Atmospheric Chemistry & Physics

An Interactive Open Access Journal of the European Geosciences Union

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Outline

Motivation

- *open access perspectives & challenges*

Interactive Open Access Publishing: Public Peer Review & Interactive Discussion

- *principles & effects*

Atmospheric Chemistry & Physics (ACP) and the European Geosciences Union (EGU)

- *organisation, aims & achievements*

Summary & Outlook

- *EGU interactive open access concept*
- *alternatives & future developments*
- *conclusions, vision & propositions*

Motivation for Open Access

Scientific, economic & educational advantages of free online availability of scientific research publications

Educational:

- *information & stimulation for students & general public*
- *equal opportunities in the information society (global & social)*

Economic:

- *liberation of distorted scientific information market*
- *resolution of serial & budget crisis at university & research libraries*

Scientific:

- *enhancement of research impact & productivity*
- ***improvement of quality assurance:* bigger need, larger gain and higher importance than "mere increase of impact & productivity"**
- *promotion of scientific progress*

Open Access & Quality Assurance

1. We expect that the transition to open access will **enhance the quality assurance and evaluation of scholarly output**. This will be a **direct consequence of the free availability of information**.
2. In disciplines where peer-review is a cornerstone of the scientific information system, open-access publishing has demonstrated the same standards as traditional publishing. We foresee that open access will allow the development of even **more effective peer-review by**
   - allowing **interactive forms of review and discussion**,
   - permitting **more efficient and more inclusive selection of referees**, and
   - giving **referees more information with which to do their work**.
3. Open access allows the development of new forms of measurement of the quality and impact of scholarly work. The globalization of scholarly activities requires a global assessment of their impact, which is only possible if there is free access to information. Measures that go beyond simple citation counting have already evolved in communities where open access is the rule.
4. In order to improve the quality of scholarly assessment, we urge funding organizations to require all scholarly output to be archived in an open-access environment and to support any costs associated with quality assessment and archiving for such environments.

Barnes et al., Berlin Open Access Conference 2003 (www.zim.mpg.de/openaccess-berlin)

Present Publishing Problems (I)

Large proportion of scientific publications are careless, useless, or false

Tip of the Iceberg: fraud

- *falsification, selective omission & tuning of results*
- *e.g. Schön et al., 2002/2003 (molecular physics): retraction of > 20 papers from top journals (Science, Nature, Phys. Rev., etc.)*

Common Practice: carelessness & uselessness

- *superficial & irreproducible description of experiments & models*
- *non-traceable arguments & conclusions, duplicate & split papers, etc.*

Consequences: waste & misallocation of resources

- *costly reconstruction of poorly described methods & results*
- *propagation of errors & misinterpretations, misevaluation of projects & scientists (publication numbers vs. quality), etc.*

Pöschl, Learned Publishing, 17, 105-113, 2004

Present Publishing Problems (II)

Traditional journals & peer review fail to provide efficient scientific exchange & quality assurance

Editors & Referees: limited competence & conflicting interests

- *few editors for large subject areas*
  - ⇒ *limited knowledge of scientific details & specialist referees*
- *work overload, conflicts of interest & little reward for referees*
  - ⇒ *superficial or prejudiced review & evaluation*

Closed Peer Review: retardation & loss of information

- *publication delays, watering down of messages, plagiarism*
- *critical, supportive & complementary comments unpublished*

Traditional Discussion: sparse & late commentaries

- *labor-intensive, delayed & watered-down by peer review*
  (comment/article ratio 1978 ⇒ 1998: 1/20 ⇒ 1/100)

Pöschl, Learned Publishing, 17, 105-113, 2004

Dilemma: Speed vs. Quality

Two conflicting needs of scientific publishing:
rapid publication vs. thorough review & discussion

Rapid Publication: widely pursued

- *required for efficient exchange of new findings & open questions*
- *traditional journal preferences for short peer review times (2-4 weeks) & short papers with little detailed information*
- *information market flooded with preprints & proceedings with no or little quality assurance*

Thorough Review & Discussion: widely neglected

- *required to identify scientific flaws, useless research & duplications*
- *rarely possible by a couple of referees within 2-4 weeks*
- *frequently ignored for spectacular high-impact publications*

