Scientific Quality Assurance by Interactive Peer Review & Public Discussion

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Open Access & Quality Assurance

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Working Group Statement

1. Enhance the quality assurance and evaluation of scholarly output. Free availability of information...web access.

2. More effective peer-review by
   - allowing interactive forms of review and discussion.
   - permitting more efficient and more inclusive selection of referees.
   - giving referees more information with which to do their work.

Barnes et al., www.zim.mpg.de/openaccess-berlin, 2003
A growing trend…a growing dilemma

- Desire for fast publication, too many submissions, quality is sacrificed

A possible solution…”Open Access” peer review

- The Interactive Journal “Atmospheric Chemistry and Physics”

- A two-stage review process…web based

- Principles & advantages
The “Tip of the Iceberg”: fraud
- falsification, selective omission & tuning of results,

The “Norm”: carelessness & uselessness
- superficial & irreproducible description of experiments & models
- non-traceable arguments & conclusions, duplicate & split papers, etc.

The 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.
Present Problems (II) - Review

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, conflicting interests & little gain 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- critical, supportive & complementary comments unpublished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
Increase of articles & decrease of comments in traditional journals

Number of articles (a) and comments (b) published in Monthly Weather Review (solid) and Journal of Atmospheric Sciences (dashed) within the indicated year. Comment / Article Ratio (1978 ⇒ 1998): 1 / 20 ⇒ 1 / 100

The Dilemma

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 journals push for short peer review times (2-4 weeks) & prefer short papers with little detailed information
- preprints & proceedings with no or little quality assurance flood the information market

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
Is there a Solution?

Two-stage publication process with interactive peer review & public discussion

**Stage 1:** Rapid publication of Discussion Paper

*pre-selected by editors (referees), fully citable & permanently archived*

*(more than traditional preprint)*

**Interactive Peer Review & Public 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 Revised Paper

*analogous to traditional peer review & journal publication*
ACP Open Access Journal Concept

**Combination of multiple features for maximum efficiency of scientific exchange & quality assurance**

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

Interactive peer review & public discussion

⇒ public comments support peer review, revision & editorial decision
⇒ maximum quality assurance & information density

Optional anonymity for referees

⇒ critical comments from competent but dependent or busy referees

Archiving & citability of all discussion papers & comments

⇒ documentation of controversial scientific innovations & flaws in papers reviewed & commented but finally rejected
Atmospheric Chemistry & Physics (ACP)

Publisher & Distributor

- European Geosciences Union (EGU)
- **free internet access** ([www.atmos-chem-phys.org](http://www.atmos-chem-phys.org))
  - paper copies & CDs printed & sold on demand
- journal launch in September 2001
- **full coverage by ISI & CAS**

Editors

- globally distributed network of ~ **70 editors covering 32 major subject areas**
- coordination by executive committee & chief executive editor

Publication Market

- ~ **40 traditional journals** publishing ~ **4000 atmospheric papers/yr**
- **major competitors:**
  - J. Geophys. Res. - Atmos. (AGU) ~1000 papers/yr,
  - Atmos. Environ. (Elsevier) ~500 papers/yr,
  - Atmos. Res. (Elsevier) ~100 papers/yr,
  - J. Aerosol Sci. (Elsevier) ~100 papers/yr, etc.

- **ACP in 2003:** ~**150 papers/yr, increasing trend**
Interactive Scientific Journal

Discussion Forum (stage 1) + Journal (stage 2)
ACP Discussion Example

Atmospheric Chemistry and Physics Discussions (ACP): Interactive Discussion

Discussion Paper

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

Status: Closed

RC S1124: 'Referee Comment on Kay et al.', Anonymous Referee #2, 28.07.2003, 19:06
---AC S1176: 'Response to Anonymous Referee #2', Jennifer Kay, 05.08.2003, 20:05

RC S1126: 'Referee comment on Kay et al.', Paul DeMott, 28.07.2003, 22:59
---AC S1201: 'Author response to referee Pa...', Jennifer Kay, 07.08.2003, 10:02

