Publishing: An editor's perspective

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Editor for Geophysical Research Letters, 2010-2015
Topic areas: Physical, Biological, Chemical, Paleo Oceanography
(so note that editors are not always specialists in your field)

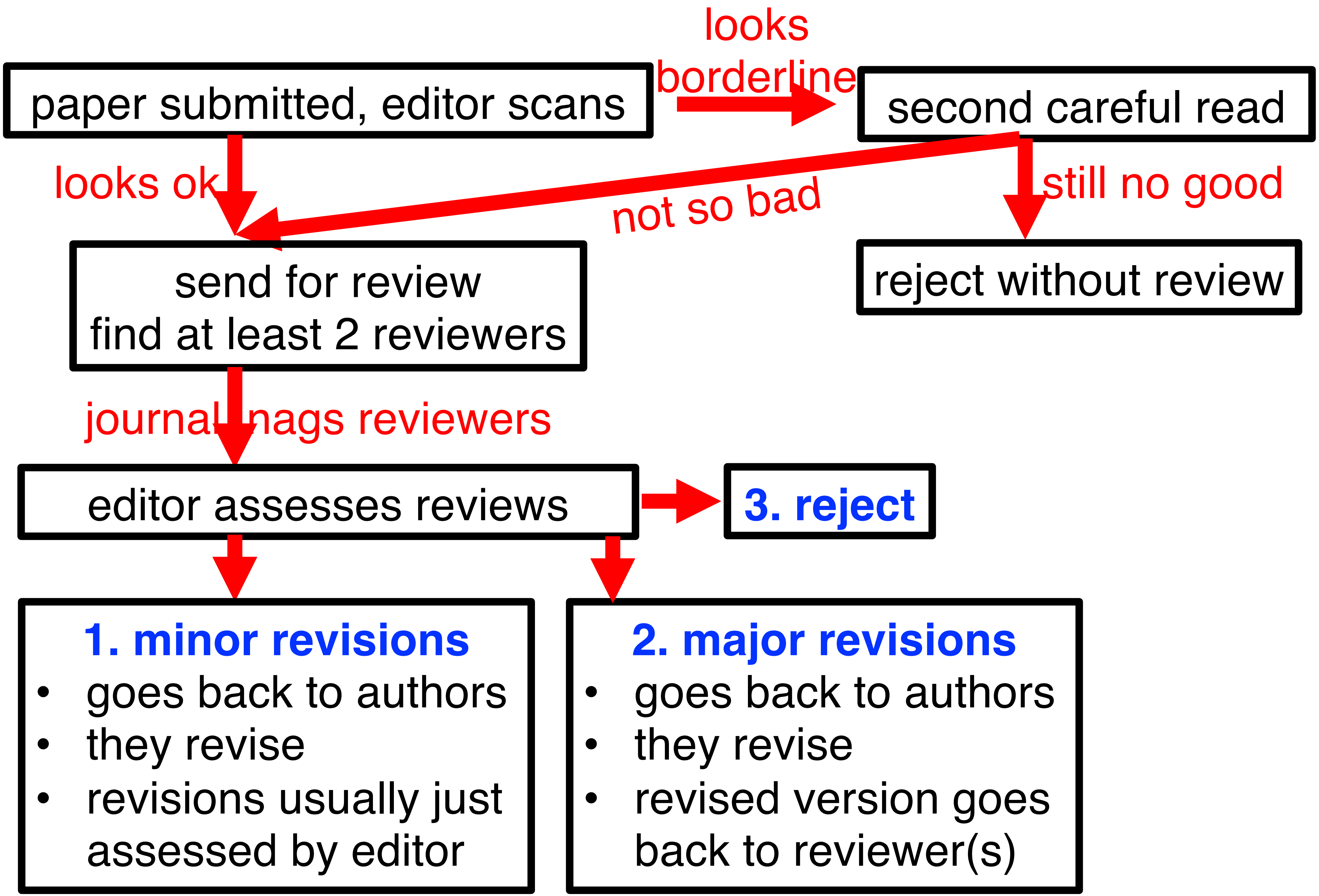
Some stats:
1304 manuscripts (20-25 per month)
35% acceptance rate (but actually higher)
25% reject without review
8-10 hours work per week?

Outline

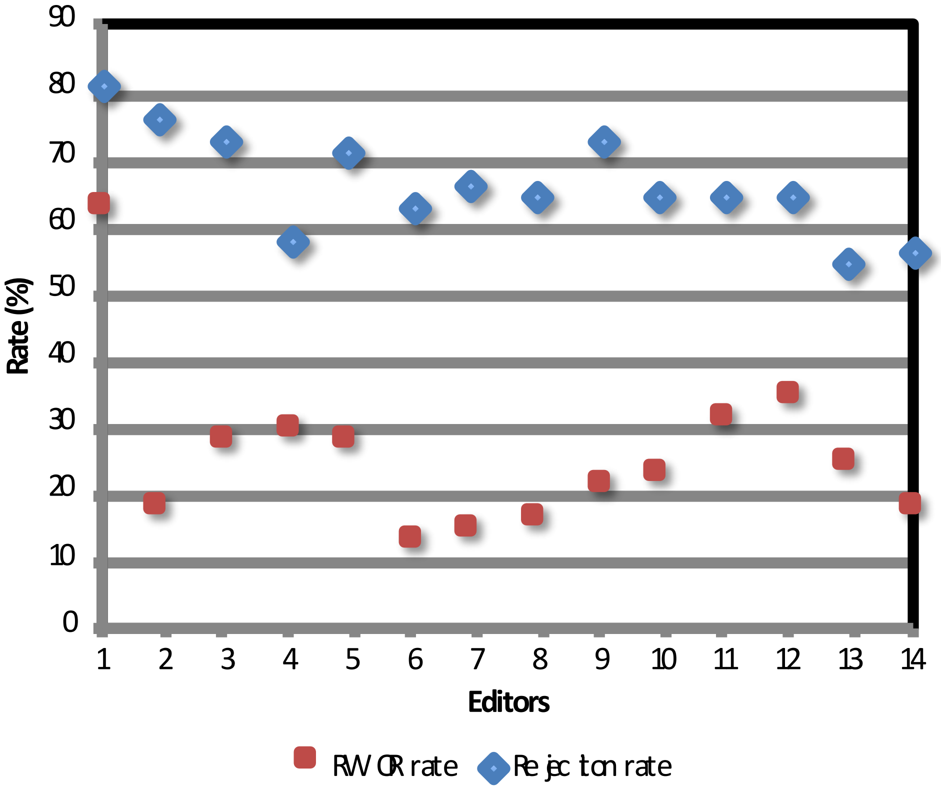
- The editorial process (GRL-centric)