Pöschl, Learned Publishing, 17, 105-113, 2004

Solution: Speed & Quality

Two-stage open access publication with public peer review & interactive discussion

Stage 1: Rapid publication of Discussion Paper

pre-selected by editors (referees), fully citable & permanently archived (more than traditional preprint)

Public Peer Review & Interactive Discussion

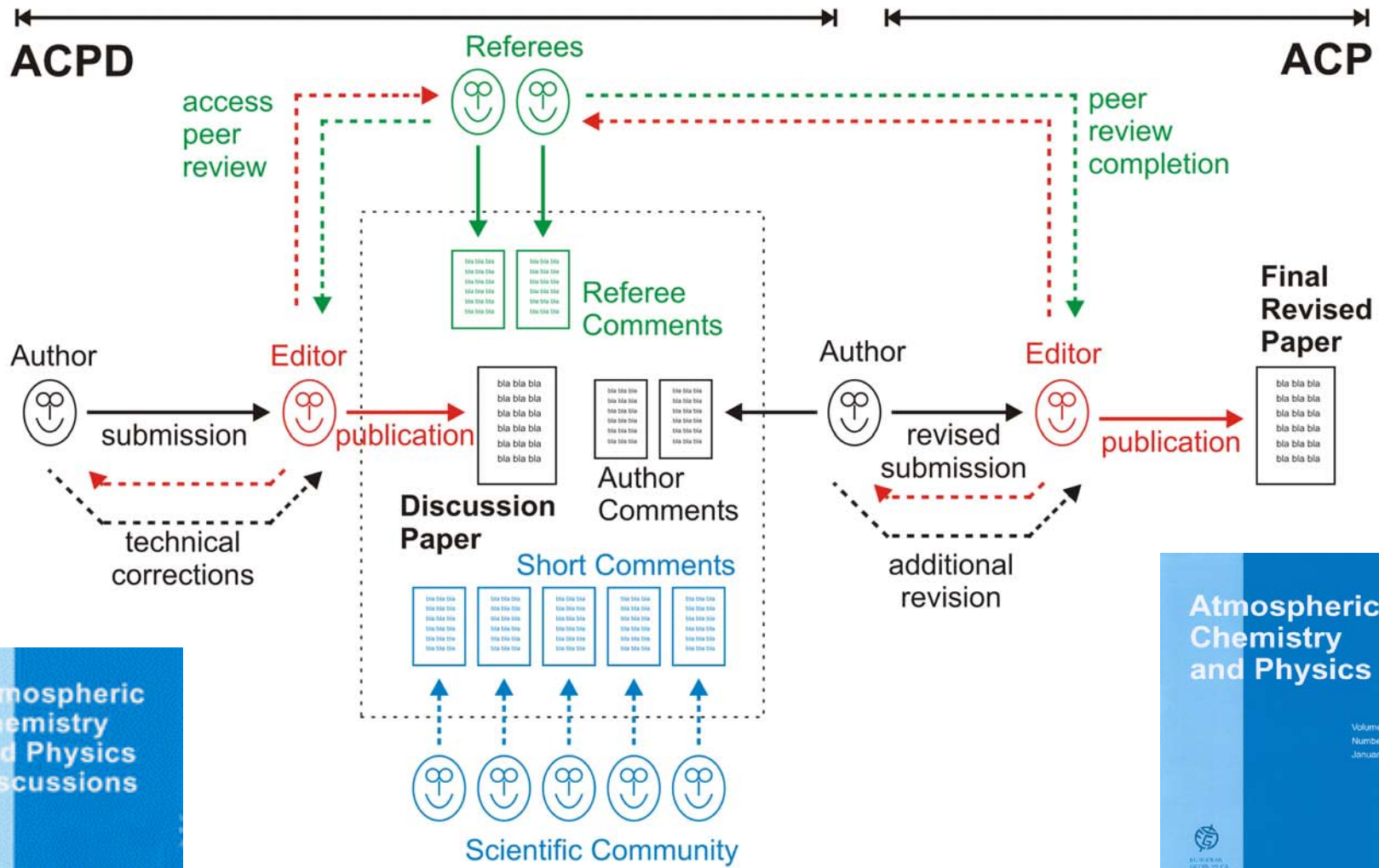
referee comments & additional comments by interested colleagues published alongside the discussion paper (anonymous or attributed, non-reviewed but individually citable & permanently archived)

