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The peer review system revisited

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Part 1

Introduction to review systems

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How it started

- ◆ Kundzewicz, Z. W. & Koutsoyiannis, D. (2005) Editorial — The peer-review system: prospects and challenges. *Hydrol. Sci. J.* 50(4) 577-590;
- ◆ Discussions by:
Makropoulos, C., Butler, D. & Maksimovic, C. (2006) *Hydrol. Sci. J.* 51(2) 350-351; Pannell, D. J. (2006) *Hydrol. Sci. J.* 51(2) 352-353; Schumann, A. H. (2006) *Hydrol. Sci. J.* 51(2) 354; Wong, T. S. W. (2006) *Hydrol. Sci. J.* 51(2) 355-356;
- ◆ Reply:
Kundzewicz, Z. W. & Koutsoyiannis, D. (2006) Pathologies, improvements and optimism. *Hydrol. Sci. J.* 51(2) 357-363.

Objectives of the review process

- ◆ The general objective of the review system is to help answer the following question: **is the object under review** (submitted manuscript, project proposal, etc.) **good enough** (for publication or funding) relative to other candidates and/or to a pre-defined (possibly fuzzy) threshold?
- ◆ The normative statement of the task of reviewing a manuscript submitted to a journal for possible publication is that of **comparison to a (varying) set of standards** (e.g. to other papers in the same journal, or in other journals).

The acceptance level is an **Editor's instrument** to match supply and demand (incoming papers vs available journal space). He may adjust the threshold of acceptance, seeking an equilibrium level dependent on circumstances. He navigates trying to avoid the two extremes:

- ▣ having a large backlog of accepted papers waiting for their turn to be published; and
- ▣ having too few accepted papers for the forthcoming issue.

Objectives of the review process – cont.

- ◆ Wesolowski (2003) stated that the review process should ensure, among other things, that the **material is new** (or a **useful summary** of previous work), that **data and conclusions are correct or at least believable**, that the **subject matter and impact are appropriate** for a given journal, and that the presentation is **readable**.
- ◆ As Beck (2003) puts it, a system of reviewing should **filter out junk science** and **provide useful feedback to authors of non-junk science who have submitted work that can be improved**.
- ◆ This filtering, however, should be careful enough to **allow unorthodox but possibly correct, innovative ideas to get through**.
- ◆ Reviewers have a duty to help the authors, help the advancement of the science, and help the journals publish useful papers.

- ◆ The stakeholders in the review process: **authors, reviewers, editors, readers and publishers**, have different points of view. The review process may occasionally lead to disappointing results in the perception of one or more stakeholders.
- ◆ **Editors** are primarily responsible for the quality of journals. Typically, an editor wishes **to avoid**, as far as possible, making editorial “errors of the first kind” (**publishing papers that do not deserve publication**) and “errors of the second kind” (**rejecting papers that deserve publication**) (cf. Kundzewicz, 2002).

Basic review systems

Half-blind review

- ◆ Names of referees are unknown to authors, but names of authors are known to referees, so the system is asymmetric, by construction.
- ◆ Another asymmetry lies in the perspective of the parties, since authors are working for their career, while referees are doing unaccounted (due to anonymity) and unpaid community service.
- ◆ Half-blind (half-anonymous) mode is the dominant option in academic publishing.

Open (*eponymous*) review

- ◆ Open review (where all names are known to all parties) is being introduced in some journals, and considered in others (this is also known as *signed review*, mandatory reviewer identification and more concisely, *eponymous*, as opposed to anonymous review).
- ◆ The rationale is: “Let’s do away with anonymous reviews and take both the credit and the blame for our ideas” (Robinove, 2003).

Blind (*anonymous*) review

- ◆ Completely blind review: no one but an editorial assistant knowing the identity of the authors and only the editor knowing the identity of the reviewer.
- ◆ The rationale for the blind review is: “I do not want people to think about who I am. I want them to think about what I write” (Forel, 2003).

Advantages and disadvantages of basic options of peer review

Option	Main advantages	Main disadvantages
Half-blind review (dominant system)	Workable; satisfactory to most stakeholders	Allows subjectivity, bias, abuse; affords the referees the possibility to be rude, vindictive and lazy
Open review	Transparency; equity; accountability of referees' work	Reluctance of referees to follow; probably positively biased for established authorities
Blind review	Equity	Costly and difficult to implement, or even infeasible

Illustration of performance of the review system in *HSJ* (sample size: 100 submissions)

- ◆ In many cases, reviews of the same paper, provided by different referees, are in agreement. In 68 cases, all referees who dealt with a given paper placed it in **the same** category, i. e. (i) poor to fair, or (ii) good, or (iii) very good to excellent.
- ◆ 10 papers: both referees dealing with a given paper recommended acceptance as it stands, or after minor revisions
- ◆ 10 papers: both referees recommended rejection
- ◆ 27 cases, reviewers were in agreement, recommending the action: “possibly accept after major revision and re-review”

- ◆ However, there are 4 examples of **strongly conflicting opinions**:
“good / accept after minor revisions” vs “poor to fair / reject”,
“very good to excellent / accept as it stands” vs “poor to fair / major revision and re-review”.

