Public Peer Review and Interactive Discussion: The Effectiveness of Transparency and Self-Regulation

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Introduction
- challenges & perspectives

Collaborative Peer Review:
Public Peer Review & Interactive Discussion
- concepts & effects

Atmospheric Chemistry and Physics (ACP) &
European Geosciences Union (EGU)
- aims & achievements

Summary & Outlook
- conclusions & vision
Open Access not a threat to scientific quality assurance but an urgently needed opportunity for improvement

Traditional Peer Review: fully compatible with OA
- successful OA journals with traditional peer review, e.g.:
  PLoS Biology, BMC Structural Biology, New J. Physics, etc.

Information for Reviewers: strongly enhanced by OA
- unlimited & interdisciplinary access to relevant publications
- subscription: limited access to relevant publications

Collaborative Peer Review: fully enabled by OA
- unlimited & interdisciplinary discussion in & between scientific communities
- subscription: limited circle of readers & comment
- ACP/EGU, Economics e-journal, PLoS One, BMC Biology Direct, etc.

Barnes et al., Berlin Open Access Conference 2003 (www.zim.mpg.de/openaccess-berlin)
Tip of the Iceberg: fraud
- selective omission, tuning & fabrication of results
- e.g. Schön et al., 2002/2003; Hwang et al. 2004/2005

Common Practice: carelessness
- superficial & irreproducible description of experiments & models
- non-traceable arguments & conclusions, duplicate & split papers, etc.
- dilute rather than generate knowledge

Consequences: waste & misallocation of resources
- costly reconstruction of poorly described methods & results
- propagation of errors & misinterpretations
- misevaluation of projects & scientists

Pöschl, Learned Publishing, 17, 105-113, 2004
Traditional peer review insufficient for efficient quality assurance in today’s highly diverse & rapidly evolving world of science

Editors & Referees: limited capacities & competence
- 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- critical, supportive & complementary comments unpublished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
Conflicting needs of scientific publishing:
rapid publication vs. thorough review & discussion

Rapid Publication: widely pursued
- required for efficient exchange of new findings & open questions
- traditionally achieved by rapid reviews & short papers with a lack of detailed information

Thorough Review & Discussion: grossly neglected
- required to identify scientific flaws & duplications
- traditionally limited by availability of referees, review time & access to information

Pöschl, Learned Publishing, 17, 105-113, 2004
Two-stage publication with collaborative peer review

**Stage 1:** Rapid publication of **Discussion Paper**
- *pre-selected by editors* (optionally supported by referees),
- *fully citable & permanently archived* (more than traditional preprint)

**Public Peer Review & Interactive Discussion**
- referee comments & additional comments by interested colleagues
- published alongside discussion paper (anonymous or by name, 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
Advantages of Interactive OA Publishing

All-win situation for authors, referees & readers

Discussion Paper

- free speech & rapid publication (authors & readers)

Public Peer Review & Interactive Discussion (Collaborative Peer Review)

- 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; save refereeing capacities & readers’ time (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
MPIC Atmospheric Chemistry & Physics (ACP)

Publisher

- **European Geosciences Union (EGU) & Copernicus (Max Planck Society Spin-Off)**
- free internet access (www.atmos-chem-phys.org)
  paper copies & CDs on demand
- copyright: Creative Commons License

Editors

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

Publication Market (Atmospheric Science)

- ~ 50 journals publishing ~ 5000 papers/yr
- major journals (2007):
  - J. Geophys. Res. (AGU) ~ 1000 papers/yr
  - Atmos. Environ. (Elsevier) ~ 800 papers/yr
  - Atmos. Chem. Phys. (EGU) ~ 500 papers/yr (~10%)
  - J. Atmos. Sci. (AMS) ~ 200 papers/yr
  - J. Atmos. Chem. (Springer) ~ 100 papers/yr
# ACP Publication & Discussion Statistics

## Discussion Papers (ACP-D)
- **submissions** (increasing): $\sim 50 \text{ month}^{-1}$ (D $\approx$ US, UK, F, ...)
- **rejections** (access review): $\sim 10 \%$
- **submission-to-publication time**: $\sim 1 \text{ month}$ (min: 10 days)
- **publication charge** (author): $\sim 1000 \text{ EUR/paper}$ (incl. final paper)

## Final Papers (ACP)
- **rejections** (review completion): $\sim 10 \%$ (~ 20 % total, save referees)
- **submission-to-publication time**: $\sim 1 \text{ month}$ (3-6 months in total)

## Interactive Discussion
- **interactive comments / discussion paper**: $\sim 5$ (up to 17)
- **comment pages / paper pages**: $\sim 50 \%$
- **referee anonymity** (exp. vs. mod.): $\sim 60 \%$ (70% vs. 30%)
- **reader comments / discussion paper**: $\sim 1/4$ (up to 10)
- **constructive suggestions, harsh criticism, applause**