Stage 2: Review completion & publication of Final Paper

analogous to traditional peer review & journal publication

Pöschl, Learned Publishing, 17, 105-113, 2004

Discussion Forum *(Pub. Stage 1)* + Journal *(Pub. Stage 2)*



EGU Advantages of Interactive Open Access Publishing

All-win situation for authors, referees & readers

Discussion Paper

- *free speech & rapid publication (authors & readers)*

Interactive Peer Review & Public Discussion

- *direct feedback & public recognition for high quality papers (authors)*
- *prevention of hidden obstruction & plagiarism (authors)*
- *documentation of critical comments, controversial arguments, scientific flaws & complementary information (referees & readers)*
- *deterrence of careless, useless & false papers (referees & readers)*

Final Paper

- ***maximum quality assurance & information density*** *through complete peer review, public discussion & final revision* ***(readers)***

Pöschl, Learned Publishing, 17, 105-113, 2004

EGU Atmospheric Chemistry & Physics (ACP)

Publisher & Distribution

- *European Geosciences Union (EGU)*
- *free internet access (www.atmos-chem-phys.org)*
- *paper copies & CDs printed & sold on demand*
- *full coverage by ISI-SCI (since launch in 2001)*
- *copyright: initially EGU, now authors (Creative Commons License)*

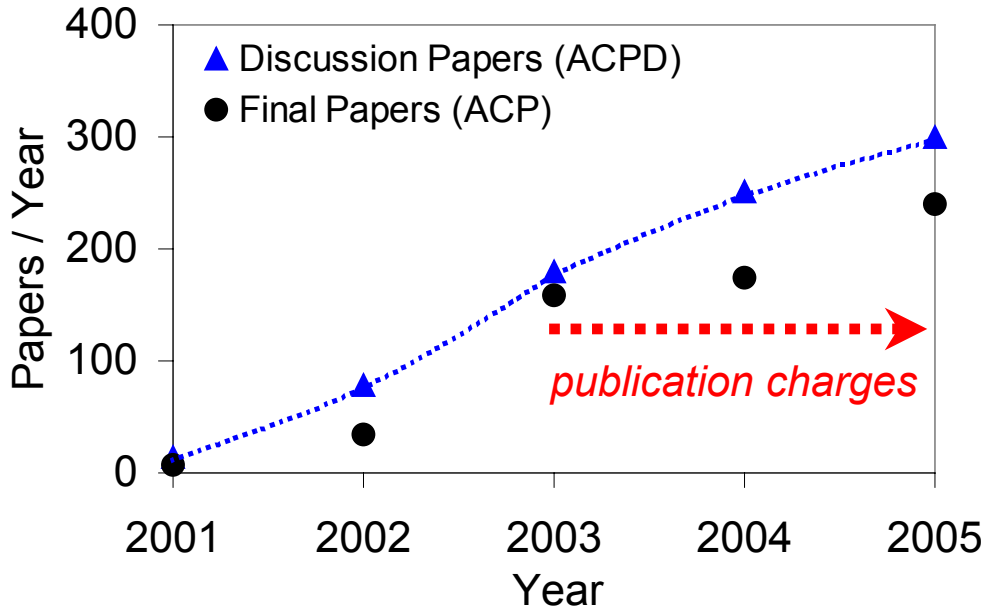
Editors

- *globally distributed network of ~ 70 editors covering 32 major subject areas*
- *coordination by executive committee & chief executive editor*
- *advisory board chaired by Nobel laureate P. J. Crutzen*

Publication Market

- *~ 40 traditional journals publishing ~ 4000 atmospheric science papers/yr*
- *major journals (2005):* *J. Geophys. Res. (AGU) ~ 1000 papers/yr*
  Atmos. Environ. (Elsevier) ~ 500 papers/yr
  Atmos. Chem. Phys. (EGU) ~ 250 papers/yr
  J. Atmos. Sci. (AMS) ~ 200 papers/yr
  J. Atmos. Chem. (Springer) ~ 100 papers/yr

