

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*

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.*

***Large proportion of scientific publications
carelessly prepared & faulty***

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*

***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*)

***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*

***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

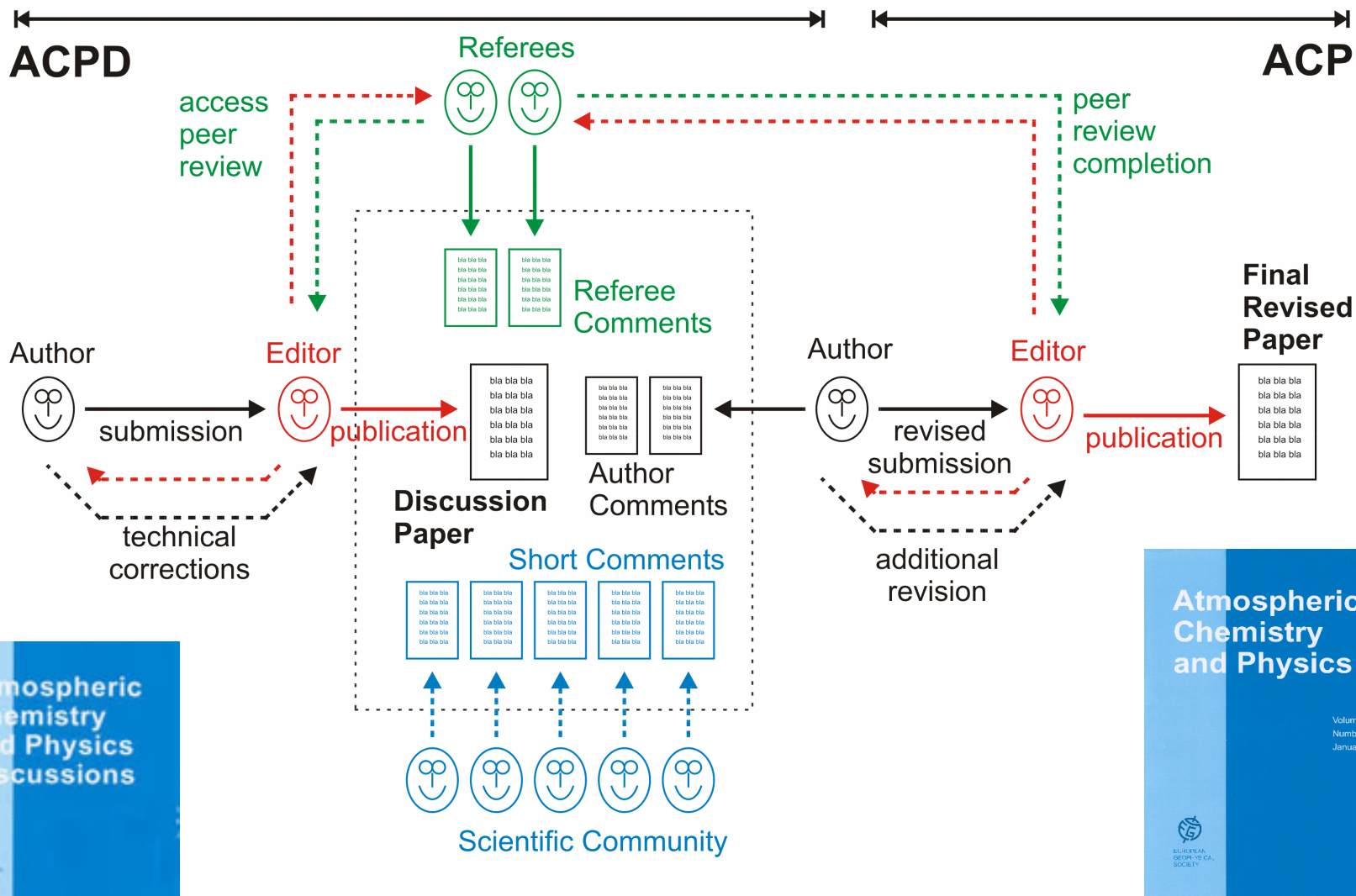
*referee comments & additional comments by interested colleagues
published alongside discussion paper (anonymous or by name,
non-reviewed but individually citable & permanently archived)*