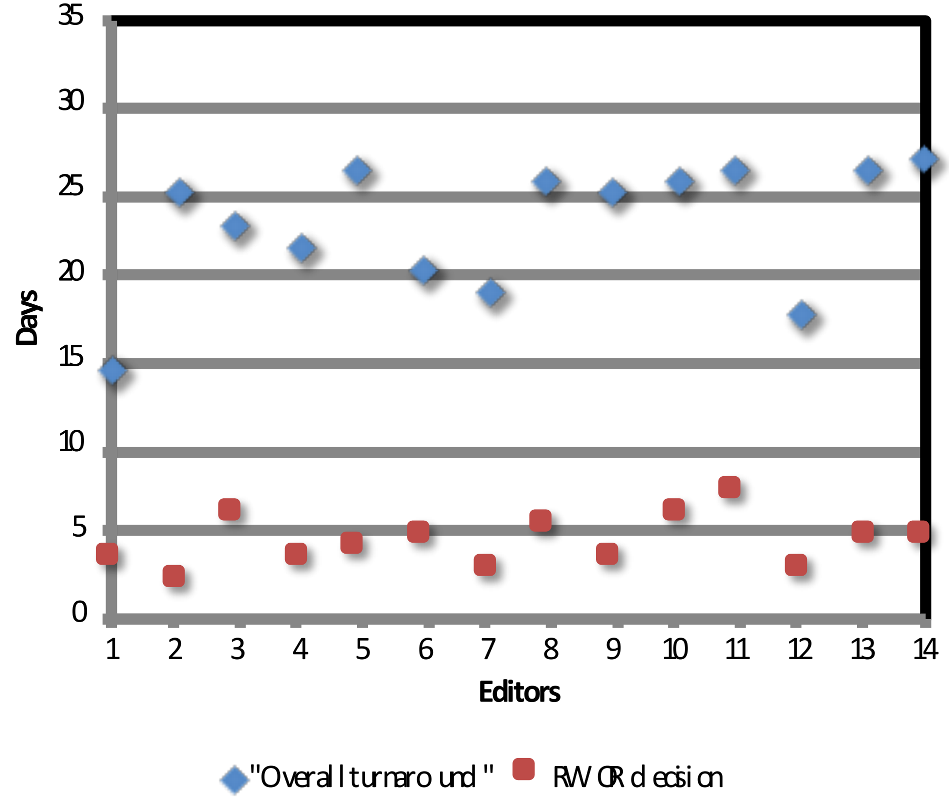
- Tips for authors:
  - Submission
  - Revising
  - Dealing with rejection
  - Authorship.

The real review process



GRL performance (2009-2014)





Target:

RWOR decision time < 7 days

overall turnaround time < 25-30 days

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- Author Instructions
- Submit Manuscript
- Post Decision Manuscripts (1)

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- Editor Instructions
- Associate Editor Keyword(s) Report
- Find Manuscript
- Find Person
- Reports
- Awaiting Associate Editor Assignment 0 Ed
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Details	Files	Tasks	History	E-Mails (16 Latest: 2012-09-16)	Notes (2)

Manuscript Items

1. Merged File containing manuscript text and 3 Figure files. PDF (15407KB)
   a. Article File PDF (455KB)
   b. Figure 1 PDF (5212KB)
   c. Figure 2 PDF (3085KB)
   d. Figure 3 PDF (6760KB)

Manuscript Workflow Tasks

Editor Decision (2 received / 2 assigned / 2 desired)

Cover letter would go here

Manuscript #	2012GL053623
Current Revision #	0
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Question 1. *Major Topic or Scientific Question	[redacted]
Question 2. *New Scientific Knowledge	
Question 3. *Broad Implications	
Related Manuscript	N/A
Key Points	[redacted]
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Cover letters are important

November 26, 2002

Editor
Nature Genetics
345 Park Avenue South, 10th Floor
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Dear Editor,

It is not clear why a cover letter is required except to fulfill the silly British preoccupation with letterhead and other emblems of status.

Please accept my correspondence.

Sincerely,

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What should the cover letter do?

- Highlight the main points of the manuscript
- What is new and/or innovative?
  - Perhaps including what is hot in this field
- Why is the ms appropriate to the journal
  - Perhaps past history of similar papers
- Suggested reviewers
  - (although this is usually covered elsewhere online)
- Suggested reviewers to avoid
  - But go easy, perhaps explain why

Cover letter:
What makes this a great paper?

- Discovery
- Major revision to our understanding
- Resolution of a controversy
- Timely – immediate relevance
- Unsurprising but important quantifications

Discovery

nature Vol 459 | 4 June 2009 | doi:10.1038/nature08024

LETTERS

The Gamburtsev mountains and the origin and early evolution of the Antarctic Ice Sheet

Sun Bo[1], Martin J. Siegert[2], Simon M. Mudd[2], David Sugden[2], Shuji Fujita[3], Cui Xiangbin[1], Jiang Yunyun[1], Tang Xueyuan[1] & Li Yuansheng[1]

Ice-sheet development in Antarctica was a result of significant and rapid global climate change about 34 million years ago[1]. Ice-sheet and climate modelling suggest reductions in atmospheric carbon dioxide (less than three times the pre-industrial level of 280 parts per million by volume) that, in conjunction with the development of the Antarctic Circumpolar Current, led to cooling and glaciation paced by changes in Earth's orbit[2]. Based on the present subglacial topography, numerical models point to ice-sheet genesis on mountain massifs of Antarctica, including the Gamburtsev mountains at Dome A, the centre of the present ice sheet[1,3]. Our lack of knowledge of the present-day topography of the Gamburtsev mountains[4] means, however, that the nature of early glaciation and subsequent development of a continental-sized ice sheet are uncertain. Here we present radar information about the base of the ice at Dome A, revealing classic Alpine topography with pre-existing river valleys overdeepened by valley glaciers formed when the mean summer surface temperature was around 3 °C. This landscape is likely to have developed during the initial phases of Antarctic glaciation. According to Antarctic climate history (estimated from offshore sediment records) the Gamburtsev mountains are probably older than 34 million years and were the main centre for ice-sheet growth. Moreover, the landscape has most probably been preserved beneath the present ice sheet for around 14 million years.

Deep-sea oxygen isotope records show that the Eocene and Oligocene epochs represent times of global cooling culminating in the development of the first Antarctic Ice Sheet and an important expansion of Antarctic ice volume[5]. The Eocene (~52 to ~34 million years (Myr) ago) is characterized by a global cooling trend which continued during the remainder of the Cenozoic era. Subsequently there were two stepped changes in the rate of cooling. The first, at the Eocene–Oligocene boundary ~34 Myr ago, saw the onset of significant glaciation in Antarctica. The second, at ~14 Myr ago, is recorded by a 6–7 °C cooling in the marine isotope record[5,6] and in terrestrial evidence of cooling of at least 8 °C in the Transantarctic mountains[7].

Two approaches to modelling the initial growth of the Antarctic Ice Sheet show that glaciation begins in the upland mountain massifs of Antarctica, at coastal Dronning Maud Land, the Transantarctic mountains, and the Gamburtsev mountains beneath Dome A[1,8]. This central dome dominates glaciation because of its high altitude and consequent cold surface temperatures. Ice-sheet modelling, ocean cores and stratigraphic evidence suggest that for 20 million years, from 34 to 14 Myr ago, Antarctica experienced orbitally driven ice-volume fluctuations similar in scale to those of the Pleistocene ice sheets of the Northern Hemisphere and that these fluctuations were accompanied by marked changes in global sea level[2,9–11]. Tundra biota survived at high altitudes during this period[7]. After 14 Myr the ice sheet, at least in higher mountain peripheries in East Antarctica, maintained its presence and control over the cold polar climate of today, leading to extremely low rates of erosion[12], cold-based local glaciers[13] and even the preservation of buried Miocene ice[14].