EGU ACP Publication Statistics



2001-2003: free of charge
⇒ *near-exponential growth*

2004-2005: pub. charges
⇒ *near-linear growth*

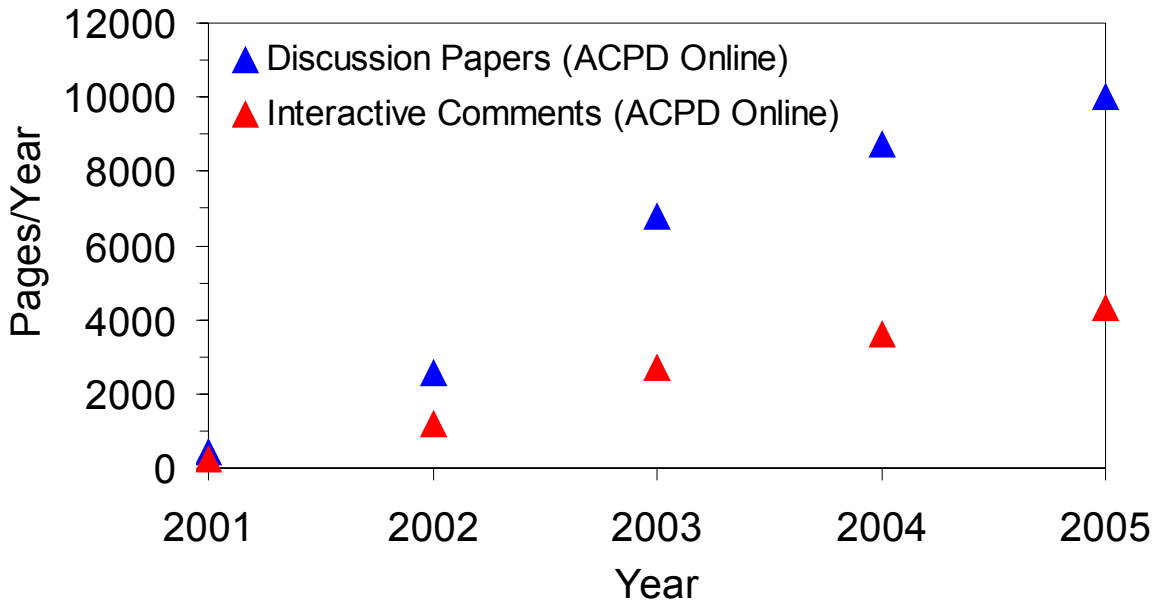
Discussion Papers (ACPD)

- ***submission rate*** *(increasing)**:*** ***~ 30 month^{-1}***
- ***rejection rate*** *(access review)**:*** ***~ 10 %***
- ***submission-to-publication time:*** ***1-2 months*** *(min: 10 days)*
- ***publication charges*** *(author)**:*** ***500-1000 EUR/paper*** *(incl. final paper)*

Final Papers (ACP)

- ***rejection rate*** *(review completion)**:*** ***~ 10 %*** *(~ 20 % in total)*
- ***submission-to-publication time:*** ***~ 1 month*** *(3-6 months in total)*

ACP Discussion Statistics



Interactive Discussion

- *referee & author comments / discussion paper:* ***~ 4*** *(max: 16)*
- *comment pages / discussion paper pages:* ***~ 40 %***
- *referee anonymity (exp. vs. mod.):* ***~ 60 %*** *(80% vs. 40%)*
- *additional comments / paper:* ***~ 1/4***
- *constructive suggestions, harsh criticism & open applause (see examples)*

Extended Discussion

- *peer-reviewed commentaries / paper:* ***~ 1/100*** *(≈ trad. journals)*

EGU ACP Discussion Examples (I)

Discussion Paper

Publication Date	*Title, Authors, Reference*	*Online Access*
20.08.2004	**A review of the Match technique as applied to AASE-2/EASOE and SOLVE/THESEO 2000** G. A. Morris, B. R. Bojkov, L. R. Lait, M. R. Schoeberl *Atmospheric Chemistry and Physics Discussions*, 4, 4665-4717, 2004 SRef-ID: 1680-7375/acpd/2004-4-4665	Abstract Online Version (PDF, 3860 KB) Print Version (PDF, 3622 KB) SRef Overview