## Extended Discussion
- **peer-reviewed commentaries / paper**: $\sim 1/100$ ($\approx$ trad. journals)
### ACP Discussion Example

**Discussion Paper**

<table>
<thead>
<tr>
<th>Publication Date</th>
<th>Title, Authors, Reference</th>
<th>Online Access</th>
</tr>
</thead>
</table>
| 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 |  |

### Interactive Discussion

**Status:** Final Response (Author Comments only)

- **RC S1626:** 'General comments from reviewer', Anonymous Referee #3, 27.08.2004, 17:21
  - **AC S3966:** '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
    - **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 Tilmens, 07.09.2004, 11:36
  - **AC S4007:** 'Response to S. Tilmens', 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

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**See (Google Search):**

*ACPD, “Online Library” (OA), “Most Commented Papers”*
ISI Journal Citation Report 2006 (five years after journal launch)

**ACP impact factor 2006**: 4.36 *(citations in 2006 to papers of 2004 & 2005)*

- # 1 out of 47 journals in “Atmosphere Sciences” *(incl. Meteo & Climate)*
- # 2 out of 129 journals in “Geosciences” *(Multidisciplinary)*
- # 3 out of 140 journals in “Environmental Sciences”

www.atmos-chem-phys.net: News – Impact Factor
European Geosciences Union (EGU), www.egu.eu

- **Mission & History:** international scientific society for Earth, planetary & space sciences, merger of EGS & EUG, partner of AGU
- **Meetings:** up to ~ 10000 participants, turnover ~ 3 MEUR/yr
- **Publications:** global open access leader in geosciences (since 2001), volume ~ 15000 pages/yr, turnover ~ 1.5 MEUR/yr
- **8 Interactive OA Journals:** Atmos. Chem. Phys. (ACP), Biogeosciences (BG), Climate (CP), Cryosphere (TC), e-Earth (eE), Geoscientific Models (GMD), Hydrology (HESS), Ocean Science (OS); … more to come
- **2 OA Journals** (trad. peer review): Natural Hazards (NHESS), Nonlinear Processes (NPG)
- **1 Subscription Journal** (trad. peer review): Ann. Geophys.(ANGEO),

**Copernicus Publications, www.copernicus.org**

- **Mission & History:** scientific service provider for EGU & other societies, SME spin-off of the Max Planck Society
- **Meetings & Publications:** development & application of advanced software tools for high quality at low cost (~ 100 EUR/page, ~1000 EUR/paper)
ACP & EGU interactive open access sister journals demonstrate that:

1) Strengths of traditional publishing & closed peer review can be efficiently combined with the opportunities of open access & public peer review

2) Collaborative peer review (public review & interactive discussion) enables highly efficient quality assurance; it leads to high quality (top reputation & impact) at low rejection rates (10-20% vs. 30-70%)

3) Transparency enhances self-regulation and saves the most limited resource in scientific publishing: refereeing capacity

4) Scientific societies & commercial publishers can establish new open access journals & improved quality assurance mechanisms

5) Traditional journals can be efficiently & successfully converted into (interactive) open access journals

6) Interactive open access publishing can be realized at moderate costs (~ 1 kEUR/paper), and technology can reduce costs further
Future Perspectives

Efficient & flexible combination of new & traditional forms of review & publication

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
  (Berkeley Journals in Economics)

Statistical analysis & quality assurance feedback
- download/usage, commenting & citation statistics for discussion & final papers or different versions of “living papers” (MPG 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
Promotion of scientific & societal progress by open access & collaborative review 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
**Open Peer Review**
- e.g. *Journal of Interactive Media in Education, BioMed Central Biology Direct, British Medical Journal*
- no referee anonymity

**Pre-Publication History & Peer Commentary**
- e.g. *BioMed Central Medical Journals, Behavioral & Brain Sciences*
- no integration of peer review & public discussion

**Collaborative Peer Review & Interactive Open Access Publishing**
- ACP & EGU sister journals with public peer review & interactive discussion
- optional referee anonymity, iteration of review & revision
  - do not abandon traditional peer review but complement its strengths & reduce its weaknesses by transparency & interactive public discussion
  - optimize quality assurance & information density
Future Styles of Assessment

• Community assessment
  – Commentaries
  – Review articles
  – Citation analyses (big possibilities in open-access)

• Organized analysis
  – Journal peer-review

Both systems may co-exist: address different needs

Bernard F Schutz
Albert Einstein Institute

combination = interactive open access publishing & collaborative peer review
Disaggregated Systems: open to current agents, new entrants, value added services, and various business models

herbert van de sompel