



European Geosciences Union



Open Access Publications of the European Geosciences Union (EGU) with examples from Climate of the Past

Facts, Innovative Approaches, Dissemination

Denis-Didier Rousseau

(denis.rousseau@lmd.ens.fr)

January 2014/Montpellier Geosciences



10 Years Interactive Open Access Publishing

[more...]



2001-2011



The European Geosciences Union

- Merger of the European Geophysical Society (EGS) and the European Union of Geosciences (EUG), founded in 2002
- Dynamic, innovative, and interdisciplinary learned association
- Devoted to the promotion of the sciences of the Earth and its environment and of planetary and space sciences

Facts

- 11,167 Participants from 95 countries in its 2013 General Assembly (largest European Geosciences conference, 2nd in the world)
- 5,550 Paid-up Members (2011), and +11,000 (stand 20.10.2011) EGU members including complementary memberships
- 22 Divisions
- 15 Open Access Journals + 1 to be launched in 2014

Signatory of the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities 2003



The "Mainz All-In-One Model" for OA Publishing in Sciences



Arne Richter, EGU Executive Secretary
2002-2009
Copernicus Managing Director 1988-2007

we developed our own internet-based software for the meeting and for the editorial support offices, respectively. By 2000 we were also able to typeset, to layout and to print our own journals in different styles and manners.

At the end of the 1990s three major concepts were discussed regarding the advancements in the publication of our scientific journals:

1. While all publications were still in the classical style and on paper, we experienced to extend our software to include a publication of all articles also directly on the internet – even in an easy-to-read, one-column, landscape format – to be downloaded directly on the PC. And right from the beginning it was ar-

gued that the internet must be free of charge for reading and downloading of manuscripts.

2. In parallel it was suggested that the classical way of publishing final articles hard and fast should be replaced by an open forum of outright discussions in which everyone should be able to take part.
3. Finally, it was proposed that the classical blind and anonymous way of review – occasionally even by the same pre-selected yet anonymous referees – should be replaced by an open and eponymous review procedure, even by including the public.

In 2000 several meetings took place at the Max Planck Institute for Chemistry in Mainz, Germany, by invitation of Paul Crutzen and Ulrich Pöschl together with

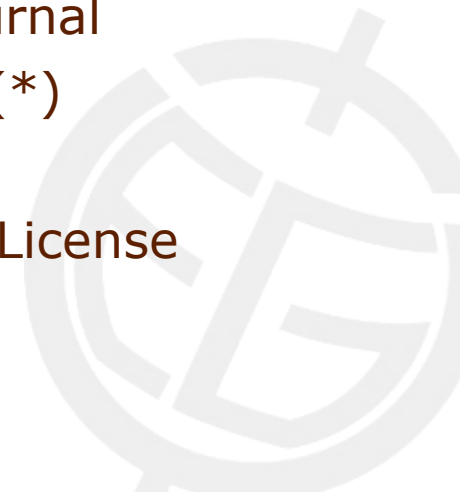


Mission Statement for Publications

"Dedicated to the pursuit of excellence and free and universal accessibility of scientific publications in all areas of geosciences and planetary and solar system sciences for the benefit of the scientists worldwide."

Publication Strategy

- Rigorous Peer-Review – at least 2 independent referees
- Immediate Open Access to all articles of all journals
- Page charge waiver for the first 3 years of a journal
- Moderate page charges for authors afterwards (*)
- No extra charges for color illustrations etc.
- Author copyright under the Creative Commons License





Publication Facts

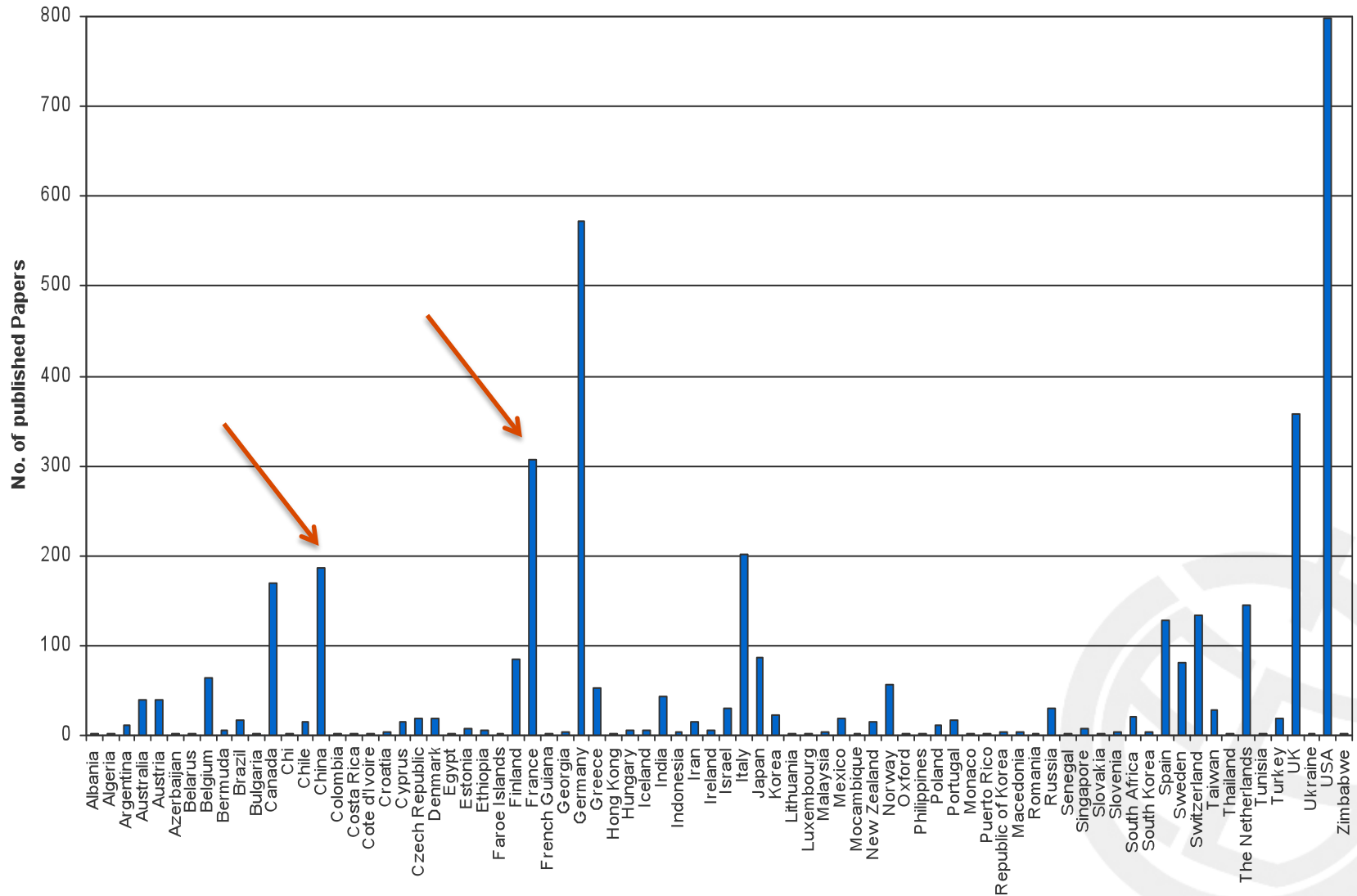
- 136,899 Published pages in 2012 (95,886 in 2010)
- 5,316 Published papers in 2012 (3,085 in 2010)
- 15458 Authors from 113 countries in 2012 (76 in 2010)
- 752 Editors in 2013

All journals are published by Copernicus Publications, a member of the not-for-profit organization Copernicus Gesellschaft, on behalf of the European Geosciences Union



