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

Ulrich Pöschl

Max-Planck-Institut für Chemie, Mainz
www.mpch-mainz.mpg.de/~poeschl

European Geosciences Union
www.egu.eu

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)

Quality Assurance Problems (I)

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*

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)

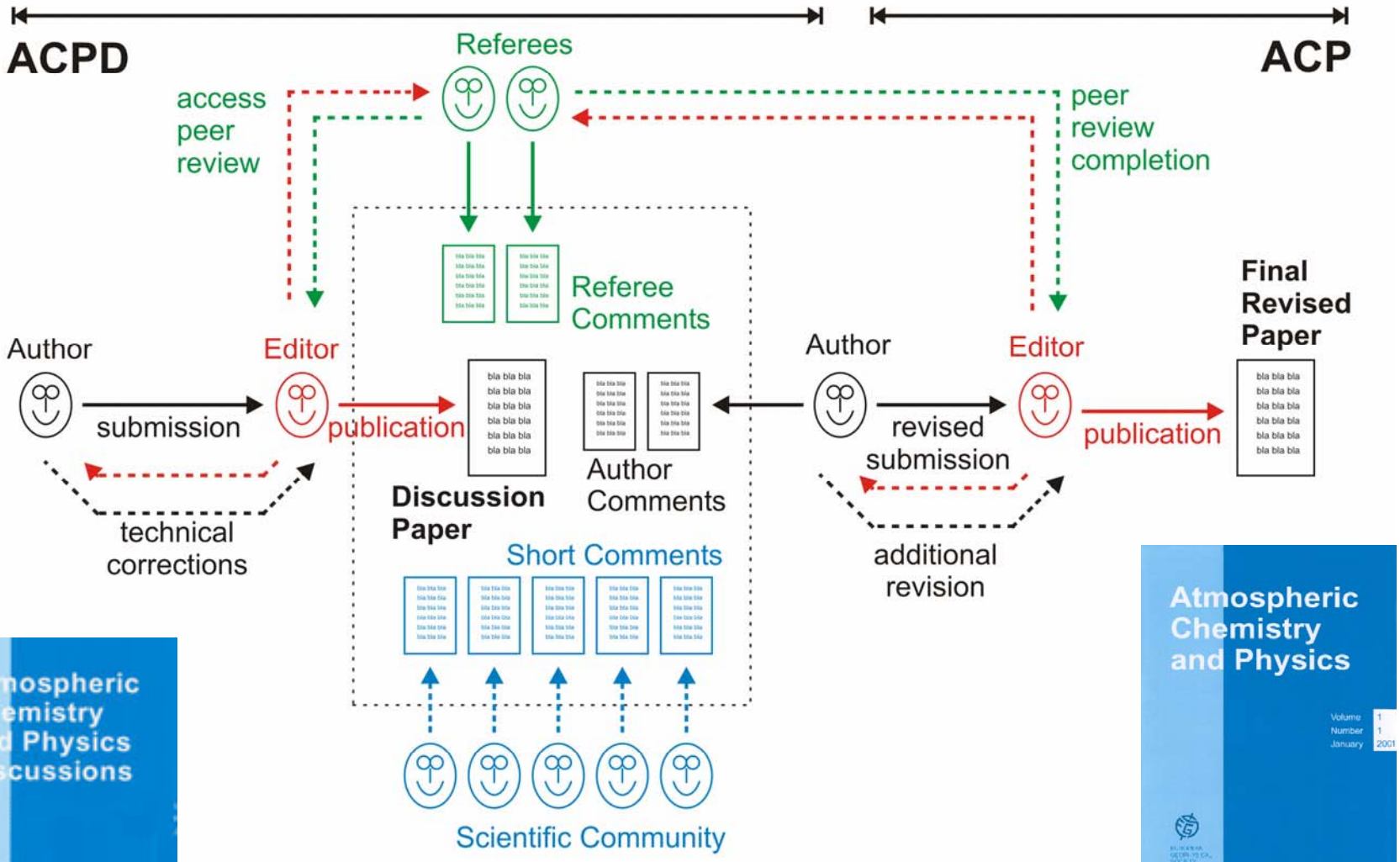
Stage 2: Review completion & publication of Final Paper

analogous to traditional peer review & journal publication

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

Interactive Open Access Publishing

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



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

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 (2008):* *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