Our knowledge of the subglacial topography at Dome A has been obtained during only one radar flight in the 1970s[4,15,16]. Consequently, the present form and evolution of the Gamburtsev mountains are poorly understood, making models of ice-sheet inception problematic. Indeed, the morphology of the mountains is less well known than the surface of Mars.

In seasons 2004/05 and 2007/08, Chinese glaciologists made the first detailed radar survey of the Gamburtsev mountains (as part of the International Polar Year programme Chinese Antarctic Research Expedition; CHINARE). The bed was detected in the majority of radar lines (Fig. 1), and by subtracting ice thickness from surface elevation (measured by GPS) the elevation of the bed could be found. The bed elevations were then interpolated[17] onto a regular grid with pixel resolution of 140.5 m (see Methods Summary and Supplementary Methods for interpolation details). The unprecedented density of radar transects in this region means that the resulting Digital Elevation Model (DEM) provides the first detailed depiction of the topography of the central Gamburtsev mountains (Fig. 2).

The topography revealed beneath the ice is striking (Fig. 2 and Supplementary Fig. 1). The region consists of a south-facing elongated valley head, cutting over a kilometre into flanking mountains. The whole region is covered by ice 1,649–3,135 m thick. The maximum elevation of the topography is 2,434 m above sea level at 80° 18′ S, 76° 10′ E. The valley geometry is dendritic. We highlight this geometry by extracting a drainage network using standard methods[18] (Fig. 2, Supplementary Discussion 1). Recent numerical modelling, backed by empirical observations, has shown that ice cannot create such networks alone; subglacial topography takes this form only when ice exploits pre-existing fluvial topography (Supplementary Fig. 2)[8,19]. This fluvial landscape has subsequently been subject to intense valley glaciation, as demonstrated by overdeepening in the valley floors of up to 432 m and the presence of steep trough sides. It is also shown by details such as the location of overdeepened basins at points of valley convergence, staircases of intervening riegels or valley steps, hanging tributary valleys, and corries with steep arcuate cliffs and flat floors at the head of some tributary valleys (Fig. 3); such features are characteristic of landscapes shaped by valley glaciers[20,21]. Hanging valleys are formed when ice ponds in tributary glaciers as they enter the trunk glacier; this ponding leads to reduced ice surface slopes, which in turn reduces shear stress and sliding velocities at the glacier bed, ultimately reducing erosive capacity in the tributary glacier[22,23]. Another effect of

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Major revision
to our
understanding

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LETTERS

Interior pathways of the North Atlantic meridional overturning circulation

Amy S. Bower[1], M. Susan Lozier[2], Stefan F. Gary[2] & Claus W. Böning[3]

To understand how our global climate will change in response to natural and anthropogenic forcing, it is essential to determine how quickly and by what pathways climate change signals are transported throughout the global ocean, a vast reservoir for heat and carbon dioxide. Labrador Sea Water (LSW), formed by open ocean convection in the subpolar North Atlantic, is a particularly sensitive indicator of climate change on interannual to decadal timescales[1–5]. Hydrographic observations made anywhere along the western boundary of the North Atlantic reveal a core of LSW at intermediate depths advected southward within the Deep Western Boundary Current (DWBC)[6–9]. These observations have led to the widely held view that the DWBC is the dominant pathway for the export of LSW from its formation site in the northern North Atlantic towards the Equator[10,11]. Here we show that most of the recently ventilated LSW entering the subtropics follows interior, not DWBC, pathways. The interior pathways are revealed by trajectories of subsurface RAFOS floats released during the period 2003–2005 that recorded once-daily temperature, pressure and acoustically determined position for two years, and by model-simulated 'e-floats' released in the subpolar DWBC. The evidence points to a few specific locations around the Grand Banks where LSW is most often injected into the interior. These results have implications for deep ocean ventilation and suggest that the interior subtropical gyre should not be ignored when considering the Atlantic meridional overturning circulation.

Profiling floats[12] released in the Labrador Sea during the 1990s showed little evidence of southward export of LSW in the DWBC[13–16]. This result was surprising because the DWBC is widely thought to be the dominant LSW export pathway towards the subtropics and tropics. Why did these floats not follow the DWBC into the subtropics? Were they biased by upper-ocean currents when they periodically ascended to the sea surface to fix their position, as recently suggested by numerical model results[17]? Were they released mainly in the recirculating waters of the subpolar gyre? Or is the DWBC in fact not the dominant export pathway for LSW?

To address these questions, 76 acoustically tracked Range and Fixing of Sound (RAFOS) floats[18], which do not need to surface to fix their position, were sequentially released in the DWBC near 50° N from 2003 to 2006 at two LSW depths, 700 and 1,500 m, for two-year drifting missions (see Fig. 1a and Methods for more details). Here we describe the spreading pathways of LSW revealed by the first 40 high-resolution RAFOS float trajectories, ten additional float displacement vectors and simulated trajectories (e-floats) from a high-resolution numerical ocean circulation model[19].

All RAFOS floats initially drifted southward in the DWBC after release at 50° N (Fig. 1b). But a large fraction of the floats—about 75% (29/40)—escaped from the DWBC before reaching the southern tip or 'Tail' of the Grand Banks (43° N) (Fig. 2a and b) and drifted into the interior. Many of these followed an eastward path along the subpolar–subtropical gyre boundary (Fig. 1a and b). Only 8% of all floats (3/40) followed the DWBC continuously from launch around the Tail of the Grand Banks. This is more than the number of profiling floats from the Labrador Sea that rounded the Tail of the Grand Banks in the DWBC (zero)[16], but is still a remarkably low number in light of the expectation that the DWBC is the dominant southward pathway for LSW.

A larger percentage of the RAFOS floats—about 23% (9/40)—reached the subtropics via an interior pathway, indicated by the cluster of trajectories extending south of 42° N in the longitude band 40°–60° W (Fig. 1b). The warmer temperatures measured by these floats indicate that they crossed the Gulf Stream into the subtropical gyre. The dominance of the interior versus DWBC pathway is further supported by the larger ensemble of 50 RAFOS float displacement vectors (Fig. 1b inset)—about 24% (12/50) surfaced south of 42° N in the interior (east of 60° W). Furthermore, the largest southward float displacements over two years were made by floats following an interior, not DWBC path (Fig. 1b inset). Interior pathways for the southward spreading of LSW into the subtropics have been suggested previously[7,8,17,20,21] but these float tracks offer the first evidence of the relative dominance of this pathway compared to the DWBC.