Stage 2: Review completion & publication of Final Paper

analogous to traditional peer review & journal publication

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



All-win situation for authors, referees & readers

Discussion Paper

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

Public Peer Review & Interactive Discussion (Collaborative Peer Review)

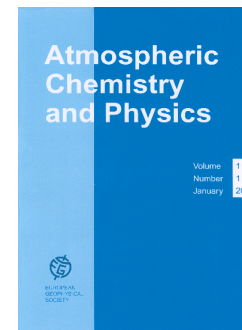
- *direct feedback & public recognition for high quality papers* (*authors*)
- *prevention of hidden obstruction & plagiarism* (*authors*)
- *documentation of critical comments, controversial arguments, scientific flaws & complementary information* (*referees & readers*)
- *deterrence of careless, useless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

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 (ACPD)

- **submissions** (increasing): ~ 40 month⁻¹ (*D* ≈ US, 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): ~ 10 % (~ 20 % total, save referees)
- **submission-to-publication time**: ~ 1 month (3-6 months in total)

Interactive Discussion

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

Extended Discussion

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

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)

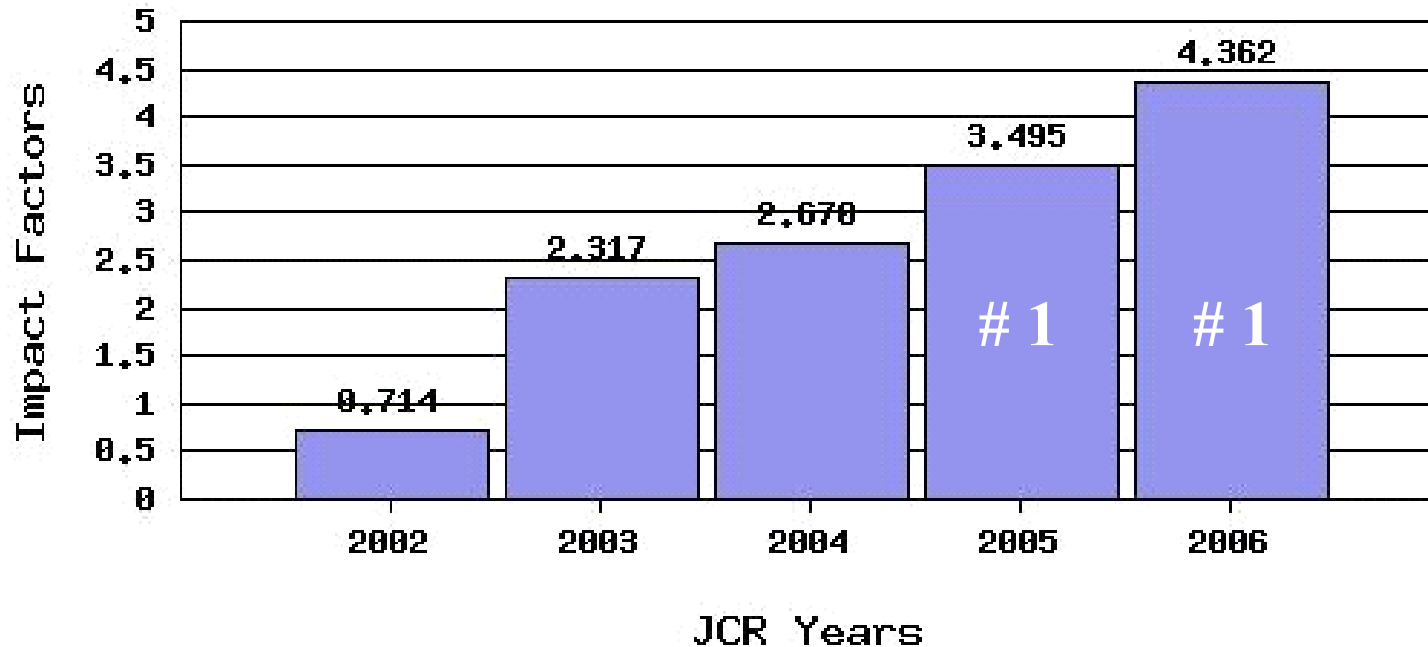
SC: Short Comment (attributed)