MPIC

ACP Publication & Discussion Statistics

Discussion Papers (ACPD)

- ***submissions*** *(increasing)**:*** ***~ 50 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 18)*
- ***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)*

MPIC

ACP Discussion Example

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

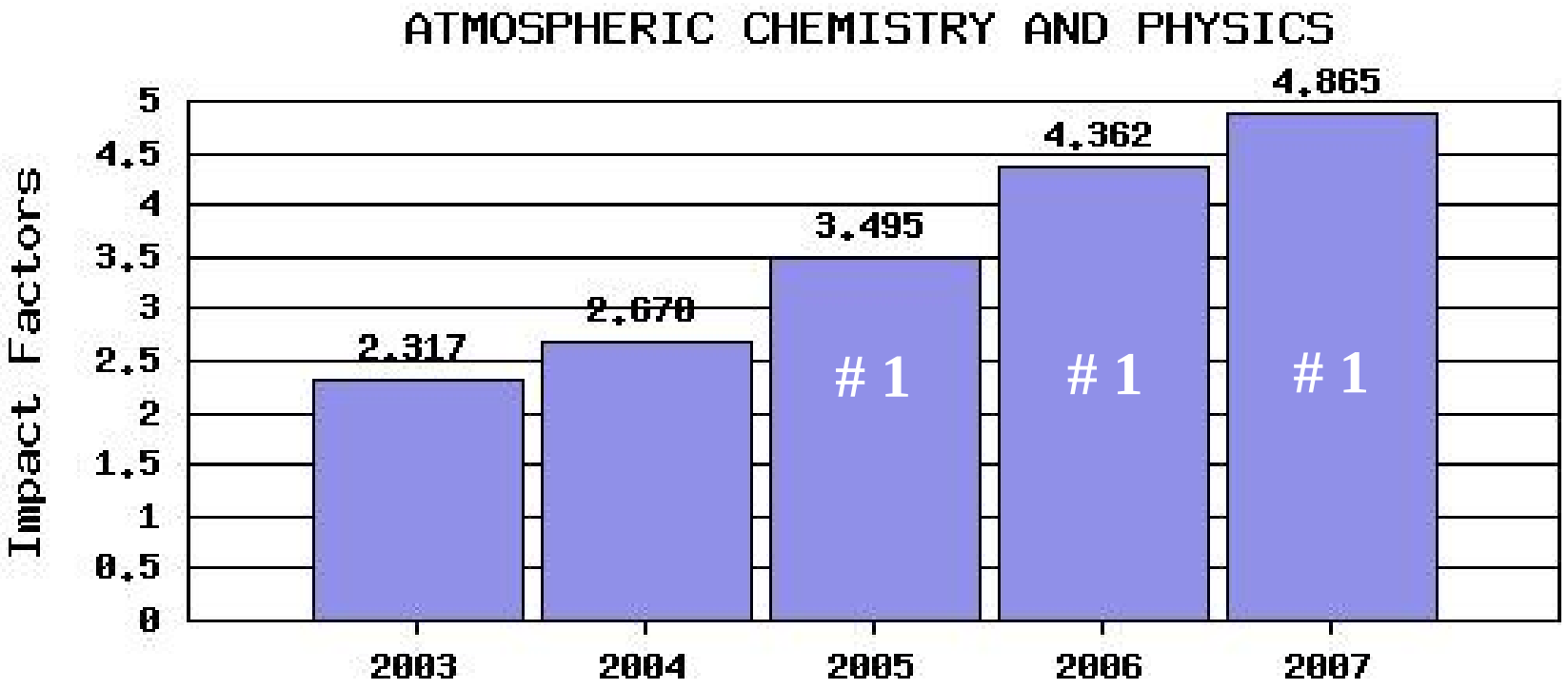
SC S2118 : 'Comment #1' , Markus Rex, 19.10.2004, 11:37
AC S4025 : 'Response to M. Rex' , Gary Morris, 17.05.2005, 0:54