The RAFOS float trajectories reveal two primary locations where LSW escapes from the DWBC and enters the interior ocean—at the southeastern corner of Flemish Cap (especially for 1,500 m floats) and just upstream of the Tail of the Grand Banks (Fig. 2a and b). At these locations, the North Atlantic Current (Fig. 1a) is closest to the continental slope, supporting a previous conjecture that onshore excursions of the North Atlantic Current temporarily interrupt the flow of the DWBC and divert LSW into the interior[22].

To complement this analysis of the necessarily limited number of RAFOS float trajectories, simulated trajectories were generated using the eddy-resolving (~1/12°) primitive equation Family of Linked Atlantic Models Experiment (FLAME) model[19] (see Methods for details of trajectory computation). The e-float trajectories were calculated using the three-dimensional (x, y, z), time-varying model velocity fields to simulate fluid parcel motion as accurately as possible. The constant-pressure RAFOS floats drift only with the two-dimensional (x–y) flow field, but no significant differences were found in the model results using the two-dimensional or three-dimensional model velocity fields, in contrast to a previous modelling analysis of LSW pathways which used time-mean (as opposed to the time-varying fields used here) model velocity fields[17] (see Supplementary Information).

Seventy-two e-floats were initialized in the DWBC near 50° N with the same spatial and temporal pattern as the RAFOS floats. The spread of the model and RAFOS float trajectories after two years is very similar (Fig. 3a). There is little evidence for a continuous DWBC pathway; rather, e-floats tend to recirculate within the subpolar gyre and drift southward into the subtropical gyre interior. The loss of

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Resolution of a controversy

Vol 461 | 17 September 2009 | doi:10.1038/nature08355

LETTERS

Holocene thinning of the Greenland ice sheet

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On entering an era of global warming, the stability of the Greenland ice sheet (GIS) is an important concern[1], especially in the light of new evidence of rapidly changing flow and melt conditions at the GIS margins[2]. Studying the response of the GIS to past climatic change may help to advance our understanding of GIS dynamics. The previous interpretation of evidence from stable isotopes ($\delta^{18}O$) in water from GIS ice cores was that Holocene climate variability on the GIS differed spatially[3] and that a consistent Holocene climate optimum—the unusually warm period from about 9,000 to 6,000 years ago found in many northern-latitude palaeoclimate records[4]—did not exist. Here we extract both the Greenland Holocene temperature history and the evolution of GIS surface elevation at four GIS locations. We achieve this by comparing $\delta^{18}O$ from GIS ice cores[3,5] with $\delta^{18}O$ from ice cores from small marginal icecaps. Contrary to the earlier interpretation of $\delta^{18}O$ evidence from ice cores[3,6], our new temperature history reveals a pronounced Holocene climatic optimum in Greenland coinciding with maximum thinning near the GIS margins. Our $\delta^{18}O$-based results are corroborated by the air content of ice cores, a proxy for surface elevation[7]. State-of-the-art ice sheet models are generally found to be underestimating the extent and changes in GIS elevation and area; our findings may help to improve the ability of models to reproduce the GIS response to Holocene climate.

Ice cores from six locations[3,8] have now been synchronized to the Greenland Ice Core Chronology 2005 (GICC05) throughout the Holocene epoch (Fig. 1a). The GICC05 annual layer counting was performed simultaneously on the DYE-3, GRIP and NGRIP ice cores for the entire Holocene[9,10]. For the Agassiz[11], Renland[12] and Camp Century ice cores the timescale was transferred by using volcanic markers identifiable in electrical conductivity measurements[13] (Supplementary Information). The six synchronized Holocene $\delta^{18}O$ records show large differences in millennial scale trends (Fig. 1b). All $\delta^{18}O$ records were obtained in the same laboratory (the Copenhagen Isotope Laboratory), ensuring maximum confidence in the homogeneity of the data sets. The differences are therefore real features that need to be understood and explained before firm conclusions about the evolution of Greenland climate during the Holocene can be supported by the data.

Changes in regional temperatures, moisture source regions, moisture transport and precipitation seasonality affect the $\delta^{18}O$ of precipitation[6]. However, all these parameters are expected to produce regional patterns of change, implying that trends in nearby $\delta^{18}O$ records should always be similar, except where the records are heavily influenced by a combination of ice flow and post-deposition phenomena, such as wind-scouring. Ice cores from Agassiz and Renland are retrieved from icecap domes and are therefore not influenced by ice flow. The Camp Century site is only slightly affected by a steady ice flow, yet the trends in the neighbouring Agassiz and Camp Century cores are dissimilar; in fact, the $\delta^{18}O$ signal at Agassiz is much more similar to the signal recorded at Renland on the other side of the GIS.

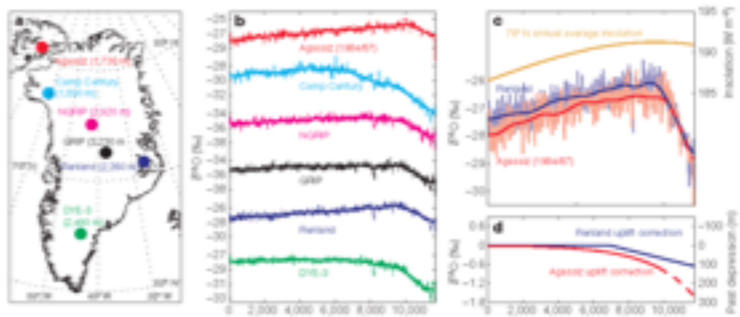

Figure 1 | Holocene $\delta^{18}O$ records. a, Drill site locations for the ice cores that have been cross-dated to the GICC05 timescale. Site elevations are given in parenthesis. **b,** 20-year averages and millennial scale trends of $\delta^{18}O$ during the Holocene as observed in ice core records from six locations in Greenland and Canada. All $\delta^{18}O$ values are expressed with respect to Vienna standard mean ocean water (V-SMOW). **c,** Uplift-corrected Renland and Agassiz Holocene $\delta^{18}O$ values: 20-year averages and millennial scale trends in the Agassiz and Renland Holocene $\delta^{18}O$ records. Annual average insolation at 75° N is shown in orange. **d,** Agassiz and Renland post-glacial bedrock uplift histories and corresponding $\delta^{18}O$ correction values.