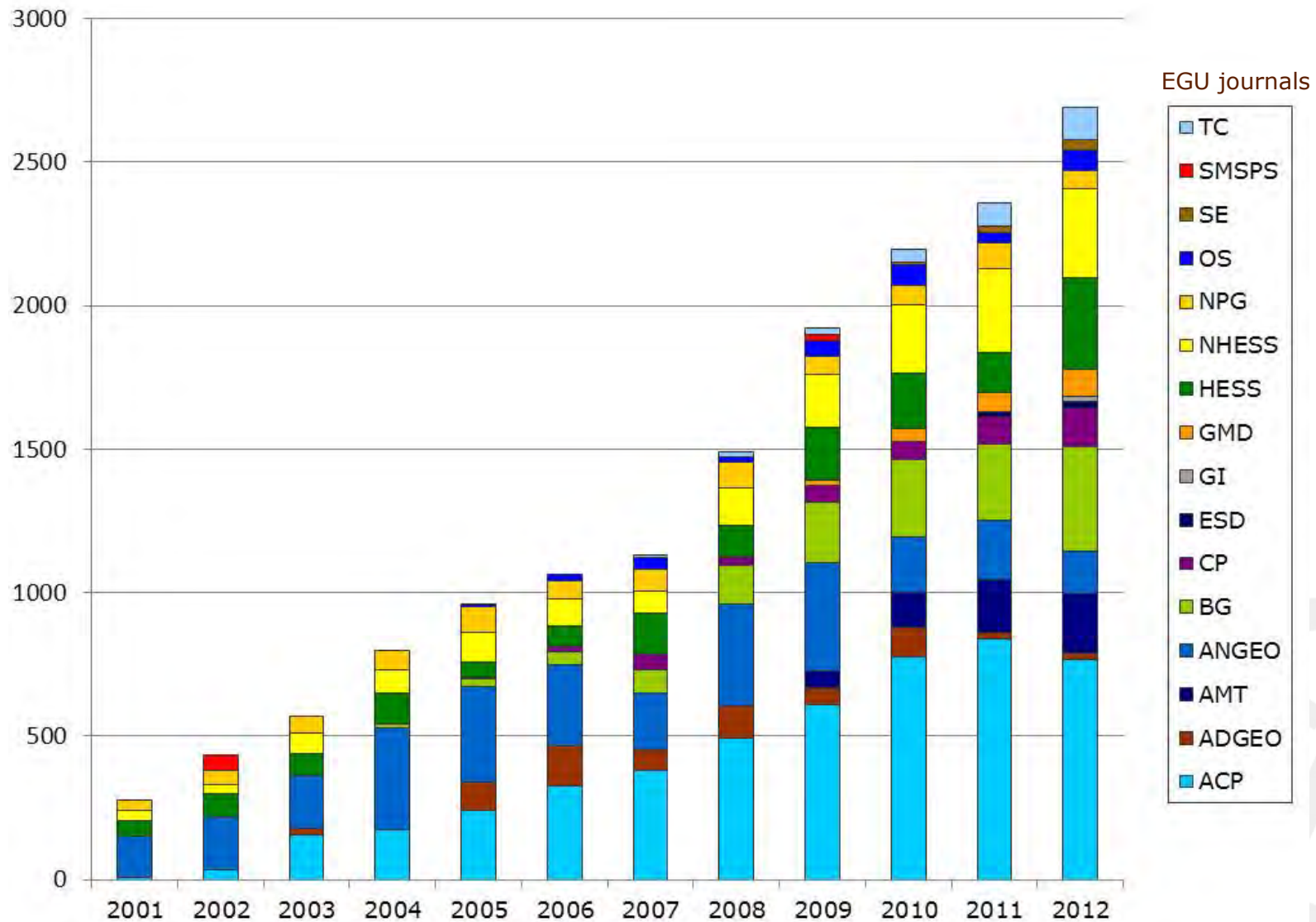


Publication Facts: published papers in 2012





Publication Facts: published papers 2001-2012





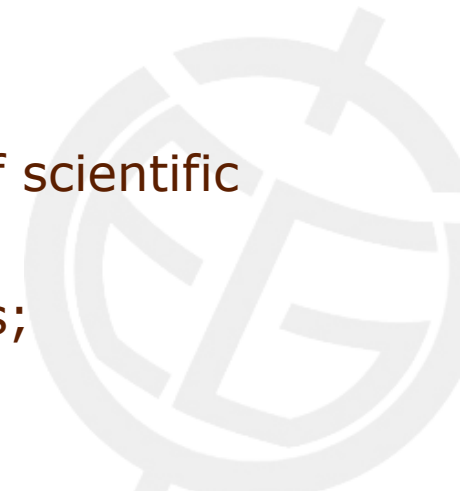
Innovative Approaches

Public Peer-Review & Interactive Public Discussion

- Rapid access peer-review → publication as discussion paper
- Interactive public discussion: published referee comments, author comments & comments of the scientific community
- Paper revision & final acceptance → publication as final revised paper

Designed to

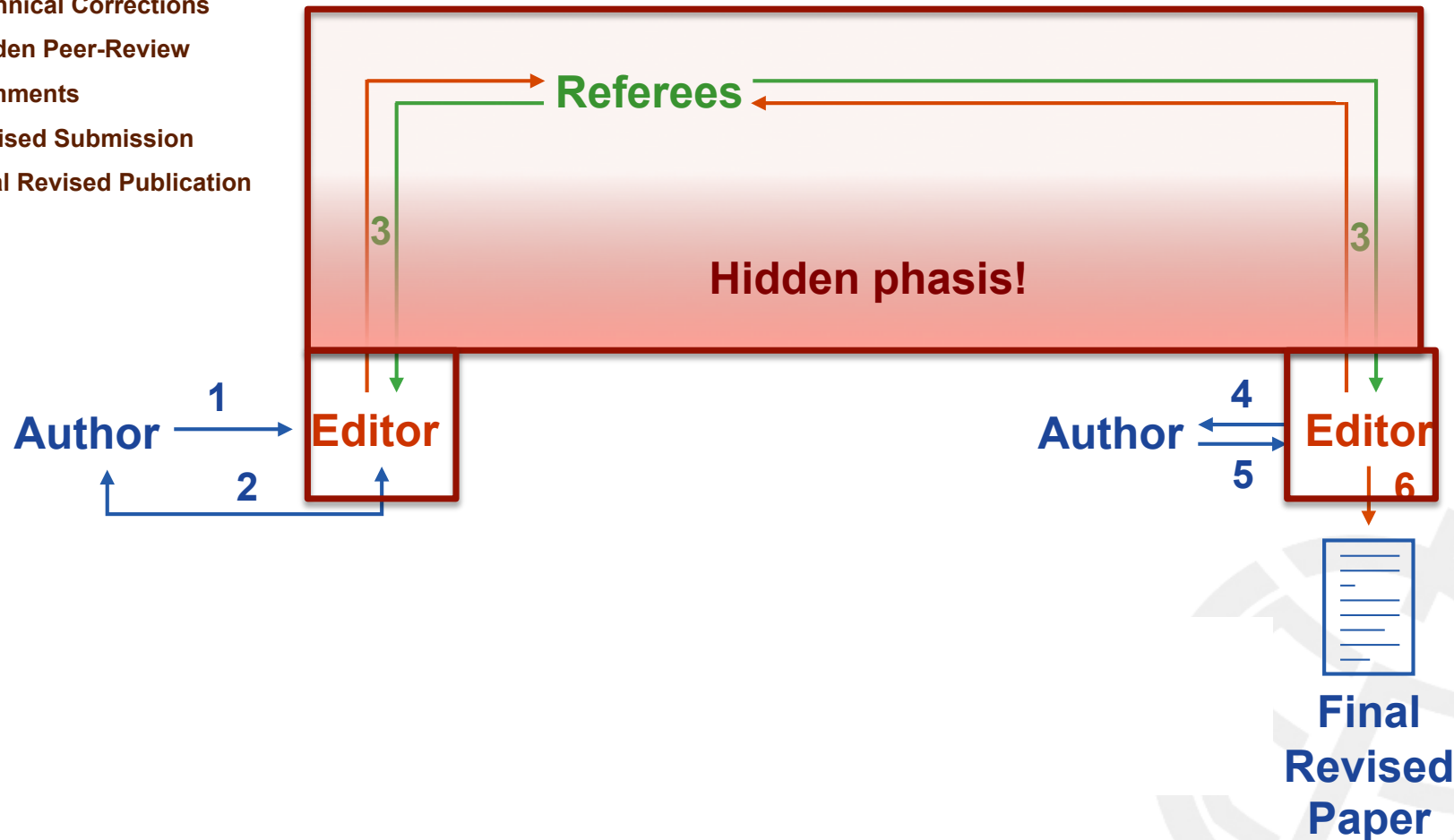
- foster scientific discussion;
- maximize the effectiveness and transparency of scientific quality assurance;
- enable rapid publication of new scientific results;
- make scientific publications freely accessible.