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)

See (Google Search):
ACPD, "Online Library" (OA),
"Most Commented Papers"

ACP Citation Statistics



ISI Journal Citation Report 2006 (five 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

EGU & Copernicus

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)*

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)*

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

Vision

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

Slower, more accurate in long-term

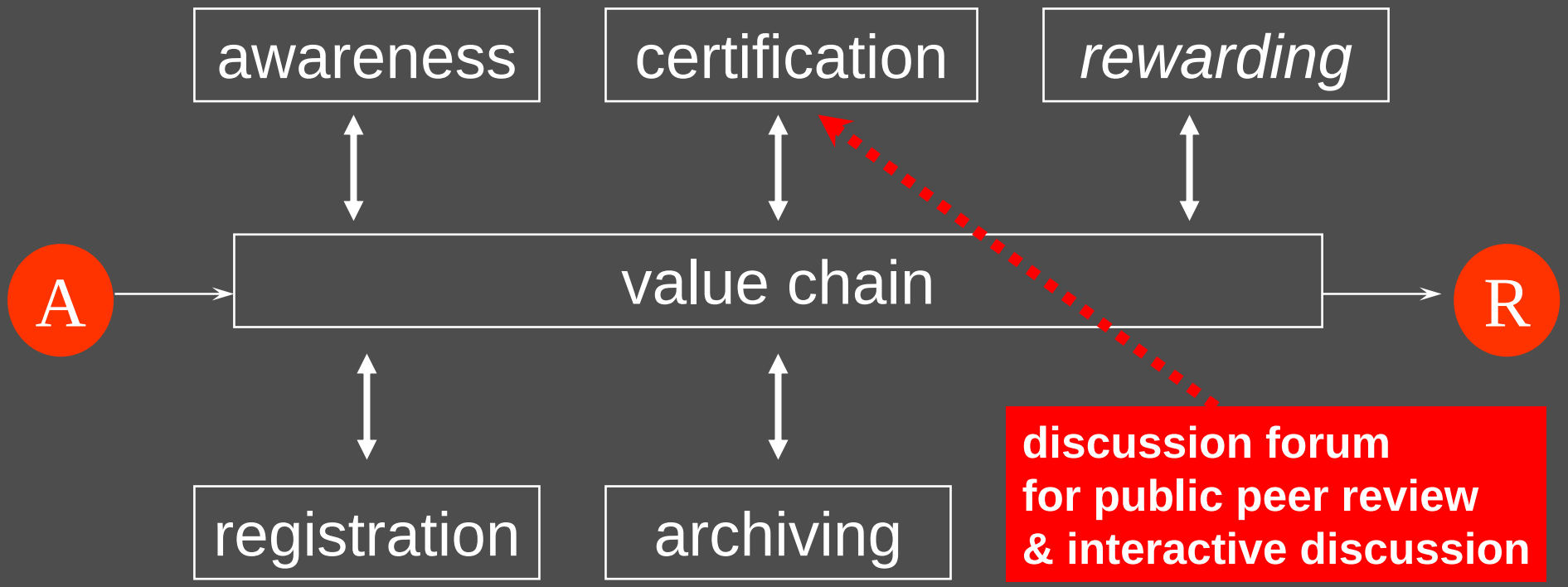
Immediate but cruder

Both systems may co-exist: address different needs

combination = interactive open access publishing & collaborative peer review

Bernard F Schutz
Albert Einstein Institute

Systems for Scholarly Communication



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

herbert van de sompel

Los Alamos NATIONAL LABORATORY

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*