Interactive Discussion

Status: Final Response (Author Comments only)

RC S1626 : 'General comments from reviewer' , Anonymous Referee #3, 27.08.2004, 17:21
- **AC** S3996 : 'Response to Reviewer #3' , Gary Morris, 17.05.2005, 0:23

RC S1660 : 'Technical issues with the Figures' , Anonymous Referee #2, 31.08.2004, 18:14
- **AC** S1793 : 'correcting figures' , Gary Morris, 15.09.2004, 6:07
  - **RC** S1971 : ' Match analysis of the winters 1991/1992' , Anonymous Referee #2, 05.10.2004, 9:30
    - **AC** S4010 : 'Response to Referee #2' , Gary Morris, 17.05.2005, 0:49

RC S1731 : 'Trajectory mapping approach' , Anonymous Referee #2, 07.09.2004, 9:40
- **AC** S4002 : 'Response to second Referee #2' , Gary Morris, 17.05.2005, 0:28

SC S1734 : 'Ozone loss from ozone-tracer correlation' , Simone Tilmes, 07.09.2004, 11:36
- **AC** S4007 : 'Response to S. Tilmes' , Gary Morris, 17.05.2005, 0:30

RC S2014 : 'Review' , slimane BEKKI, 07.10.2004, 14:48
- **AC** S4036 : 'Response to Bekki' , Gary Morris, 17.05.2005, 1:09

SC S2118 : 'Comment #1' , Markus Rex, 19.10.2004, 11:37
- **AC** S4025 : 'Response to M. Rex' , Gary Morris, 17.05.2005, 0:54

SC S2126 : 'Comment # 2' , Markus Rex, 19.10.2004, 11:37
- **AC** S4032 : 'Response to M. Rex - Detailed comments' , Gary Morris, 17.05.2005, 0:56

AC: Author Comment (on behalf of all co-authors)
RC: Referee Comment (anonymous or attributed)
SC: Short Comment (attributed)
EC: Editor Comment (attributed)
Online Version (PDF)
Print Version (PDF)

ACP Discussion Examples (II)

Constructive Suggestions & Applause

- **Interested Reader** (ACPD, 3, S1107–S1108, 2003):
  *Investigating thoroughly the effects of … **was something that really needed to be done, so a bouquet to the authors for doing it.***
  *My comment is that it also **necessitates an extension** …*