Classical Peer-Review Process

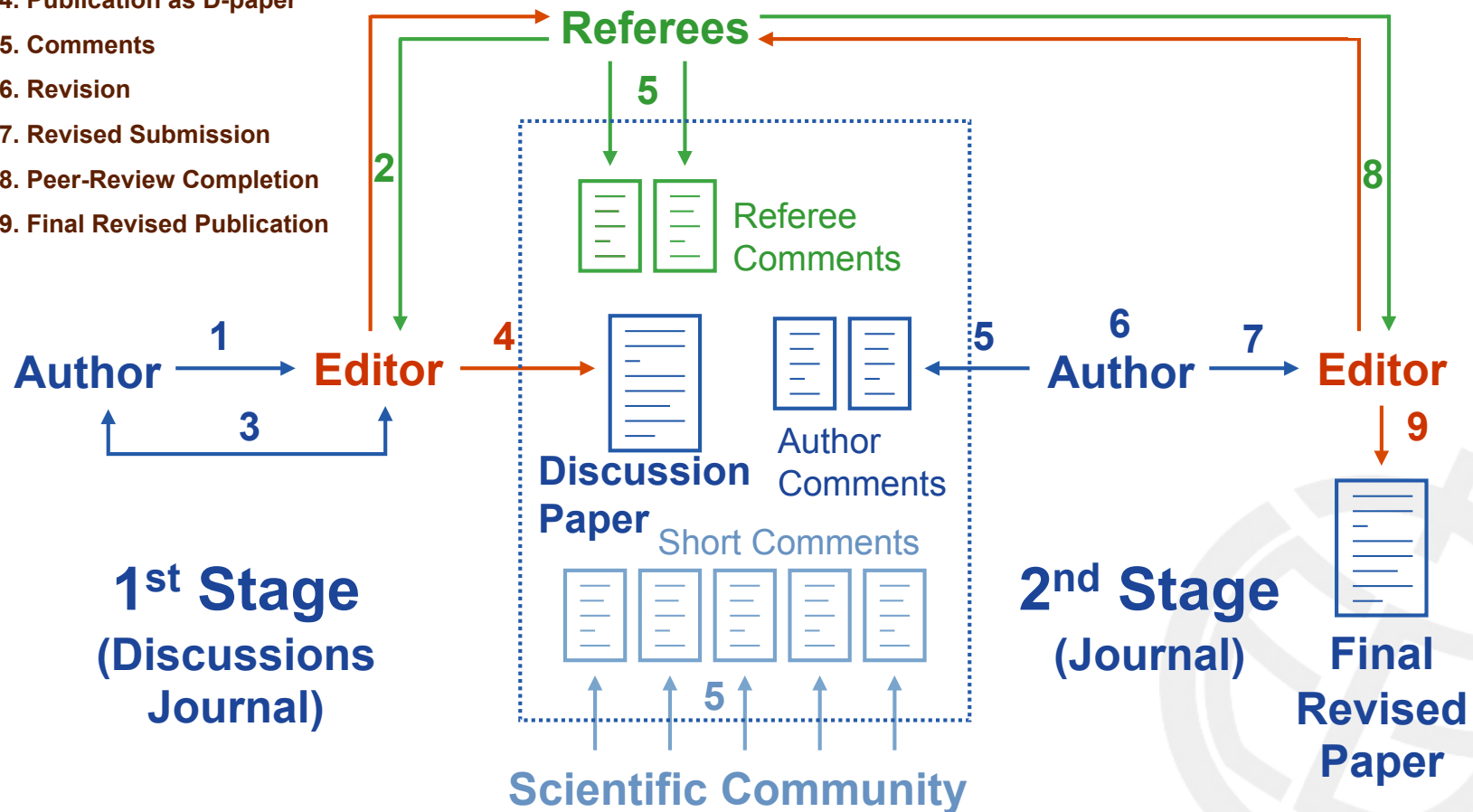
1. Submission
2. Technical Corrections
3. Hidden Peer-Review
4. Comments
5. Revised Submission
6. Final Revised Publication





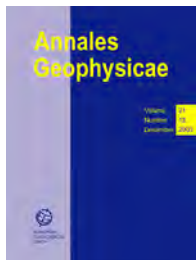
Public Peer-Review & Interactive Public Discussion

1. Submission
2. Access Peer-Review
3. Technical Corrections
4. Publication as D-paper
5. Comments
6. Revision
7. Revised Submission
8. Peer-Review Completion
9. Final Revised Publication





Journals & Subject Areas (IF 2012)



Annales Geophysicae

Sun-Earth system, including the science of Space Weather, the Solar-Terrestrial plasma physics, and the Earth's atmosphere and oceans.

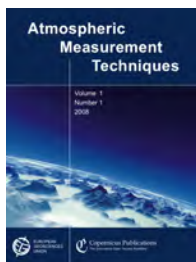
ISI Impact Factor 1.518



Atmospheric Chemistry & Physics (incl. D-journal)

Earth's atmosphere and the underlying chemical and physical processes.

ISI Impact Factor 5.510



Atmospheric Measurement Techniques (AMT)(incl. D-journal)

All aspects of advances in remote sensing, in-situ and laboratory measurement techniques for the constituents and properties of the Earth's atmosphere. **ISI Impact Factor 3.305**



Biogeosciences (incl. D-journal)

Interactions between the biological, chemical and physical processes in terrestrial or extraterrestrial life with the geosphere, hydrosphere and atmosphere. **ISI Impact Factor 3.754**



Journals & Subject Areas



Climate of the Past (incl. D-journal)

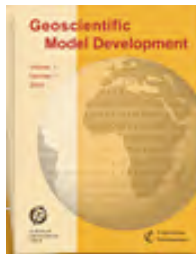
The climate history covering both observational and modelling studies of all periods of Earth history up to and including the instrumental period.

ISI Impact Factor 3.556



Earth System Dynamics (incl. D-journal)

Publication and public discussion of studies that take an interdisciplinary perspective of the functioning of the whole Earth system and global change.



Geoscientific Model Development (GMD)(incl. D-journal)

All description, development and benchmarking of numerical models of the Earth System and its components.

ISI Impact Factor 5.030

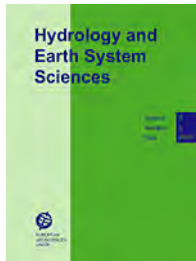


Geoscientific Instrumentation, Methods and Data Systems (GI) (incl. D-journal)

For swift publication of original articles and short communications in the area of geoscientific instruments.



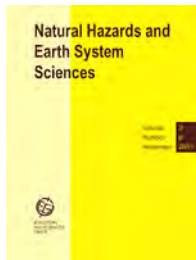
Journals & Subject Areas



Hydrology and Earth System Sciences (incl. D-journal)

Hydrology, placed within a holistic Earth System Science context.

