Open Peer Review & Interactive Open Access Publishing: 
The Effectiveness of Transparency & Self-Regulation in 
Scientific Quality Assurance

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Outline

Introduction

    challenges & perspectives

Interactive Open Access Publishing & Collaborative Peer Review

    concepts & effects

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

    aims & achievements

Conclusions

    summary & outlook
Motivation of Open Access

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

Educational:
- inform & stimulate students & general public
- equal opportunities in the information society (global & social)

Economic:
- liberate distorted scientific information market
  (subscription/usage, cost/benefit, library budget crisis)
- enhance efficiency & facilitate innovation
  (formatting, distribution, evaluation, archiving, etc.)

Scientific:
- enhance research impact & productivity
- improve quality assurance: bigger need, larger gain and
  higher importance than “mere increase of impact & productivity”
Open Access & Quality Assurance

**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/Copernicus, economics e-journal, 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
Quality Assurance Problems (II)

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
Dilemma: Speed vs. Quality

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
Solution: Speed & Quality

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
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 ~ 100 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 (2008): J. Geophys. Res. (AGU) ~ 1000 papers/yr
  Atmos. Environ. (Elsevier) ~ 800 papers/yr
  Atmos. Chem. Phys. (EGU) ~ 700 papers/yr (~10%)
  J. Atmos. Sci. (AMS) ~ 200 papers/yr
  J. Atmos. Chem. (Springer) ~ 100 papers/yr
## ACP Publication & Discussion Statistics

### Discussion Papers (ACPD)
- **submissions (increasing):** ~ 60 month\(^{-1}\) (US, D, UK, F, …)
- **rejections (access review):** ~ 10 %
- **submission-to-publication time:** ~ 1 month (min: 10 days)
- **publication charge (author):** ~ 1000 EUR/paper (incl. final paper)

### Final Papers (ACP)
- **rejections (review completion):** ~ 5 % (< 20 % total, save referees)
- **submission-to-publication time:** ~ 1 month (3-6 months in total)

### Interactive Discussion
- **interactive comments / discussion paper:** ~ 5 (up to ~30)
- **comment pages / paper pages:** ~ 50 %
- **referee anonymity (exp. vs. mod.):** ~ 70 % (80% vs. 60%)
- **reader comments / discussion paper:** ~ 1/4 (up to 10)
- Constructive suggestions, harsh criticism, applause

### Extended Discussion
- **peer-reviewed commentaries / paper:** ~ 1/100 (∼ trad. journals)
ACP Discussion Example

Discussion Paper

Publication Date
20.08.2004

Title, Authors, Reference
A review of the Match technique as applied to AASE-2/EASOE and SOLVE/THESOO 2000
G. A. Morris, B. R. Bojkov, L. R. Lait, M. R. Schoebert
Atmospheric Chemistry and Physics Discussions, 4, 4665-4717, 2004
SRef-ID: 1680-7375/acpd/2004-4-4665

Online Access

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 S3896: '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

AC S4007: 'Response to S. Tilmes', Gary Morris, 17.05.2005, 0:30

AC S4036: 'Response to Bekki', Gary Morris, 17.05.2005, 1:09

AC S4025: 'Response to M. Rex', Gary Morris, 17.05.2005, 0:54

AC S4032: 'Response to M. Rex - Detailed comments', Gary Morris, 17.05.2005, 0:56

See (Google Search):
ACPD, “Online Library” (OA), “Most Commented Papers”
ISI Journal Citation Report 2007 (six years after journal launch)

**ACP impact factor 2006: 4.9** (citations in 2006 to papers of 2004 & 2005)

- **# 1** out of **51 journals** in “Atmosphere Sciences” (incl. Meteo & Climate)
- **# 2** out of **137 journals** in “Geosciences” (Multidisciplinary)
- **# 2** out of **160 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
- **9 Interactive OA Journals**: Atmos. Chem. Phys. (ACP), Atmos. Meas. Techn. (AMT), Biogeosciences (BG), Climate (CP), Cryosphere (TC), e-Earth (eE), Geoscientific Models (GMD), Hydrology (HESS), Ocean Science (OS); … more to come
- **3 OA Journals** (trad. peer review, formerly subscription-based): Geophysics (ANGEO), Natural Hazards (NHESS), Nonlinear Processes (NPG)


- **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)
Conclusions from ACP/EGU & Copernicus

ACP/EGU interactive open access sister journals demonstrate that:

1) **Strengths of traditional publishing & peer review**
can be efficiently combined with the opportunities of open access, interactive discussion & public peer review

2) **Collaborative peer review (public review & interactive discussion)**
enables highly efficient quality assurance, leading to **high quality** (top impact & reputation) 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
Alternative Concepts

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
Systems for Scholarly Communication

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

herbert van de sompel
Propositions

Promote open access publishing

- **prescribe open access** to publicly funded research results
- **transfer funds** from subscription to open access publications:
  convert subscription budgets (e.g. 10-30 % per year) into OA publishing funds (e.g., 2000 EUR per year & scientist, plus project-specific funds)

Emphasize quality assurance & interactivity

- **foster open access publishing & public peer review:**
  implement discussion forums in new & existing journals
- **mere access is not enough** (repositories & self-archiving)

Improve scientific evaluation & rating methods

- **evaluate individual papers** not just journal impact factors
- **refine statistical parameters** for citation, download, and usage;
  interactive commenting & rating