---AC S1374: 'Author Response to Tabazadeh ...', Jennifer Kay, 24.08.2003, 20:21
---SC S1393: 'Reply to Kay et al.', Azadeh Tabazadeh, 26.08.2003, 18:11
---AC S1507: 'Author Response to A. T...', Jennifer Kay, 12.09.2003, 0:41

RC S1407: 'review of Kay et al', Anonymous Referee #1, 28.08.2003, 9:46
Primary Advantages

All-win situation for authors, referees & readers

Interactive Peer Review & Public Discussion

- documentation of critical comments, controversial arguments, scientific flaws & complementary information (referees & readers)
- deterrence of careless, useless & false papers (referees & readers)

Discussion Paper

- free speech & rapid publication (authors & readers)
- direct feedback & public recognition for high quality papers (authors)

Final Revised Paper

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

- **Submission rate (increasing):** \(\sim 20 \text{ month}^{-1}\)
- **Rejection rate in access peer review (ACPD):** \(\sim 20\%\)
- **Rejection rate in peer review completion (ACP):** \(\sim 10\%\)
- **Time from submission to publication in ACPD:** 1-2 months
- **Time from submission to publication in ACP:** 4-6 months
ACP Discussion Statistics - 2003

- **interactive comments / article:** ~ 4
- **comment pages / article page:** ~ 1/3
- **public interactive comments / article:** ~ 1/4
- **(traditional) peer-reviewed comments / article:** ~ 1/100
- **increase with visibility & publication alert service expected**
ISI Journal Citation Report 2003 (2 years after journal launch):

- **ACP impact factor (citations 2003 to papers of 2001 and 2002):**
  2.32 - number 12 out of 46 atmospheric sciences journals

- **ACP immediacy index (citations 2003 to papers of 2003):**
  0.76 - number 1 out of 46 atmospheric sciences journals
mix of constructive contributions, harsh criticism & applause
referees preferring anonymity: ~ 70 %
(experimentalists: ~ 50 %, modellers: ~ 20 %)

Examples for constructive contributions & applause

Public Comment (ACPD, 2, S530-S532, 2002):
… the following comment does not affect the aim of the paper …
however, it might be of general interest for all those modelling …
I would like to suggest that … be included.

Public Comment (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 …
Examples for harsh criticism & controversy

➢ **Referee Comment** (ACPD, 3, S448-S451, 2003):

  This is by no means possible, … I am really frustrated about the fact that the authors … already published a large number of papers in which they state again and again …

  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 Response** (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 …

  This manuscript confirms once again the existence of such correlations and shows the actual retrieval uncertainties to be even smaller

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**No abusive commenting or personal offenses**
The Vision is Becoming a Reality

Promotion of scientific progress by interactive peer review & public discussion

Revaluation & higher information density of scientific literature

- interactive 2-stage process of peer review, publication & discussion
  ⇒ more attention & carefulness of authors, more input from referees & other scientists into review & revision ⇒ better & fewer papers

Better documentation & evaluation of scientific quality & competence

- interactive peer-review & public discussion ⇒ more information about scientific quality, competence & style of papers & authors ⇒ facilitate evaluation by non-specialist readers & evaluation committees (funding & positions)

Faster scientific innovation & disclosure of scientific flaws

- publication of discussion papers before full peer review ⇒ free speech & documentation of controversial scientific innovations & flaws

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

Maintain flexibility of interactive peer review & public discussion processes

Adjustment of pre-selection & discussion period
extent of referee involvement & technical corrections

Statistical rating of individual papers
download, commenting & citation statistics

Section for final revised papers with low editorial rating
final revised papers not accepted for publication in main journal
(e.g. ACP Contributions, ACPC)

Quality assurance feedback loop
editorial rating (ACP/ACPC) vs. statistical rating of papers (discussion/final)

Integration in large-scale open access publishing systems
evolution towards peer networks etc.
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