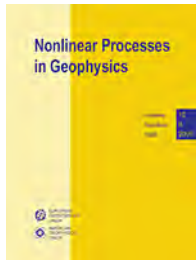
ISI Impact Factor 3.587



Natural Hazards and Earth System Sciences

Interdisciplinary journal for the publication of original research concerning natural hazards.

ISI Impact Factor 1.751



Nonlinear Processes in Geophysics (to become interactive journal with D-journal phase in 2014)

Research furthering knowledge on nonlinear processes in all branches of Earth, planetary and solar system sciences.

ISI Impact Factor 1.409



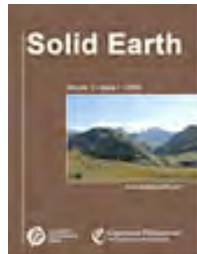
Ocean Science (incl. D-journal)

All aspects of ocean science, experimental, theoretical and laboratory.

ISI Impact Factor 2.164



Journals & Subject Areas



Solid Earth(incl. D-journal)

Multidisciplinary research on the composition, structure and dynamics of the Earth from the surface to the deep interior at all spatial and temporal scales.

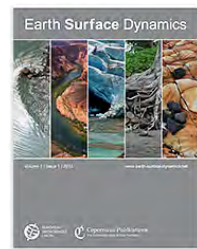
ISI Impact Factor 1.371



The Cryosphere (TC)(incl. D-journal)

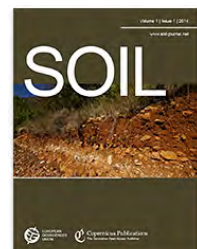
All aspects of frozen water and ground on Earth and on other planetary bodies.

ISI Impact Factor 3.770



Earth Surface Dynamics (incl. D-journal)

International scientific journal dedicated to the publication and discussion of high quality research on the physical, chemical and biological processes shaping Earth's surface and their interactions on all scales. *Launched in May 2013*



SOIL (incl. D-journal)

SOIL is an international scientific journal dedicated to the publication and discussion of high-quality research in the field of soil system sciences. *To be launched in May 2014*



Journals & Subject Areas

Proceedings Journal



Advances in Geosciences

Interdisciplinary journal for fast publication of collections of short, but self-contained communications in the Earth, planetary and solar system sciences.



Stephan Mueller Special Publication series

International, interdisciplinary journal for fast publication of collections of short, but self-contained communications in the Earth, planetary and solar system sciences, published in separate volumes online with the option of a publication on paper (print-on-demand).

EGU policy is to have at least every of its divisions developing a dedicated on-line and open access journal. So more journals to come, considering the number and the fields of EGU scientific divisions.



Dissemination & Archiving of the Journals

Copernicus Publications and the EGU feel responsible to

- enable a wide dissemination of the articles through scientific databases, libraries or search engines;
- enable an availability of the articles in the future independent from their own sources but in cooperation with strong partners (MPS, ~~INSU-CNRS~~, Helmholtz Association, Göttingen State and University Library).

Therefore, the EGU journals are at least indexed but also long-term archived in the following categories:

- ISI – Thomson Scientific
- Copyright Libraries
- e-Archives
- Searchable Databases
- Scientific Online Search Engines





ISI – Thomson Scientific

- Science Citation Index Expanded (Web of Science)
- Current Contents / Physical, Chemical & Earth Sciences
- Current Contents / Agriculture, Biology & Environmental Sciences

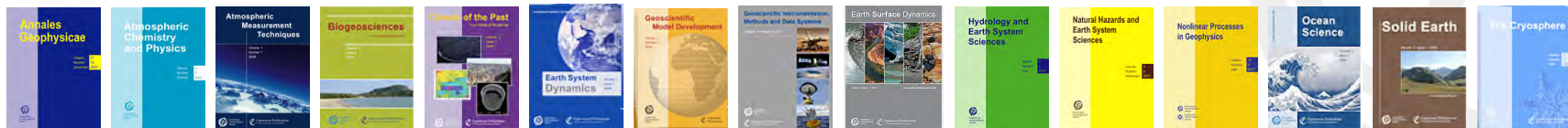
Supply: Digital (since September 2006)

Online Information:

- Bibliographic data (article level)
- Abstract
- References (forwards and backwards)

THOMSON

WELCOME to
THOMSON SCIENTIFIC





Copyright Libraries

- Bodleian Library (UK)
- Deutsche Nationalbibliothek (German National Library)
- Library of Congress (USA)
- Niedersächsische Landesbibliothek (Library of the state of Lower Saxony in Germany)

Supply: Analog

Online Information:

- Bibliographic data

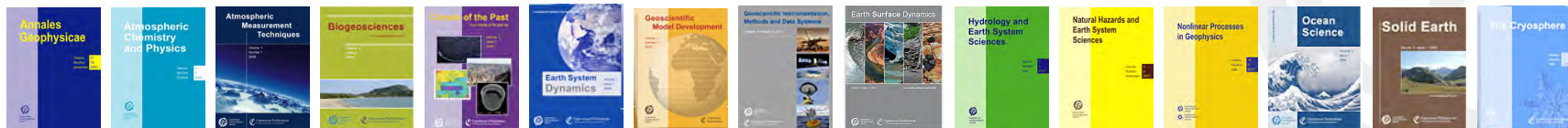


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UNIVERSITY OF OXFORD

Die Deutsche Bibliothek



The LIBRARY of CONGRESS





e-Archives

- Die Deutsche Digitale Bibliothek (German Digital Library)
 - J-Gate
 - Portico
 - **CLOCKSS**
 - HAL (**HAL-INSU*) ?
- Supply:** Digital



PORTICO



Online Information:

- Bibliographic data (article level)
- Abstract
- Full text PDF on their own server



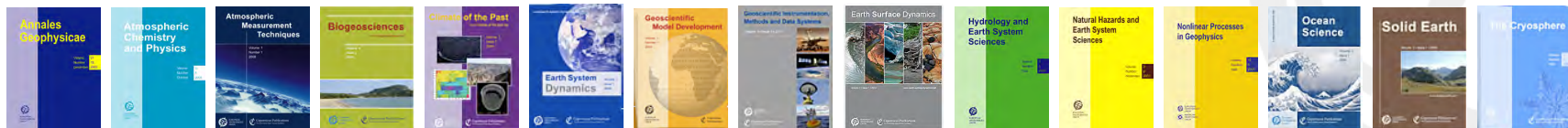
DEPOSIT.DDB.DE





Searchable Databases

- ADS – NASA Astrophysics Data System
- CAS – Chemical Abstract Service → CA⁺, SciFinder, STN
- CSA – Cambridge Scientific Abstracts → Aquatic Science and Fisheries Abstracts (ASFA)
- DOAJ – Directory of Open Access Journals
- GeoArchive – EarthScienceWise
- GeoBase – Elsevier
- GeoRef – American Geological Institute (AGI)
- Scopus – Elsevier
- J-Gate – Inform India





New in 2013: article metrics



Article-level metrics

Article-level metrics (ALMs) aim to quantify the usage (downloads, views), impact (citations), saves (bookmarks), and discussion (social media) of scholarly work at the article level. ALMs comprise a set of easy-to-understand real-time impact indicators that track how an article is read, discussed, or citedⁱ. The usage is collected from individual accesses to the Copernicus library servers (robot traffic is filtered), the impact is counted from CrossRef and Google Scholar citations, the saves are counted from CiteULike and Mendeley, and the discussions are represented by Research Blogging, Facebook, ScienceSeeker, Nature Blogs, Wikipedia, Wordpress.com, Reddit, and Google Blogs.

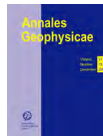
In comparison to the traditional way of measuring impact at the journal level, ALMs offer a more informative way of assessing the overall influence and reach of the articles themselvesⁱⁱ.