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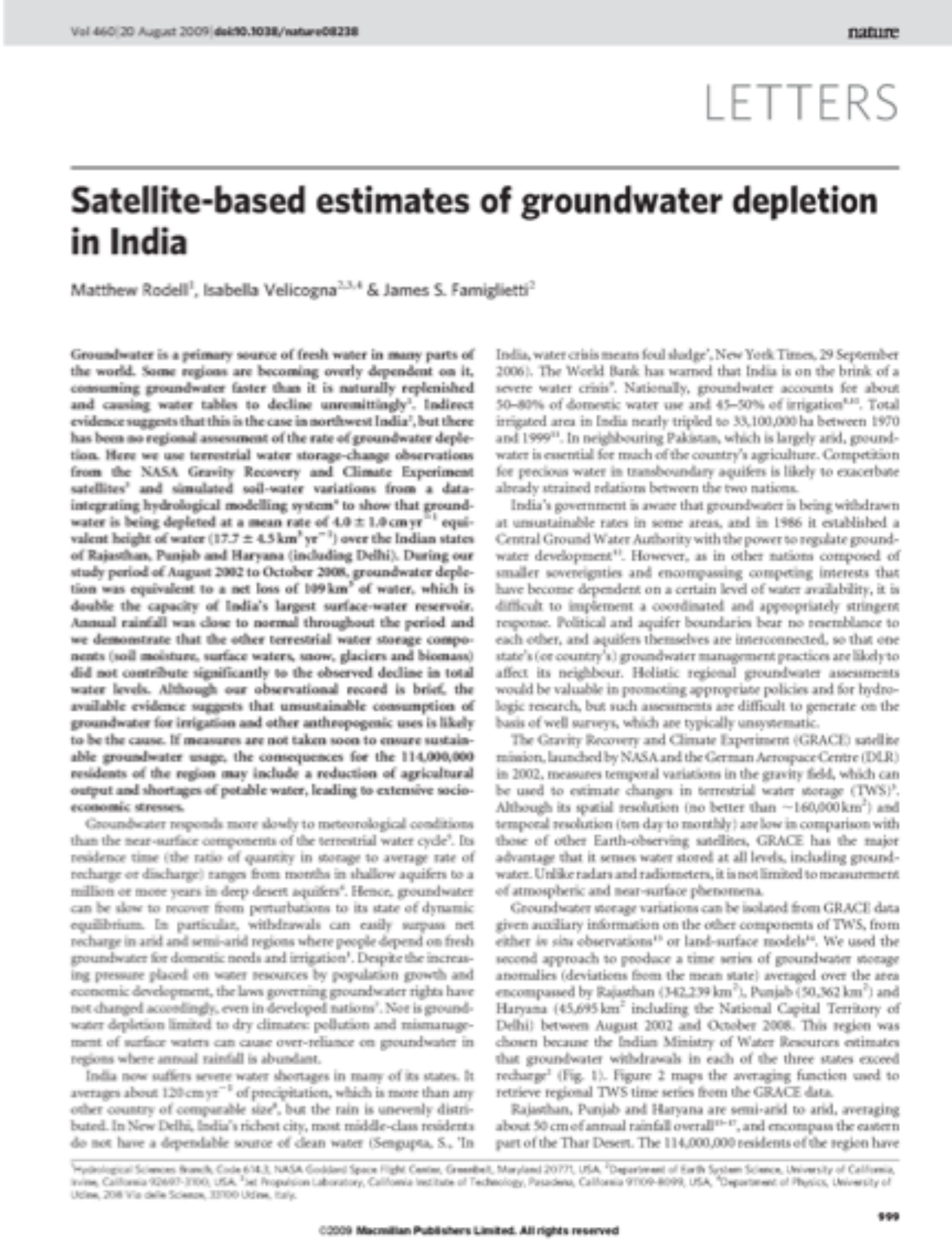
Timely – immediate relevance



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LETTERS

Satellite-based estimates of groundwater depletion in India

Matthew Rodell[1], Isabella Velicogna[2,3,4] & James S. Famiglietti[2]

Groundwater is a primary source of fresh water in many parts of the world. Some regions are becoming overly dependent on it, consuming groundwater faster than it is naturally replenished and causing water tables to decline unremittingly[1]. Indirect evidence suggests that this is the case in northwest India[2], but there has been no regional assessment of the rate of groundwater depletion. Here we use terrestrial water storage-change observations from the NASA Gravity Recovery and Climate Experiment satellites[3] and simulated soil-water variations from a data-integrating hydrological modelling system[4] to show that groundwater is being depleted at a mean rate of $4.0 \pm 1.0\,\mathrm{cm\,yr^{-1}}$ equivalent height of water ($17.7 \pm 4.5\,\mathrm{km^3\,yr^{-1}}$) over the Indian states of Rajasthan, Punjab and Haryana (including Delhi). During our study period of August 2002 to October 2008, groundwater depletion was equivalent to a net loss of $109\,\mathrm{km^3}$ of water, which is double the capacity of India's largest surface-water reservoir. Annual rainfall was close to normal throughout the period and we demonstrate that the other terrestrial water storage components (soil moisture, surface waters, snow, glaciers and biomass) did not contribute significantly to the observed decline in total water levels. Although our observational record is brief, the available evidence suggests that unsustainable consumption of groundwater for irrigation and other anthropogenic uses is likely to be the cause. If measures are not taken soon to ensure sustainable groundwater usage, the consequences for the 114,000,000 residents of the region may include a reduction of agricultural output and shortages of potable water, leading to extensive socio-economic stresses.

Groundwater responds more slowly to meteorological conditions than the near-surface components of the terrestrial water cycle[5]. Its residence time (the ratio of quantity in storage to average rate of recharge or discharge) ranges from months in shallow aquifers to a million or more years in deep desert aquifers[6]. Hence, groundwater can be slow to recover from perturbations to its state of dynamic equilibrium. In particular, withdrawals can easily surpass net recharge in arid and semi-arid regions where people depend on fresh groundwater for domestic needs and irrigation[1]. Despite the increasing pressure placed on water resources by population growth and economic development, the laws governing groundwater rights have not changed accordingly, even in developed nations[7]. Nor is groundwater depletion limited to dry climates: pollution and mismanagement of surface waters can cause over-reliance on groundwater in regions where annual rainfall is abundant.

India now suffers severe water shortages in many of its states. It averages about $120\,\mathrm{cm\,yr^{-1}}$ of precipitation, which is more than any other country of comparable size[8], but the rain is unevenly distributed. In New Delhi, India's richest city, most middle-class residents do not have a dependable source of clean water (Sengupta, S., 'In India, water crisis means foul sludge', New York Times, 29 September 2006). The World Bank has warned that India is on the brink of a severe water crisis[9]. Nationally, groundwater accounts for about 50–80% of domestic water use and 45–50% of irrigation[9,10]. Total irrigated area in India nearly tripled to 33,100,000 ha between 1970 and 1999[11]. In neighbouring Pakistan, which is largely arid, groundwater is essential for much of the country's agriculture. Competition for precious water in transboundary aquifers is likely to exacerbate already strained relations between the two nations.

India's government is aware that groundwater is being withdrawn at unsustainable rates in some areas, and in 1986 it established a Central Ground Water Authority with the power to regulate groundwater development[12]. However, as in other nations composed of smaller sovereignties and encompassing competing interests that have become dependent on a certain level of water availability, it is difficult to implement a coordinated and appropriately stringent response. Political and aquifer boundaries bear no resemblance to each other, and aquifers themselves are interconnected, so that one state's (or country's) groundwater management practices are likely to affect its neighbour. Holistic regional groundwater assessments would be valuable in promoting appropriate policies and for hydrologic research, but such assessments are difficult to generate on the basis of well surveys, which are typically unsystematic.

