Interactive Open Access Publishing and Collaborative Peer Review for Improved Scientific Communication and Quality Assurance

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Introduction
- perspectives of Open Access & challenges of scientific quality assurance

Interactive Open Access Publishing & Collaborative Peer Review
- concepts & effects

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

Alternative Concepts & Future Developments
- combination & integration

Outlook
- vision & propositions
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 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.:
  NJ Physics, NP Geophys., PLoS Biology, BMC Structural Biology, 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
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
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 open access 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
Interactive Open Access Publishing

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

- ACPD
  - Referees
    - Peer review
    - Peer review completion
  - Author
    - Submission
    - Technical corrections
  - Editor
    - Publication
  - Discussion Paper
  - Referee Comments
  - Author Comments
  - Short Comments
  - Scientific Community

- ACP
  - Final Revised Paper
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 ~ 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

- ~ 40 traditional journals publishing ~ 4000 atmospheric science papers/yr
- major journals (2006):
  - J. Geophys. Res. (AGU) ~ 1000 papers/yr
  - Atmos. Environ. (Elsevier) ~ 700 papers/yr
  - Atmos. Chem. Phys. (EGU) ~ 400 papers/yr (~10%)
  - J. Atmos. Sci. (AMS) ~ 200 papers/yr
  - J. Atmos. Chem. (Springer) ~ 100 papers/yr
### Discussion Papers (ACP D)
- **submissions (increasing):** \(~ 40 \text{ month}^{-1} (D \approx \text{US, UK, F, ...})\)
- **rejections (access review):** \(~ 10 \%\)
- **submission-to-publication time:** \(~ 1 \text{ month} \text{ (min: 10 days)}\)
- **publication charge (author):** \(~ 1000 \text{ EUR/paper} \text{ (incl. final paper)}\)

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

### Interactive Discussion
- **interactive comments / discussion paper:** \(~ 5 \text{ (up to 20)}\)
- **comment pages / paper pages:** \(~ 50 \%\)
- **referee anonymity (exp. vs. mod.):** \(~ 60 \% \text{ (70\% vs. 30\%)}\)
- **reader comments / discussion paper:** \(~ 1/4 \text{ (up to 5)}\)
- **constructive suggestions, harsh criticism, applause**

### Extended Discussion
- **peer-reviewed commentaries / paper:** \(~ 1/100 \text{ (\approx trad. journals)}\)
## Discussion Paper

### Publication Date
20.08.2004

### Title, Authors, Reference
A review of the Match technique as applied to AASE-2/EASOE and SOLVE/THESOPH 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

## 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 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
- **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

- **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
ACP Citation Statistics

ISI Journal Citation Report 2006

**ACP impact factor 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.copernicus.org/EGU/acp/journal_impact_factor.html
www.in-cites.com/journals/AtmosphericChe-N-Phy.html
European Geosciences Union (EGU), www.egu.eu

- **Mission & History:** *international 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*
- **7 Interactive OA Journals:** Atmospheric Chemistry & Physics (ACP), Biogeosciences (BG), Climate (CP), Cryosphere (TC), e-Earth (eE), Hydrology (HESS), Ocean Science (OS); … *more to come*
- **3 OA Journals** w. traditional peer review: Annales Geophysicae (ANGEO), Natural Hazards (NHESS), Nonlinear Processes (NPG)

Copernicus Group, 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 sister journals demonstrate that:

1) Interactive open access publishing & collaborative peer review indeed lead to
   - higher impact & quality of publications (top reputation & impact factors)
   - higher reviewing efficiency (10-20% rejections instead of 30-70%)
   - lower cost (~ 1 kEUR/paper vs. ~ 3-5 kEUR/paper)
     compared to traditional subscription journal publishing & closed peer review

2) New (interactive) open access journals can be successfully established by scientific societies and/or small publishers

3) Traditional journals can be efficiently converted into (interactive) open access journals
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 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
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

*Slower, more accurate in long-term*

*Immediate but cruder*

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
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
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 & collaborative 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