Article-level metrics are available for all articles of journals published by Copernicus Publications. Authors can stay up to date with their published articles and share the information about the impact of their published work with peers, funding institutions, research bodies, and the overall scientific communityⁱⁱⁱ.

Thus, ALMs have value for authors, readers, libraries, institutions, and funders^{iv, v, vi}:

- Authors can track their research, discover new research in their field, and find influential collaborators;
- Readers have the tools to browse and navigate the journal site;
- Libraries have the information they need to serve authors and readers;
- Institutions have effective tools to evaluate researchers with regard to hiring, tenure appointment, and promotion;
- Funders can use ALMs to gain a comprehensive overview of a researcher's influence.

For more detailed information about ALMs please see <http://www.sparc.arl.org/resource/sparc-article-level-metrics-primer>.



- <http://article-level-metrics.plos.org/researchers>
- <http://article-level-metrics.plos.org/alm-info>
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- <http://article-level-metrics.plos.org/funders>





Co-Editors-in-Chief

- Carlo Barbante
- Thorsten Kiefer
- Marie-France Loutre
- Denis-Didier Rousseau

cp-co-editors-in-chief@mailinglists.copernicus.org

Additional Information

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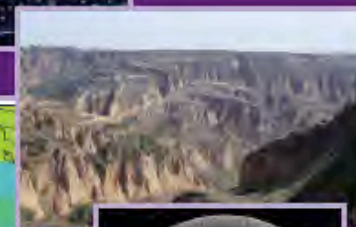
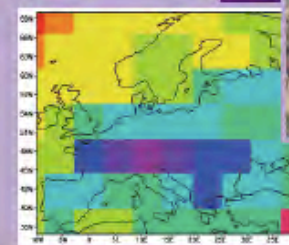
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Aims and Scope

Climate of the Past (CP) is an international scientific journal dedicated to the publication and discussion of research articles, short communications and review papers on the climate history of the Earth.

The main subject areas are:

- ❖ reconstructions of past climate based on instrumental and historical data as well as proxy data from marine and terrestrial (including ice) archives;
- ❖ development and validation of new proxies, improvements of the precision and accuracy of proxy data;
- ❖ theoretical and empirical studies of processes in and feedback mechanisms between all climate system components in relation to past climate change on all space and time scales;
- ❖ simulation of past climate and model-based interpretation of palaeo climate data for a better understanding of present and future climate variability and climate change.



CP Submission



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An Interactive Open Access Journal of the European Geosciences Union
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Before the actual submission of a manuscript to the Editorial Support for peer-review, you are kindly requested:

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- to register the manuscript in order to receive a link for uploading the manuscript files into the Copernicus Office Editor. The registration also defines the manuscript subject areas and index terms as the basis for the [editor assignment](#).

CP Manuscript Registration

Dear Dr. Rousseau,

Please click [here](#) for your personal access to the Copernicus Office.

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After the manuscript registration, you are kindly asked to upload those files which are necessary for the peer-review process. These are at least:

- The abstract (title, authors, affiliations, abstract text, [sample](#)) as *.pdf file;

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- New Tax Regulation for Service Charges
- Two Editors of Climate of the Past among EGU 2009 medalists
- Publications by EGU Medalists
- Online textbook in climatology available
- TWO editors of Climate of the Past funded by ERC

Recent Papers

07 | CP, 18 Feb 2010:
Corrigendum to "Climate reconstruction from pollen and $\delta^{13}C$ records using inverse vegetation modeling - Implication for past and future climates" published in Clim. Past, 5, 147-156, 2009

08 | CP, 17 Feb 2010:
Potential analysis reveals changing number of climate states during the last 60 kyr



Manuscript registration



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Manuscript Registration

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Short Title:

Companion Paper(s):

Authors*:

	Initials	Last Name
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2.		
3.		
4.		
5.		

[more](#)

Is the first Author affiliated with one of the following institutions?*

The listed institutions signed agreements with Copernicus Publications about publication charge payments (see [Financial Support for Authors](#)).

~~CNRS/INSU~~

Affiliation*:

Contact Author: Dr. Denis-Didier Rousseau, denis.rousseau@lmd.ens.fr,

Second Contact Author:

First Name:

Last Name:

Email:

Always send a copy of any email to the Second Contact Author:



Manuscript Overview by editor in chief



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My Editor Overview

Sort by: Manuscript Number

cp-2009-2 Submitted on 09 Jan 2009
Mid-Tertiary palaeoenvironments in Thailand: pollen evidences
 P. Sepulchre, D. Jolly, S. Ducrocq, Y. Chaimanee, and J.-J. Jaeger
Special Issue: Data/model interactions: the biological perspective of understanding past global changes
Status: Peer-Review Interrupted (CP Discussions)
[\[MS Records\]](#)

cp-2009-9 Submitted on 27 Jan 2009
Simulated effect of a seasonal precipitation change on the vegetation in tropical Africa
 C. Cassinat, E.S. Gritti, O. Flores, R. Bonnefille, F. Chalié, J. Guiot, and D. Jolly
Special Issue: Data/model interactions: the biological perspective of understanding past global changes
Status: Editor Final Decision (CP) Iteration: Minor Revision
[\[MS Records\]](#) [\[Decision\]](#) [\[Interactive Discussion\]](#)

cp-2009-52 Submitted on 26 Aug 2009
The reconstruction of paleo wind directions for the Eifel region (Central Europe) during the period 40.3 - 12.9 ka BP
 S. Dietrich and K. Seeles
Status: Editor Decision (CP) Iteration: Revised Submission
[\[MS Records\]](#) [\[Decision\]](#) [\[Interactive Discussion\]](#)

My Editor-in-Chief Overview

My Special Issue Overview



Call for editor



de Natascha Töpfer

répondre transférer archiver indésirable supprimer

sujet **cp-2011-152 - Editor Call 6** 25/12/11 13:10

pour Denis-Didier Rousseau autres actions

Original destination: denis.rousseau@lmd.ens.fr
Original message:
Dear Dr. Rousseau,

We are pleased to inform you about a new submission for publication in *Climate of the Past* (CP). Your support would be very much appreciated and we kindly ask you to act as the Editor for the following manuscript:

Title: Tropical Pacific spatial trend patterns in observed sea level: internal variability and/or anthropogenic signature ?
Author(s): B. Meyssignac, D. Salas y Melia, M. Becker, W. Llovel, and A. Cazenave
MS No.: cp-2011-152
MS Type: Research Article
Iteration: Initial Submission

Further information including the abstract of the manuscript and the form for your reply are available at:
http://editor.copernicus.org/CP/editor_call/cp-2011-152

To log in, please use your Copernicus Office User ID: XXXX

In any case, we would be grateful for your decision until 27 Dec 2011. Please note that the Editor call is organized on a "First Come - First Served" basis.

Detailed information on the review process can be found at: http://www.climate-of-the-past.net/review/review_process_and_interactive_public_discussion.html

Thank you very much in advance for your cooperation! In case any questions arise, please contact me!