EC: Editor Comment (attributed)

 Online Version (PDF)

 Print Version (PDF)

ATMOSPHERIC CHEMISTRY AND PHYSICS



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**”

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 (NHES), 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*

***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

Slower, more accurate in long-term

Immediate but cruder

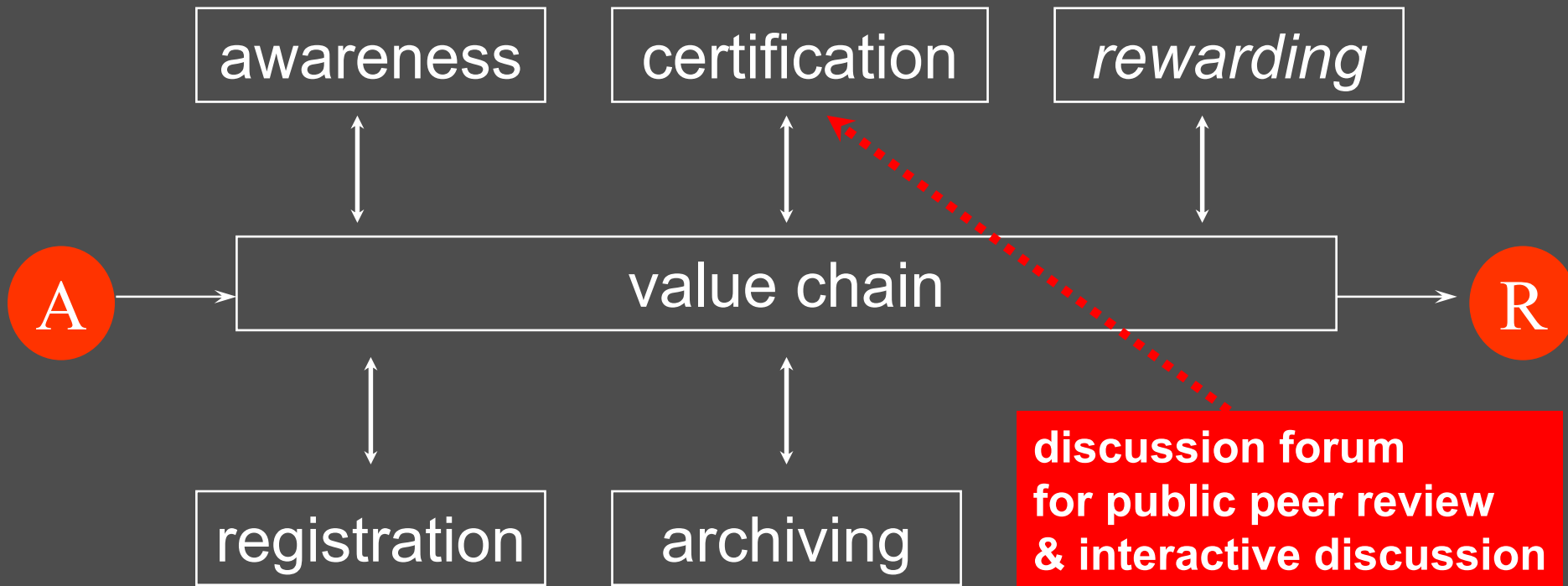
**Both systems may co-exist:
address different needs**



**combination = interactive
open access publishing &
collaborative peer review**

Systems for Scholarly Communication

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

***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***

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