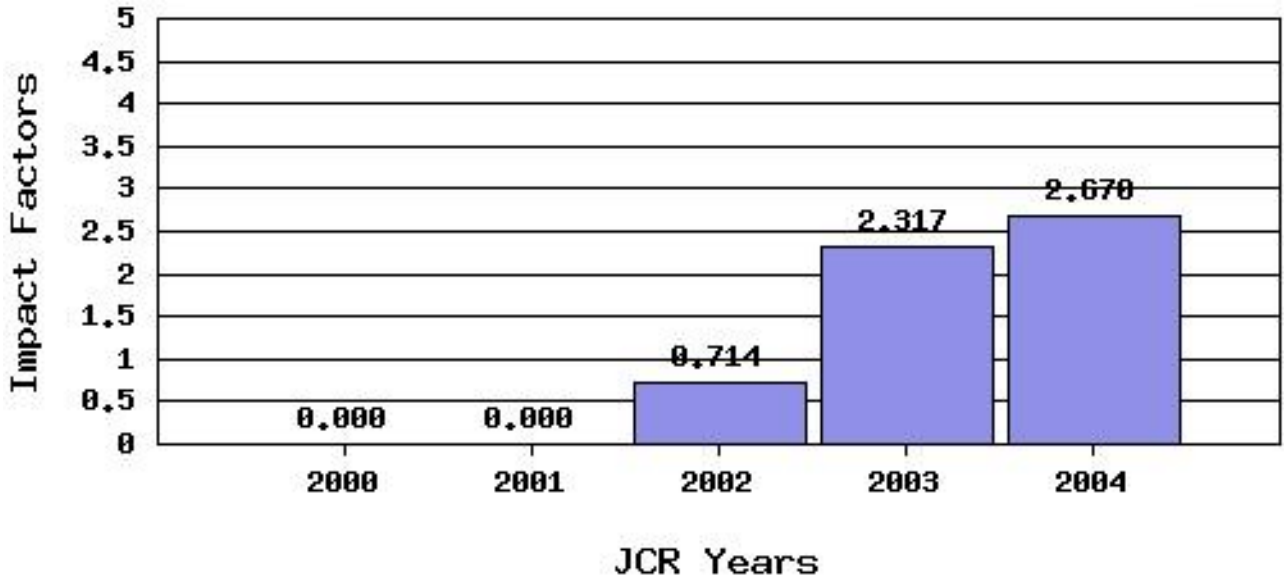
Harsh Criticism & Controversy

- **Referee** (ACPD, 3, S448-S451, 2003):
  *The authors permanently **ignore all the state-of-the-art papers** regarding the ill-posed problems associated with …*
  *So, most of the … results presented here are **just speculation**.*
- **Author** (ACPD, 3, S912-S918, 2003):
  *The reviewer does **not indicate any of these "state of the art papers".***
  *The comments just made above perfectly fit to this **reiterated opinion** …*

Abusive Commenting

- *Only 1 case of personal offense in > 500 discussions (> 2000 comments)*
- *Editors reserve right to **remove abusive comments & personal offenses** and to **exclude abusive commenters** from interactive discussion*

ACP Citation Statistics



ISI Journal Citation Report 2004 (3 years after launch of ACP)

- ***ACP impact factor 2.67*** *(citations in 2004 to papers of 2002 and 2003)*

  # 2 out of 10 journals with similar scope (Atmospheric Chemistry & Physics)
  # 6 out of 46 journals in "Meteorology & Atmosphere Sciences" (incl. Climate)
  # 7 out of 128 journals in "Geosciences, Multidisciplinary"
  # 8 out of 134 journals in "Environmental Sciences"

- ***Special Report on ACP in ISI Essential Science Indicators (InCites)***

www.copernicus.org/EGU/acp/journal_impact_factor.html
www.in-cites.com/journals/AtmosphericChe-N-Phy.html

ACP Achievements

High quality of submissions & low rejection rates

- *enhanced quality assurance & self-control by authors*
- *efficient use of referee capacities (most limited resource in scientific publishing)*

Fast publication & free speech

- *rapid dissemination of scientific ideas & results*
- *citable documentation of scientific flaws & controversial innovations*

Thorough review, complementary information & public documentation

- *elaborate referee comments & author responses (inaccessible in trad. journals)*
- *additional input from interested readers (50 times more than in trad. journals)*

High quality & high impact of final papers

- *top 10 % of relevant categories in ISI journal citation report (after only 3 years)*
- *high appreciation by scientists & recognition by publishing competitors*

High efficiency & modest cost of scientific publishing & quality assurance

- *< 1000 $/paper for two-stage publication (double typesetting) incl. interactive public discussion (40 % complementary information)*
- *>> 1000 $/paper in traditional Science, Technology & Medicine (STM) publishing (~7×10^9 $/yr for ~$10^6$ papers/yr; ~10^4 journals with ~10^2 papers/yr)*

EGU European Geosciences Union (EGU)

General Activities

- **Mission Statement:**
  dedicated to the pursuit of excellence in the geosciences and the planetary and space sciences for the benefit of humanity
- **Scientific Meetings:**
  topical conferences & annual general assembly (up to 8000 participants)
- **Outreach Activities:**
  contact & exchange of information with scientific & political organisations & public media; materials & workshops for school teachers & students; etc.