Kind regards,

Natascha Töpfer
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Editorial Support
editorial@copernicus.org

on behalf of the CP Editorial Board





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CPD - Papers in Open Discussion

Discrepancies of surface temperature trends in the CMIP5 simulations and observations on the global and regional scales 01 Nov 2013

L. Zhao, J. Xu, and A. M. Powell Jr.
 Clim. Past Discuss., 9, 6161-6178, 2013

Abstract Discussion Paper (PDF, 2000 KB) Supplement (718 KB)
 Interactive Discussion (Open, 0 Comments) **Manuscript under review for CP**

Late Glacial-Holocene climatic transition record at the Argentinian Andean piedmont between 33–34° S 31 Oct 2013

A. E. Mehl and M. A. Zárate
 Clim. Past Discuss., 9, 6125-6160, 2013

Abstract Discussion Paper (PDF, 8466 KB) Interactive Discussion (Open, 0 Comments)
Manuscript under review for CP Special Issue

A probabilistic model of chronological errors in layer-counted climate proxies: applications to annually-banded coral archives 31 Oct 2013

M. Comboul, J. Emile-Geay, M. N. Evans, N. Mirnateghi, K. M. Cobb, and D. M. Thompson
 Clim. Past Discuss., 9, 6077-6123, 2013

Abstract Discussion Paper (PDF, 2006 KB) Interactive Discussion (Open, 0 Comments)
Manuscript under review for CP

What controls the isotopic composition of Greenland surface snow? 29 Oct 2013

H. C. Steen-Larsen, V. Masson-Delmotte, M. Hirabayashi, R. Winkler, K. Satow, F. Prié, N. Bayou, E. Brun, K. M. Cuffey, D. Dahl-Jensen, M. Dumont, M. Guillevic, J. Kipfstuhl, A. Landais, T. Popp, C. Risi, K. Steffen, B. Stenni, and A. Sveinbjörnsdóttir
 Clim. Past Discuss., 9, 6035-6076, 2013

Abstract Discussion Paper (PDF, 1824 KB) Supplement (365 KB)
 Interactive Discussion (Open, 0 Comments) **Manuscript under review for CP**

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Announcements

- Article-level metrics available
- Valérie Masson-Delmotte received 2013 Irene Joliot-Curie Prize for Scientific Woman of the Year
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- New Data Policy
- In Memory: Prof. Nanne Weber
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- Publications by EGU Medalists

Recent Papers

A probabilistic model of chronological errors in layer-counted climate proxies: applications to annually-banded coral archives

04 | CPD, 31 Oct 2013:
Late Glacial-Holocene climatic transition record at the

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5-year IF 4.231

SNIP 1.061

SJR 1.924

CPD - Special Issues

Year	Special Issues
2013	<ul style="list-style-type: none"> ▣ "The Past: A Compass for Future Earth - PAGES Young Scientists Meeting 2013" Eds. G. Chen, A.-L. Daniou, M. E. de Porras, A. Elmore, K. Mills, R. Saraswat, S. Phipps, A. Reyes, and T. Kiefer ▣ "Western Pacific paleoceanography - an ocean history perspective on climate variability at orbital to centennial scales" Eds. L. Beaufort, M.-T. Chen, M. Mohtadi, and M. Yamamoto ▣ "The changing Arctic and Subarctic environment: proxy- and model-based reconstructions of Holocene climate variability in the northern North Atlantic" Eds. J. Giraudeau, H. Renssen, J. Knies, and D.-D. Rousseau
2012	<ul style="list-style-type: none"> ▣ "International Partnerships in Ice Core Sciences (IPICS): 2012 First Open Science Conference (CPD/TCD Inter-Journal SI)" Eds. M. Albert, C. Barbante, J. Chappellaz, R. Greve, E. Isaksson, K. Kawamura, A. N. LeGrande, M. Van den Broeke, G. Winckler, and E. Wolff ▣ "Past environmental and climatic stress during modern human's dispersal" Eds. F. Viehberg, F. Schäbitz, K. Reicherter, J. M. Le Tensorer, and D.-D. Rousseau ▣ "Progress in paleoclimate modelling" Eds. M. Kageyama, C. Brierley, M. Crucifix, J. C. Hargreaves, A. Paul, and G. Ramstein ▣ "Holocene changes in environment and climate in the central Mediterranean as reflected by lake and marine records" Eds. M. Magny, N. Combourieu Nebout, D.-D. Rousseau, and M.-F. Loure ▣ "Initial results from lake El'gygytgyn, western Beringia: first time-continuous Pliocene-Pleistocene terrestrial record from the Arctic" Eds. J. Brigham-Grette, M. Melles, P. Minyuk, B. Wagner, T. Cook, and D.-D. Rousseau ▣ "Integrated analysis of interglacial climate dynamics" Eds. M. Schulz, A. Paul, H. Fischer, U. Herzschuh, and H. Goosse ▣ "Advances in understanding and applying speleothem climate proxies" Eds. A. Mangini, C. Spötl, S. Frisia, G. Lohmann, E. Wolff, and D. Fleitmann
2011	<ul style="list-style-type: none"> ▣ "AICC2012: a new ice core chronology"



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IF 2,021

5-Year IF 4,239

SNIP 0,24 (App)

CPD - Papers in Open Discussion

<p>Northern Hemisphere temperature patterns in the last 12 centuries F. C. Ljungqvist, P. J. Krusic, G. Brattström, and H. S. Sundqvist Clim. Past Discuss., 7, 3349-3397, 2011</p> <p>Abstract Discussion Paper (PDF, 5092 KB) Supplement (21426 KB) Interactive Discussion (Open, 1 Comment) Manuscript under review for CP</p> <p>Impact of postglacial warming on borehole reconstructions of last millennium temperatures V. Rath, J. F. González Rouco, and H. Goosse Clim. Past Discuss., 7, 3325-3347, 2011</p> <p>Abstract Discussion Paper (PDF, 676 KB) Interactive Discussion (Open, 0 Comments) Manuscript under review for CP</p> <p>Enrichment in ¹³C of atmospheric CH₄ during the Younger Dryas termination J. R. Melton, H. Schaefer, and M. J. Whiticar Clim. Past Discuss., 7, 3287-3324, 2011</p> <p>Abstract Discussion Paper (PDF, 974 KB) Supplement (708 KB) Interactive Discussion (Open, 0 Comments) Manuscript under review for CP</p> <p>Persistent influence of ice sheet melting on high northern latitude climate during the early Last Interglacial A. Govin, P. Braconnot, E. Capron, E. Cortijo, J.-C. Duplessy, E. Jansen, L. Labeyrie, A. Landais, O. Marti, E. Michel, E. Mosquet, B. Risebrobakken, D. Swingedouw, and C. Waelbroeck Clim. Past Discuss., 7, 3239-3286, 2011</p> <p>Abstract Discussion Paper (PDF, 2562 KB) Interactive Discussion (Open, 0 Comments) Manuscript under review for CP</p> <p>Fire history in western Patagonia from paired tree-ring fire-scar and charcoal records A. Holz, S. Haberle, T. T. Veblen, R. De Pol-Holz, and J. Southon Clim. Past Discuss., 7, 3203-3238, 2011</p> <p>Abstract Discussion Paper (PDF, 1340 KB) Supplement (202 KB) Interactive Discussion (Open, 0 Comments) Special Issue Manuscript under review for CP</p>	<p>13 Oct 2011</p> <p>12 Oct 2011</p> <p>12 Oct 2011</p> <p>11 Oct 2011</p> <p>10 Oct 2011</p>
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L. Zhao, J. Xu, and A. M. Powell Jr.

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 J. Xu, A. M. Powell Jr., and L. Zhao
 Geosci. Model Dev., 6, 1705-1714, 2013

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Discrepancies of surface temperature trends in the CMIP5 simulations and observations on the global and regional scales

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Correspondence to: J. Xu (jxu14@gmu.edu)

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Discrepancies of surface temperature trends in the CMIP5 simulations and observations on the global and regional scales

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Received: 3 October 2013 – Accepted: 22 October 2013 – Published: 1 November 2013

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Abstract

Using the fifth Coupled Model Intercomparison Project (CMIP5) model simulations and two observational datasets, the surface temperature trends and their discrepancies have been examined. The temporal-spatial characteristics for the surface temperature trends are discussed. Different from a constant estimated linear trend for the entire simulation period of 1850–2012, a dynamical trend using running linear least squares fitting with the moving 10 yr time windows are calculated. The results show that the CMIP5 model simulations are generally in good agreement with the observational measurements for the global scale warming, but the temperature trends depend on the temporal change and the regional differences. Generally, contrary to the small discrepancies on the global scale, the large discrepancies are observed in the south- and north-polar regions and other sub-regions.

