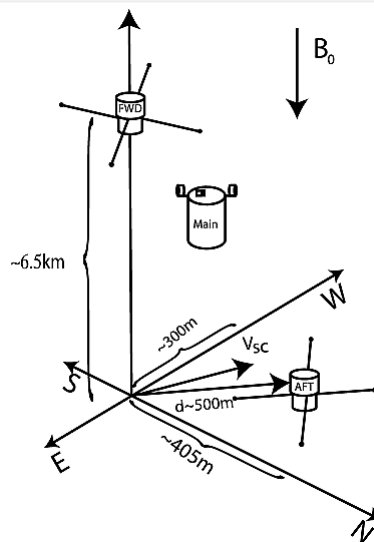
Multi-payload measurement of transverse velocity shears in the topside ionosphere

E. T. Lundberg, P. M. Kintner, K. A. Lynch, M. R. Mella

First Published: 12 January 2012 Vol: 39, L01107 | DOI: 10.1029/2011GL050018

KEY POINTS

- We present direct observation of velocity shear in the auroral ionosphere
- These directly measured shears are a factor of two lower than inferred shears
- Associated with the shears are BB-ELF and narrow band plasma wave emissions



> 1 of 3

The Cryosphere

Insignificant change in Antarctic snowmelt volume since 1979

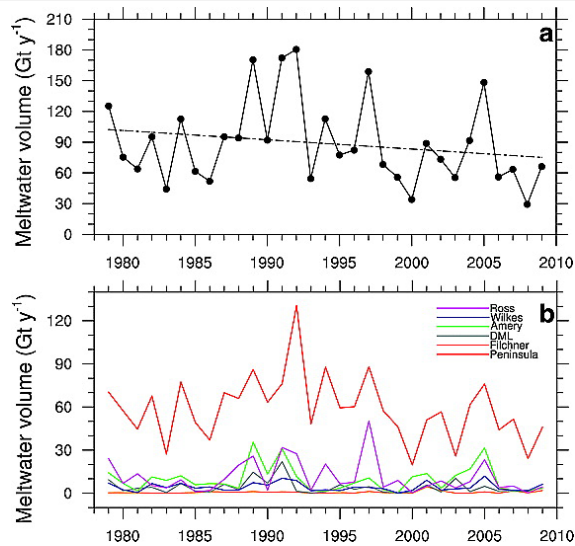
P. Kuipers Munneke, G. Picard, M. R. van den Broeke, J. T. M. Lenaerts, E. van Meijgaard

First Published: 13 January 2012 Vol: 39, L01501 | DOI: 10.1029/2011GL050207

KEY POINTS

- Antarctic meltwater volume has changed insignificantly over the past 30 years
- Mean Antarctic snowmelt volume is estimated at 89 Gigatonnes per year
- Other than atmospheric processes likely determine long-term ice shelf stability

Highlight



> 1 of 3

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