The Gravity Recovery and Climate Experiment (GRACE) satellite mission, launched by NASA and the German Aerospace Centre (DLR) in 2002, measures temporal variations in the gravity field, which can be used to estimate changes in terrestrial water storage (TWS)[3]. Although its spatial resolution (no better than $\sim 160{,}000\,\mathrm{km^2}$) and temporal resolution (ten day to monthly) are low in comparison with those of other Earth-observing satellites, GRACE has the major advantage that it senses water stored at all levels, including groundwater. Unlike radars and radiometers, it is not limited to measurement of atmospheric and near-surface phenomena.

Groundwater storage variations can be isolated from GRACE data given auxiliary information on the other components of TWS, from either *in situ* observations[13] or land-surface models[14]. We used the second approach to produce a time series of groundwater storage anomalies (deviations from the mean state) averaged over the area encompassed by Rajasthan ($342{,}239\,\mathrm{km^2}$), Punjab ($50{,}362\,\mathrm{km^2}$) and Haryana ($45{,}695\,\mathrm{km^2}$ including the National Capital Territory of Delhi) between August 2002 and October 2008. This region was chosen because the Indian Ministry of Water Resources estimates that groundwater withdrawals in each of the three states exceed recharge[2] (Fig. 1). Figure 2 maps the averaging function used to retrieve regional TWS time series from the GRACE data.

Rajasthan, Punjab and Haryana are semi-arid to arid, averaging about 50 cm of annual rainfall overall[15–17], and encompass the eastern part of the Thar Desert. The 114,000,000 residents of the region have

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Unsurprising but important quantifications

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LETTERS

Greenhouse-gas emission targets for limiting global warming to 2 °C

Malte Meinshausen[1], Nicolai Meinshausen[2], William Hare[1,3], Sarah C. B. Raper[4], Katja Frieler[1], Reto Knutti[5], David J. Frame[6,7] & Myles R. Allen[7]

More than 100 countries have adopted a global warming limit of 2 °C or below (relative to pre-industrial levels) as a guiding principle for mitigation efforts to reduce climate change risks, impacts and damages[1,2]. However, the greenhouse gas (GHG) emissions corresponding to a specified maximum warming are poorly known owing to uncertainties in the carbon cycle and the climate response. Here we provide a comprehensive probabilistic analysis aimed at quantifying GHG emission budgets for the 2000–50 period that would limit warming throughout the twenty-first century to below 2 °C, based on a combination of published distributions of climate system properties and observational constraints. We show that, for the chosen class of emission scenarios, both cumulative emissions up to 2050 and emission levels in 2050 are robust indicators of the probability that twenty-first century warming will not exceed 2 °C relative to pre-industrial temperatures. Limiting cumulative CO_2 emissions over 2000–50 to 1,000 Gt CO_2 yields a 25% probability of warming exceeding 2 °C—and a limit of 1,440 Gt CO_2 yields a 50% probability—given a representative estimate of the distribution of climate system properties. As known 2000–06 CO_2 emissions[3] were ~234 Gt CO_2, less than half the proven economically recoverable oil, gas and coal reserves[4-6] can still be emitted up to 2050 to achieve such a goal. Recent G8 Communiqués[7] envisage halved global GHG emissions by 2050, for which we estimate a 12–45% probability of exceeding 2 °C—assuming 1990 as emission base year and a range of published climate sensitivity distributions. Emissions levels in 2020 are a less robust indicator, but for the scenarios considered, the probability of exceeding 2 °C rises to 53–87% if global GHG emissions are still more than 25% above 2000 levels in 2020.

Determining probabilistic climate change for future emission scenarios is challenging, as it requires a synthesis of uncertainties along the cause–effect chain from emissions to temperatures; for example, uncertainties in the carbon cycle[8], radiative forcing and climate responses. Uncertainties in future climate projections can be quantified by constraining climate model parameters to reproduce historical observations of temperature[9], ocean heat uptake[10] and independent estimates of radiative forcing. By focusing on emission budgets (the cumulative emissions to stay below a certain warming level) and their probabilistic implications for the climate, we build on pioneering mitigation studies[11,12]. Previous probabilistic studies—while sometimes based on more complex models—either considered uncertainties only in a few forcing components[13], applied relatively simple likelihood estimators ignoring the correlation structure of the observational errors[14] or constrained only model parameters like climate sensitivity rather than allowed emissions.

Using a reduced complexity coupled carbon cycle–climate model[15,16], we constrain future climate projections, building on the Fourth IPCC Assessment Report (AR4) and more recent research. In particular, multiple uncertainties in the historical temperature observations[9] are treated separately for the first time; new ocean heat uptake estimates are incorporated[10]; a constraint on changes in effective climate sensitivity is introduced; and the most recent radiative forcing uncertainty estimates for individual forcing agents are considered[17].

The data constraints provide us with likelihood estimates for the chosen 82-dimensional space of climate response, gas-cycle and radiative forcing parameters (Supplementary Fig. 3). We chose a Bayesian approach, but also obtain 'frequentist' confidence intervals for climate sensitivity (68% interval, 2.3–4.5 °C; 90%, 2.1–7.1 °C), which is in approximate agreement with the recent AR4 estimates. Given the inherent subjectivity of Bayesian priors, we chose priors for climate sensitivity such that we obtain marginal posteriors identical to 19 published climate sensitivity distributions (Fig. 1a). These distributions are not all independent and not equally likely, and cannot be formally combined[18]. They are used here simply to represent the wide variety of modelling approaches, observational data and likelihood derivations used in previous studies, whose implications for an emission budget have not been analysed before. For illustrative purposes, we chose the climate sensitivity distribution of ref. 19 with a uniform prior in transient climate response (TCR, defined as the global-mean temperature change which occurs at the time of CO_2 doubling for the specific case of a 1% yr^{-1} increase of CO_2) as our default. This distribution closely resembles the AR4 estimate (best estimate, 3 °C; likely range, 2.0–4.5 °C) (Supplementary Information).

Maximal warming under low emission scenarios is more closely related to the TCR than to the climate sensitivity[19]. The distribution of the TCR of our climate model for the illustrative default is slightly lower than derived within another model set-up[19], but within the range of results of previous studies (Fig. 1b), and encompasses the range arising from emulations by coupled atmosphere–ocean general circulation models[16] (AOGCMs) (Fig. 1c).

Representing current knowledge on future carbon-cycle responses is difficult, and might be best encapsulated in the wide range of results from the process-based C4MIP carbon-cycle models[8]. We emulate these C4MIP models individually by calibrating 18 parameters in our carbon-cycle model[16], and combine these settings with the other gas cycles, radiative forcing and climate response parameter uncertainties gained from our historical constraining.

Additional challenges arise in estimating the maximum temperature change resulting from a certain amount of cumulative emissions. The analysis needs to be based on a multitude of emission pathways with realistic multi-gas characteristics[20,21], as well as varying

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Titles are important

Influence of the Pacific Decadel Oscillation on phytoplankton phenology and community structure in the western North Pacific based on satellite observation and the Continuous Plankton Recorder survey for 2001-2009

versus

Influence of the Pacific Decadal Oscillation on phytoplankton phenology and community structure in the western North Pacific

Or maybe even better?