1 Introduction

The fifth Coupled Model Intercomparison Project (CMIP5) provided quantitative datasets for estimating climate change based on a suite of climate models (Taylor et al., 2012). The new climate model products are considered predictions of future climate change, which relies heavily on how well the climate models simulate historical climate change. Each model's reliability impacts the credibility of that model's predictions. Consequently, evaluating climate model results using observational data sets is necessary to understand the capabilities and limitations of climate change simulations.

The surface temperature trends are a very important component to investigate for understanding the state of the global climate. The trends receive a great deal of attention in the climate change community (Hansen, 2001, 2010; Brohan et al., 2006; and many others), because these trends, anomalies, and variations provide evidence of global warming and the possibility of human influence on climate (Intergovernmental Panel on Climate Change, IPCC). However, based on previous studies, two questions

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 N. R. Nowaczyk, E. M. Haltia, D. Ulbricht, V. Wennrich, M. A. Sauerbrey, P. Rosén, H. Vogel, A. Francke, C. Meyer-Jacob, A. A. Andreev, and A. V. Lozhkin
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 T. Papina, T. Blyakharchuk, A. Eichler, N. Malygina, E. Mitrofanova, and M. Schwikowski
 Clim. Past, 9, 2399-2411, 2013
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 K. T. Lawrence, I. Bailey, and M. E. Raymo
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 T. Opel, D. Fritzsche, and H. Meyer
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Chronology of Lake El'gygytgyn sediments – a combined magnetostratigraphic, palaeoclimatic and orbital tuning study based on multi-parameter analyses

N. R. Nowaczyk¹, E. M. Haltia^{1,*}, D. Ulbricht^{1,**}, V. Wennrich², M. A. Sauerbrey², P. Rosén³, H. Vogel^{2,***},
A. Francke², C. Meyer-Jacob^{2,****}, A. A. Andreev², and A. V. Lozhkin⁴

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Received: 15 May 2013 – Published in Clim. Past Discuss.: 7 June 2013

Revised: 18 September 2013 – Accepted: 26 September 2013 – Published: 1 November 2013

Abstract. A 318-metre-long sedimentary profile drilled by the International Continental Scientific Drilling Program (ICDP) at Site 5011-1 in Lake El'gygytgyn, Far East Russian Arctic, has been analysed for its sedimentologic response to global climate modes by chronostratigraphic methods. The 12 km wide lake is sited off-centre in an 18 km large crater that was created by the impact of a meteorite 3.58 Ma ago. Since then sediments have been continuously deposited. For establishing their chronology, major reversals of the earth's magnetic field provided initial tie points for the age model, confirming that the impact occurred in the earliest geomagnetic Gauss chron. Various stratigraphic parameters, reflecting redox conditions at the lake floor and climatic conditions in the catchment were tuned synchronously to Northern Hemisphere insolation variations and the marine oxygen isotope stack, respectively. Thus, a robust age model comprising more than 600 tie points could be defined. It could be shown that deposition of sediments in Lake El'gygytgyn occurred in concert with global climatic cycles. The upper ~ 160 m of sediments represent the past 3.3 Ma, equivalent to sedimentation rates of 4 to 5 cm ka⁻¹, whereas the lower 160 m

represent just the first 0.3 Ma after the impact, equivalent to sedimentation rates in the order of 45 cm ka⁻¹. This study also provides orbitally tuned ages for a total of 8 tephras deposited in Lake El'gygytgyn.

1 Introduction

Lake El'gygytgyn in the Far East Russian Arctic (67.5° N, 172° E) with a diameter of 12 km is located off-centre in an 18 km wide impact crater formed 3.58 Ma ago (Layer, 2000). The 170 m deep lake has a bowl-shaped morphology, a surface area of 110 km², and a relatively small catchment of 293 km² (Nolan and Brigham-Grette, 2007). The bedrock in the crater catchment consists mainly of igneous rocks, lavas, tuffs, ignimbrites of rhyolites and dacites, rarely andesites and andesitic tuffs (Gurov and Koeberl, 2004), some of them with ages from 83.2 to 89.3 Ma (Layer, 2000) and 88 Ma (Kelley et al., 1999). Thus, they were emplaced during the Cretaceous normal polarity superchron (Ogg and Smith, 2004). In early 2009, the International Continental





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Chronology of Lake El'gygytgyn sediments

N. R. Nowaczyk¹, E. M. Haltia^{1,*}, D. Ulbricht^{1,}, V. Wennrich², M. A. Sauerbrey², P. Rosén³, H. Vogel^{4,***}, A. Francke², C. Meyer-Jacob^{2,****}, A. A. Andreev², and A. V. Lozhkin⁴**

¹Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences, Section 5.2, Climate Dynamics and Landscape Evolution, Telegrafenberg, 14473 Potsdam, Germany
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 ***now at: Institute of Geological Sciences, University of Bern, Baltzerstraße 1+3, Bern, Switzerland
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This discussion paper has been under review for the journal Climate of the Past (CP). Please refer to the corresponding final paper in CP.

Abstract. A 318 m long sedimentary profile drilled by the International Continental Scientific Drilling Program (ICDP) at Site 5011-1 in Lake El'gygytgyn, Far East Russian Arctic, has been analysed for its sedimentologic response to global climate modes by chrono-stratigraphic methods. The 12 km wide lake is sited in an 18 km large crater that was created by the impact of a meteorite 3.58 Ma ago. Since then sediments have been continuously deposited. For establishing their chronology, major reversals of the Earth's magnetic field provided initial tie points for the age model, confirming that the impact occurred in the earliest Gauss chron. Various stratigraphic parameters, reflecting redox conditions at the lake floor and climatic conditions in the catchment were tuned synchronously to Northern Hemisphere insolation variations and the marine oxygen isotope stack, respectively. Thus, a robust age model comprising more than 600 tie points could be

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Major dust events in Europe during marine isotope stage 5 (130–74 ka): a climatic interpretation of the "markers"

D.-D. Rousseau^{1,2}, M. Ghil^{1,3,4}, G. Kukla², A. Sima¹, P. Antoine⁵, M. Fuchs⁶, C. Hatté⁷, F. Lagroix⁸, M. Debret^{1,*}, and O. Moine⁵

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*now at: Morphodynamique Continentale et Côtière, UMR6143 CNRS, University of Rouen, 76821 Mont-Saint-Aignan Cedex, France

Abstract. At present, major dust storms are occurring at mid-latitudes in the Middle East and Asia, as well as at low latitudes in Northern Africa and in Australia. Western Europe, though, does not experience such dramatic climate events, except for some African dust reaching it from the Sahara. This modern situation is of particular interest, in the context of future climate projections, since the present interglacial is usually interpreted, in this context, as an analog of the warm Eemian interval. European terrestrial records show, however, major dust events during the penultimate interglacial and early glacial. These events are easily observed in loess records by their whitish-color deposits, which lie above and below dark chernozem paleosols in Central European records of Marine Isotope Stage (MIS) 5 age.

We describe here the base of the Dolní Vestonice (DV) loess sequence, Czech Republic, as the reference of such records. The dust is deposited during intervals that are characterized by poor vegetation – manifested by high $\delta^{13}\text{C}$ values and low magnetic susceptibility – while the fine sand and clay in the deposits shows grain sizes that are clearly different from the overlying pleniglacial loess deposits. Some of these dust events have been previously described as "Markers" or Marker Silts (MS) by one of us (G. Kukla), and are dated at about 111–109 ka and 93–92 ka, with a third and last one slightly visible at about 75–73 ka. Other events correspond to the loess material of Kukla's cycles, and are described as eolian silts (ES); they are observed in the same DV sequence and are dated at about 106–105 ka, 88–86 ka, and 78.5–77 ka. These dates are determined by considering the OSL ages with their errors measured on the studied sequence, and the comparison with Greenland ice-core and European speleothem chronologies.