Scientific Publishing

- **Mission Statement:**
  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 scientists, science, and society worldwide
- **Publication Types:**
  scientific journals, research abstracts & proceedings, book series, newsletter
- **Publisher & Scientific Service Provider: Copernicus Group**
  advanced internet & publishing technologies

www.copernicus.org/EGU/EGU.html

EGU Open Access Journals

Interactive Open Access Journals

- **Atmospheric Chemistry & Physics** *(ACP + ACPD, since 2001)*
- **Biogeosciences** *(BG + BGD, since 2004)*
- **Climate of the Past** *(CP + CPD, since 2005)*
- **Hydrology & Earth System Sciences** *(HESS + HESSD, since 2004)*
- **Ocean Science** *(OS + OSD, since 2004)*
- *further journals in preparation (Geology, Geodesy, …)*

Traditional Journals with Open Access

- **Annales Geophysicae** *(since 1994, OA since 2001)*
- **Natural Hazards & Earth System Sciences** *(since 2001)*
- **Nonlinear Processes in Geophysics** *(since 1994, OA since 2001)*

Open Access Leadership in Earth & Environmental Sciences

- *see "Directory of Open Access Journals": www.doaj.org*
- *publication charges: ~ 20 EUR/Page; ~ 500-1000 EUR/Paper (to be decreased)*
- *digital printing on demand: ~ 50 EUR/Issue*

www.copernicus.org/EGU/publication_overview.html

EGU Interactive Open Access Concept

Two- or multi-stage open access publishing with public peer review & interactive discussion

Key Features:

Publication of discussion paper before full review & revision

⇒ *rapid publication, **free speech & public accountability** of authors*

⇒ *fewer careless submissions by authors relying on referee support*

Public peer review & interactive discussion

⇒ *public comments support peer review, revision & editorial decision*

⇒ *maximum **quality assurance & information density***

Optional anonymity for referees

⇒ *fostering of **critical scientific exchange***

Archiving & citability of all discussion papers & comments

⇒ *documentation of **scientific flaws & controversial innovations** in papers that are reviewed & commented but finally not accepted*

Alternative Approaches

Interactive journal with initial "private peer review"

- *e.g. Journal of Interactive Media in Education (JIME)*
- ***no public documentation*** *of scientific flaws & controversial innovations in papers rejected after "private peer review"*

Traditional journal with "pre-publication history" & "peer commentary"

- *e.g. BioMed Central Medicine Journals (BMC)*
  Behavioral & Brain Sciences (BBS)
- ***no public documentation*** *of scientific flaws & controversial innovations in papers rejected after peer review*
- *no public contribution to peer review, revision & editorial decision*
  $\Rightarrow$ ***sub-optimal quality assurance & information density***

(Traditional) repository or "preprint server" & (traditional) journal

- *e.g. arXiv.org*
- *no formalized public reviewing by anonymous referees* ***(yet)***
  $\Rightarrow$ ***sub-optimal quality assurance & information density*** ***(easy to optimize)***

Future Developments

Flexible adaptation, complementation & integration of interactive open access concepts

Multiple stages & levels of interactive publishing & commenting

consecutive & parallel stages & levels of scientific papers & comments

⇒ *scientific & public discussion forums; iteration of review & revision*

⇒ *formal editorial rating & classification of different levels of quality & relevance (BE Journals in Economics)*

Statistical analysis & quality assurance feedback

download/usage, commenting & citation statistics for discussion & final papers or different versions of "living papers" (MPS Living Reviews)