The Pacific Decadal Oscillation impacts phytoplankton phenology and community structure.

What makes a good title?

- Accurate and concise
- Interesting (ok to omit boring details)
- Not too specific (avoid technical terms)
- Not too regional
- Maybe catchy without being too cute

GEOPHYSICAL RESEARCH LETTERS, VOL. 39, L19602, doi:10.1029/2012GL053055, 2012

The 2011 La Niña: So strong, the oceans fell

Carmen Boening,[1] Josh K. Willis,[1] Felix W. Landerer,[1] R. Steven Nerem,[2]
and John Fasullo[3]

Received 20 July 2012; revised 20 August 2012; accepted 29 August 2012; published 4 October 2012.

[1] Global mean sea level (GMSL) dropped by 5 mm between the beginning of 2010 and mid 2011. This drop occurred despite the background rate of rise, 3 mm per year, which dominates most of the 18-year record observed by satellite altimeters. Using a combination of satellite and *in situ* data, we show that the decline in ocean mass, which explains the sea level drop, coincides with an equivalent increase in terrestrial water storage, primarily over Australia, northern South America, and Southeast Asia. This temporary shift of water from the ocean to land is closely related to the transition from El Niño conditions in 2009/10 to a strong 2010/11 La Niña, which affected precipitation patterns world-wide. **Citation:** Boening, C., J. K. Willis, F. W. Landere... So stro... doi:10.1...

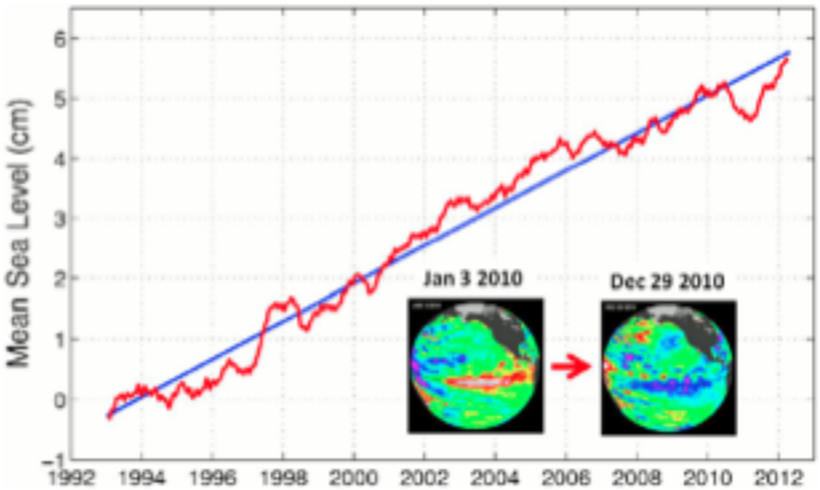
1. In...

[2] C... gauge ... increas... year, w... record ... already ... tial for ... uncerta... modern ... anthrop...

[3] S... have m... of seve... rate of ... deal of ... global ... cant ac... 2010; ... *Rahmstorf*, 2009]. In order to distinguish such longer-term accelerations from natural variations in GMSL, it is necessary to understand the causes of these interannual variations. As natural variations in GMSL can be explained and quantified, satellite altimeter observations will become a key indicator of anthropogenic influence on the global climate.

[4] Recent studies have indicated that interannual fluctuations in GMSL are connected to the tropical El Niño Southern Oscillation (ENSO) [*Nerem et al.*, 2010; *Ngo-Duc et al.*, 2005], which influences ocean surface temperatures in the tropical Pacific as well as evaporation and precipitation patterns globally [*Gu et al.*, 2007]. ENSO is known to constitute the largest year-to-year climate signal on the planet [*McPhaden et al.*, 2006]. Strong El Niño events have the potential to temporarily increase global sea level [*Ngo-Duc et al.*, 2005; *Cazenave et al.*, 2012] whereas in the cold La Niña phase the opposite occurs and sea level may see a ... evolved ... r ocean ... eratures ... ers and ... timetry ... mm in ... l). ... uted to ... Gravity ... ites are ... cean on ... imeters. ... s in the ... with an ... GMSL ... r et al., ... lso pro... eat con... s from ... ystems, ... causes ... he new ... r direct ... ted sea level change, and the relative importance of heat exchange and water mass transport. Previous studies either inferred the relative contributions [*Willis et al.*, 2004] or modeled one of the components [*Llovel et al.*, 2011; *Cazenave et al.*, 2012; *Ngo-Duc et al.*, 2005]. *Llovel et al.* [2011] also discuss the correlation between interannual sea level variations and GRACE derived terrestrial water storage from the 33 largest river basins. In particular, water storage variability in tropical river basins is identified to be strongly related to global ocean mass changes.

[5] In the past, it has been complicated to draw a conclusive, fully observation-based connection between these interannual sea level fluctuations and ENSO due to a) missing or insufficient observations before 2005 and b) significant ENSO events during the time where sufficient data are



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0094-8276/12/2012GL053055

OPTICS

Nanorod shades soak up the rays

An array of nanorods can reflect nearly all light over a precise set of wavelengths, making this a promising material for filters and other optics applications.

MATERIALS

Drawing a sensor on paper

ARCHAEOLOGY

Remains of the moa

EVOLUTION

Humble arthropod beginnings

COMMUNITY CHOICE
The most viewed papers in science

GEOPHYSICS

La Niña made the oceans fall

Ocean levels dropped by five millimetres between March 2010 and May 2011 as La Niña conditions — cooler surface waters in the eastern equatorial Pacific Ocean — contributed to heavier than normal precipitation over land.

Global mean sea level has been rising by roughly 3 millimetres per year over much of the past 18 years. But when Carmen Boening at the Jet Propulsion Laboratory in Pasadena, California, and her colleagues analysed satellite altimeter data, they detected an overall drop in sea level that coincided with the onset of La Niña in 2010. Another set of satellite data confirms a decrease in ocean mass during the same period and suggests a parallel increase in terrestrial water storage, mainly over Australia, the northern part of South America, and southeast Asia.

The 2010–11 La Niña was one of the strongest in eight decades, but sea levels recovered and had increased beyond their pre-La Niña levels by early 2012.

Geophys. Res. Lett. http://dx.doi.org/10.1029/2012GL053055 (2012)

Important things to get right

- Title and abstract
- Figures
  - Present (!)
  - Quality images
  - Informative figure legends
- References
  - because editors look there for reviewers when the ones you suggest have declined

Editor decision

Geophysical Research Letters

grl-submit.agu.org/cgi-bin/main.plex?form_type=display_ed_decision&j_id=279&ms_id=730009&ms_rev_no=0&ms_id_key=9KbjVRTVnFRGFpwv5WUdgg&ndt=AB2N7eZ

Geophysical Research Letters

Home

2012GL053623	Fenfen Liu	Editor Decision Started	The nonlinear mesoscale eddy and its impact on phy...

Editor's Overall Assessment

Associate Editor	Zanna Chase
Date Due	2012-09-22
Manuscript #	2012GL053623
Title	[redacted]
Corresponding Author	[redacted]
Contributing Author	[redacted]

Evaluations - To include any of the following information in the author's decision letter, please check the appropriate check box.