The fine eolian deposits mentioned above, MS as well as ES, correspond to short events that lasted about 2 ka; they are synchronous with re-advances of the polar front over the North Atlantic, as observed in marine sediment cores. These deposits also correlate with important changes observed in European vegetation. Some ES and MS events appear to be coeval with significant dust peaks recorded in the Greenland ice cores, while others are not. This decoupling between the European eolian and Greenland dust depositions is of considerable

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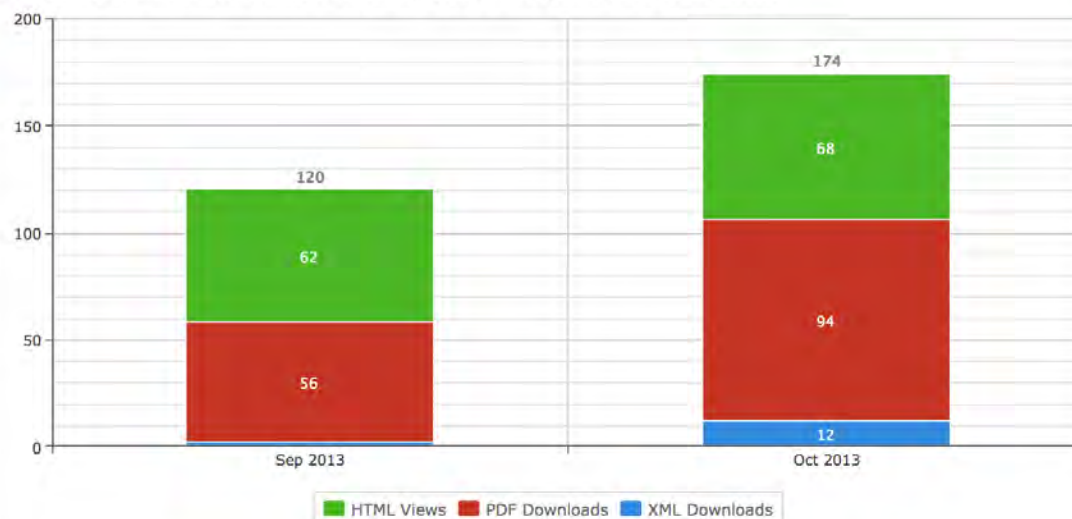
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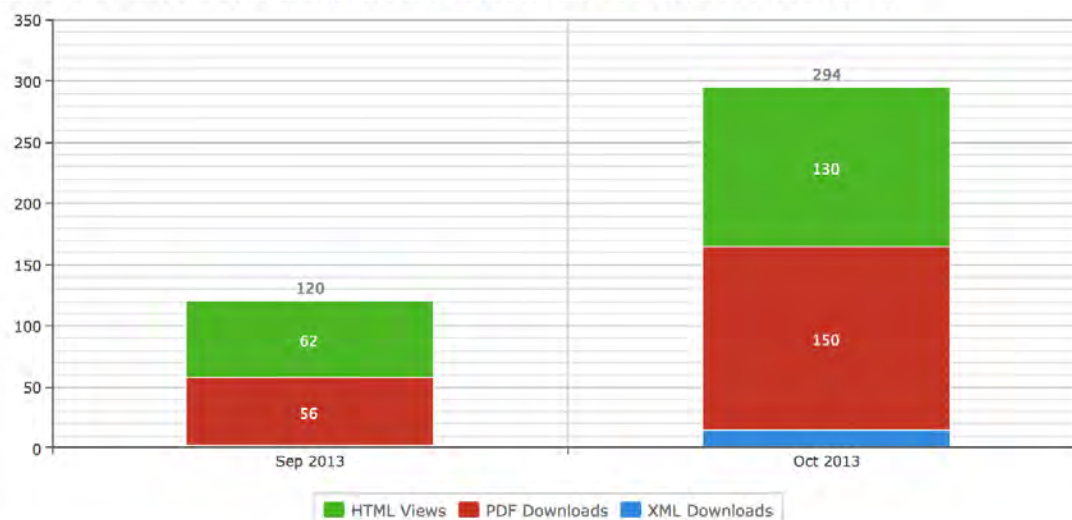
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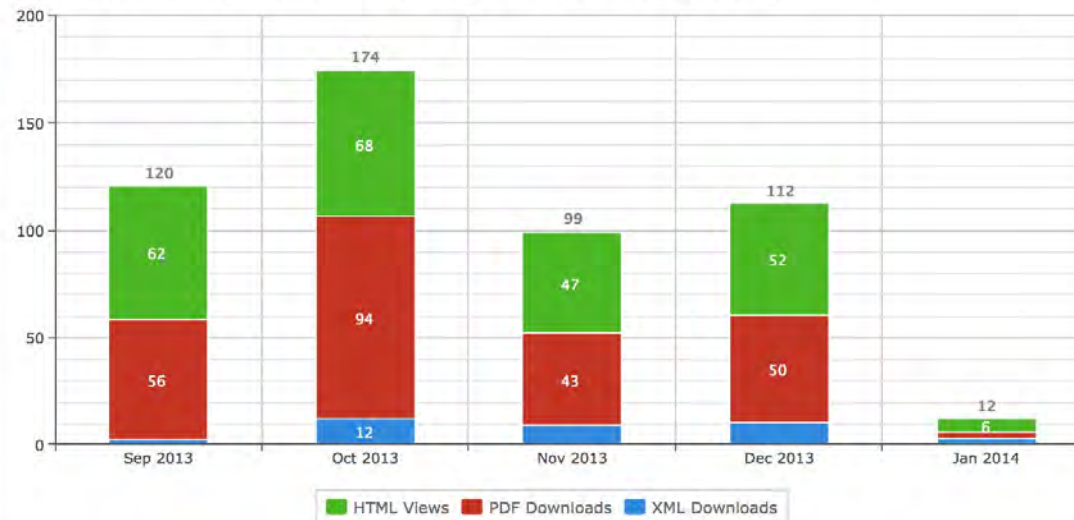
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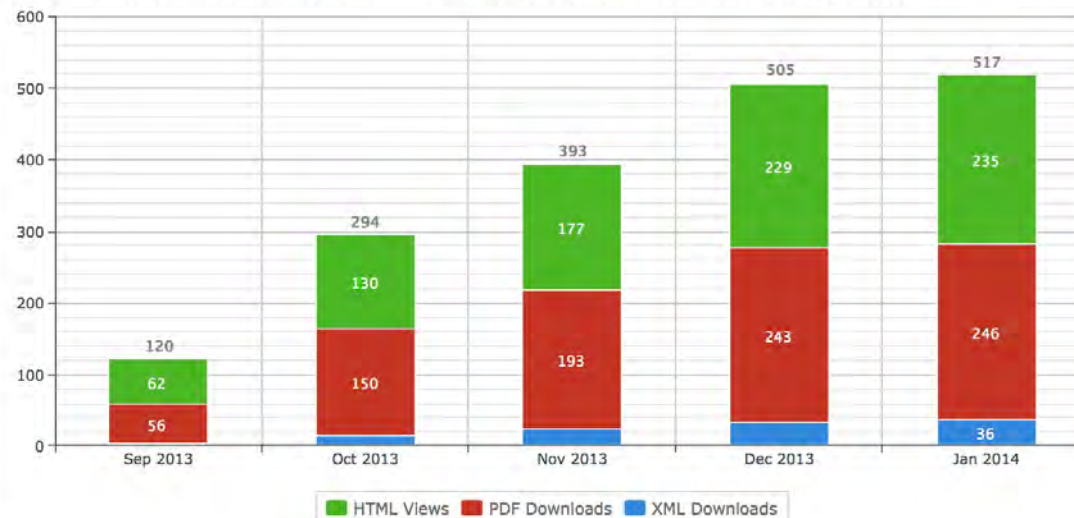
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back-diffusion calculations in order to restore the full magnitude of seasonal variations, a method classically applied for identifying seasonal cycles in damped isotopic signals.

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