⇒ *compare editorial rating & statistical rating ("community assessment")*

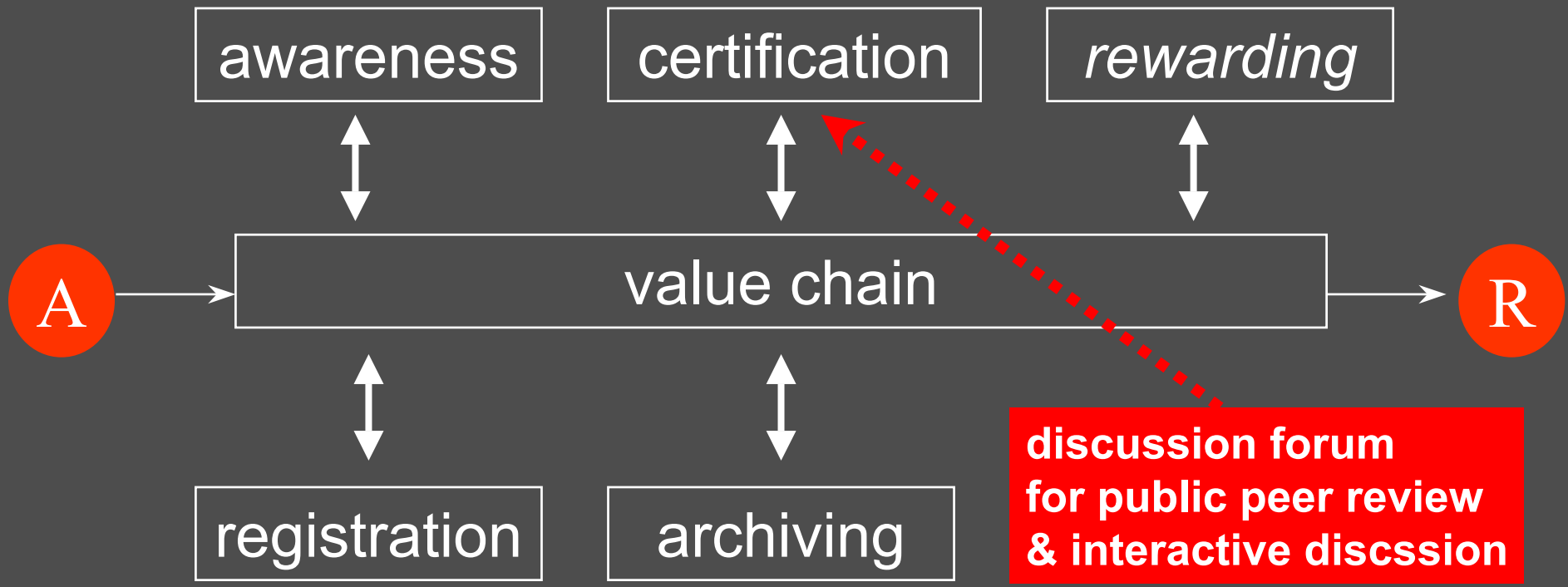
⇒ *evaluation of editors*

Integration in large-scale open access publishing systems

⇒ *disaggregation of archiving, evaluation & distribution*

⇒ *repositories, peer networks & "assessment houses" (instead of journals) with discussion forums for public peer review & interactive discussion*

Systems for Scholarly Communication



Disaggregated Systems: open to current agents, new entrants, value added services, and various business models

herbert van de sompel

Los Alamos NATIONAL LABORATORY

Future Styles of Assessment

- **Community assessment**
  - Commentaries
  - Review articles
  - Citation analyses (big possibilities in open-access)
- **Organized analysis**
  - Journal peer-review

Slower, more accurate in long-term

Immediate but cruder

Both systems may co-exist: address different needs

combination = interactive open access publishing

Bernard F Schutz
Albert Einstein Institute

Conclusions

Achievements of ACP & EGU clearly demonstrate that:

High quality open access journals can indeed be

- operated by scientific societies;
- financed by modest publication charges.

Multi-stage interactive open access publishing does indeed promote

- critical exchange across scientific disciplines & communities;
- rapid publication & dissemination of scientific findings;
- efficient, transparent & consistent scientific quality assurance;
- traceable documentation of scientific controversies.

Vision

Promotion of scientific & societal progress
by open access, public review, and interactive discussion
in global information commons

Access to high quality scientific publications

review & revision with input from referees & scientific community

⇒ ***more & better information for scientists & society***

Documentation of scientific discussion

free speech & public exchange of arguments

⇒ ***evidence of controversial opinions & open questions***

Demonstration of transparency & rationalism

transparent & rational approach to complex questions & problems

⇒ ***role model for political decision process***

Propositions

Promote open access publishing

- ***prescribe open access*** *to publicly funded research results*
- ***transfer funds*** *to open access service providers & authors; e.g.: convert 10-50 % of subscription budgets per year into seed funds for open access publications (e.g. 1000 EUR per year & scientist)*

Emphasize quality assurance, public discussion & interactivity

- ***implement public review & discussion forums*** *in new & existing journals & repositories*
- ***mere accessibility & archiving are not enough***

Improve scientific evaluation & rating methods

- *evaluate papers rather than journals:* ***commenting & statistics***
- *refine basic statistical parameters (citation & download numbers) by* ***quality assurance factors*** *(number & rating of public comments)*