	Role	Science Category	Acknowledge Required	Presentation Category	Grammar	Anonymous	Needs editing for grammar	Highlight	Review a revision	Annotated Manuscript
[redacted]	Reviewer #1	Science Category 3	No	Presentation Category B			No	No	Yes	No
	Reviewer #2	Science Category 3	No	Presentation Category B			No	No	Yes	No
	Associate Editor	Science Category 3		Presentation Category B	No	Yes		No		No

Reviewer Rankings

Name	Role	Ranking	Additional Ranking Notes
[redacted]	Reviewer #1	None	
	Reviewer #2	None	

Jason D. Everett's Comments (Reviewer #1) - 2012-09-16

Note	Comment	Send to Author
Highlight Description		☐
Confidential Remarks to AE and Editor	While some of the oceanography/physics in this article is out of my area of expertise I do feel the article needs much clarification, particularly in the Methods and Results. I would read this article because of my interest in the biology of eddies, but there were concepts which were not readily apparent to me and were not defined. I have highlighted these below in the Formal Review. It made understanding the paper quite difficult (Hopefully this isn't my lack of understanding). In particular I was constantly going back to the methods to look for things which weren't defined. I have selected Science Category 3 as I believe the paper is very regional and the methods in particular need further revision before the paper is publishable. The figures were clear and well presented but the captions were disappointing and need further info to explain exactly what they show (Fig 3 for example).	

Editor decision

I find this a very important and enlightening paper dealing with ... It is of fundamental international concern … The manuscript is very well written and revealing... My recommendation is to accept it for publication, pending some minor clarifications.

versus

I do not consider the authors present robust evidence and analyses to support their conclusions. In addition, I found several major flaws. For both these reasons, I think this paper should be rejected for publication. I also note that there are 10 authors listed for this paper and find it surprising that none have picked up on what, to me, are fairly obvious errors and inconsistencies.

What happens after reviews are in?

- Accept as is
  - Never happens
- ‘Minor revision’
  - 2 week turnaround (GRL), usually doesn’t go back to reviewers, response document is crucial
- ‘Major revision’
  - aka reject and encourage resubmit: Authors get 6 months, usually goes back to at least one reviewer
- Reject (~15 to 30% of papers)

Dealing with rejection

- It’s ok to challenge the editor’s decision
  - Consult with co-authors
  - Were the reviewers off-base?
  - Was the decision inconsistent with the reviews or the ranking system, or both?
  - Be civil
- It happens to everyone
- ‘If you never have a paper rejected, you’re not aiming high enough’

The response to reviewers document

Make it as easy as possible for the editor

- We want happy editors
- May mean that it doesn't go back out
- May speed the process

Tread a fine line with the reviewers: Pick your battles and don't be too sycophantic

The response to reviewers document:
Don't just say you've fixed it, show how

One other major flaw of the paper is the total lack of question and/or hypothesis to justify the work done. As a result, I have not learned much by reading this paper. I see no major (and solid) result there that actually improves our understanding of phytoplankton blooms or marine ecosystem interactions.

The introduction, results and discussion have all been reworked to emphasize the three main themes of the manuscript: (1) examine the relationships between mixed layer variability and bloom dynamics (2) determine whether bio-optical data can be used to describe changes in the phytoplankton community over the course of the bloom, and (3) compare the in situ data to their satellite equivalents. The significance of these goals is described in the introduction thus: '<u>Goal (1) is important because of the region's status as a globally significant carbon sink that has received relatively little attention in terms of focused process studies. It addresses interannual variability and factors limiting the bloom at its peak. Goal (2) is relevant to nascent ocean observing systems, because it provides an example of interpreting bio-optical data in the context of phytoplankton community composition. Goal (3) quantifies the accuracy of satellite measurements for high latitude systems.'</u>

Journal choice

- Timeliness (especially for ECRs)
- Impact factor
- Where similar work has been published
  - Probably less relevant now given how papers are discovered

- A searchable title is probably becoming more important than the journal?

Timeliness:
Average time to accept (old data)

Journal	2010	2011	2012	2013 Q1-Q3
GBC	225	338	321	299
GC	113	112	114	115
GRL	45	42	43	43
JGR-A (Space Physics)	123	128	132	143
JGE-B (Solid Earth)	198	171	163	177
JGR-C (Oceans)	188	174	178	167
JGR-D (Atmospheres)	163	144	153	165
JGR-E (Planets)	152	161	152	161
JGR-F (Earth Surface)	227	224	226	240
JGR-G (Biogeosciences)	207	186	178	190
JAMES			70	166
Paleo	233	205	157	206
RoG			188	216
RS	197	165	167	179
SW				56
Tec	218	200	201	202
WRR	231	240	240	272

Authorship: Who qualifies?

Attribution of authorship depends to some extent on the discipline, but must be based on substantial contributions in a combination of:

- conception and design of the project
- analysis and interpretation of data
- drafting significant parts of the work or critically revising it so as to contribute to the interpretation.

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/r39.pdf

Authorship: Who qualifies?

- Agree on authorship early and revisit as appropriate
- Offer authorship to all those who meet the criteria above
- Do not allow unacceptable inclusions of authorship: positions of authority, personal friendship, technical but not intellectual input to the project or publication, acquisition of funding or general supervision of the research team, providing data that has already been published but no other intellectual input.
- Acknowledge other contributions fairly

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/r39.pdf

Authorship: Who qualifies?

https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/r39.pdf

http://www.utas.edu.au/__data/assets/pdf_file/0004/411961/Authorship-of-Research-Policy-December-2017.pdf

https://www.nature.com/naturejobs/science/articles/10.1038/nj7417-591a

Box 1: Aggravation-free authorship

When many scientists work together, determining authorship isn't always easy. Here are some tips for settling the line-up.

- Make sure that you choose collaborators with whom you can work well.
- Discuss authorship early, and keep doing so often as a project evolves. Put it in writing.
- When there are disputes, first try to talk it out amicably and understand the other person's point of view. For example, try to work out how the idea first came about.
- If you must approach your supervisor about an authorship decision that you don't like, keep the tone inquisitive, not accusatory. Explain that you want to understand how authorship was decided.
- If a contributor's authorship is in question, it can help to consider what the paper would have looked like without their efforts, and whether someone else could have made the same contribution.
- Familiarize yourself with your institution's or journal's authorship guidelines, or those of the International Committee of Medical Journal Editors. Use them to back up your case.
- Be prepared to compromise or share credit.
- If you can't agree among yourselves, engage a supervisor, trusted colleagues or an ombudsman to investigate the matter and make a recommendation. **A.D.**

https://www.nature.com/naturejobs/science/articles/10.1038/nj7417-591a

Summary

- Take care of details: Title, cover letter, suggested reviewers (inc. reference list)
- Consider choice of journal: Impact, readership, speed of review process.
- Be a good citizen (conscientious reviewer)
- Use departmental resources for publicity
- Be able to succinctly explain your work
  - 3 main points