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Part 2

Pathologies, new opportunities, improvements and optimism

by Demetris Koutsoyiannis

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Personal experience and motivation

- ◆ As an author:
 - Overall the peer review system helped me ...
 - ... to improve my knowledge and my papers
 - ... and to build courage and self-confidence
 - ... because I had to fight to publish my papers
 - I formed the opinion that the difficulty to publish a paper may be positively correlated with (my subjective judgment of) its importance
- ◆ As a reviewer:
 - Overall I developed the positive feeling of participating in one of the most significant functions of the scientific community
 - I learned some things but not in proportion to the time I devoted
 - I took the opportunity to disseminate my own works and ideas
 - I am happy that my work was voluntary (not paid)
 - ... but I regret that it was not accountable

Another personal perspective ...

I'm The Referee

David J. Pannell*

You've posted in your paper
To a journal of repute
And you're hoping that the referees
Won't send you down the chute

You'd better not build up a sense of
False security
I've just received your manuscript and
I'm the referee

This power's a revelation
I'm so glad it's come to me
I can be a total bastard with
Complete impunity

I used to be a psychopath
But never more will be
I can deal with my frustrations now that
I'm a referee

* from: Pannell, D. J. (2002) Prose, psychopaths and persistence: personal perspectives on publishing. *Can. J. Agric. Economics* 50(2), 101–116.

Summary of pathologies

Problem	Culprit	Specification
Subjectivity	Editor	Rejecting a potentially fine paper outright, without sending to a referee
		Choice of a referee to achieve a desired decision
Bias	Referee, editor, publisher	Underestimation of papers written by less known authors, from less known institutions, discrimination due to author's young age, native language, nationality, ideology, gender, race (?)
Abuse	Author	Multiple submissions of very similar papers to different journals ("salami" publishing); downgrading junior co-authors, or inclusion of co-authors that did not contribute meaningfully to the paper..
	Referee	Abuse of access to privileged information; stealing ideas or results from material under review
		Delaying the process and ultimate publication
Non detection of defects	Referee	Non detection of errors of facts, wrong methodology, results, corollaries
Fraud and misconduct	Author	Authors fabricate results, falsify data, or claim authorship of results that they know not to be their own.

Pathologies: an interesting diagnosis and a prescription ...

- ◆ Ioannidis (2005) on the false published research findings:
 1. False findings may be the majority or even the vast majority of published research claims
 2. The greater the financial and other interests and prejudices in a scientific field, the less likely the research findings are to be true
 3. The hotter a scientific field (with more scientific teams involved), the less likely the research findings are to be true
- ◆ Armstrong's (1982) hexalogy to increase the likelihood and speed of acceptance of your paper:
 1. Do not pick an important problem
 2. Do not challenge existing beliefs
 3. Do not obtain surprising results
 4. Do not use simple methods
 5. Do not provide full disclosure
 6. Do not write clearly

Ioannidis, J. P. A. (2005) Why most published research findings are false. *PLoS Med.* 2(8), 124.

Armstrong, J. S. (1982) Barriers to scientific contributions: the author's formula. *Behavioral and Brain Sci.* 5(2), 197–199.

A characteristic recent example – *Science* and stem cell research

- ◆ Two “breakthrough” celebrated papers in stem cell research were published in *Science* (in 2004 and 2005),
 - ... but then were retracted (2006), after a major fraud was found (fabrication of results) resulting from serious research misconduct
- ◆ Donald Kennedy, Editor-in-Chief of *Science*: “Peer review cannot detect [fraud] if it is artfully done”
- ◆ Martin Blume, Editor-in-Chief of the American Physical Society and its nine journals: “Peer review doesn’t necessarily say that paper is right; it says it’s worth publishing”
- ◆ A very interesting point of this story is that the fraud was not uncovered by means of formal journal procedures (i.e. discussion papers), but through Internet exchanges
- ◆ The positive message is that fraud was (and will be) eventually uncovered and, thanks to the Internet, today this can be done faster than ever
- ◆ This proved power of the Internet may discourage research misconduct in the future
- ◆ The Internet also makes plagiarism impossible (search engines will spot it)

New opportunities for improvements: Basic tools

- ◆ The Internet:
 - Global and interactive representation of human knowledge
 - Enhancement of distribution of scientific knowledge and scientific communication
 - Guarantee of worldwide access
 - No censorship
- ◆ The open society paradigm:
 - Transparent and flexible mechanisms
 - No secrets for public issues
 - No authoritarianism
 - Responsiveness and tolerance
 - No need for bloodshed (according to Karl Popper)

The Internet as a medium of communication

- ◆ Distant joint research and authoring of scientific articles were made fast and easy
- ◆ Submission and tracking procedures of articles were made automatic, fast and cheap
- ◆ The review process has taken full advantage of the possibilities offered by the Internet
- ◆ Authors are happier due to reduction of processing times ...
... but technology does not suffice

The Internet as a medium of dissemination

- ◆ The Internet offers:
 - ability to any user to publish information of any kind
 - direct accessibility of any user to information
 - extremely convenient and fast locating of information via search engines
- ◆ The Internet does not offer quality control of information, unless combined with some cleverly designed mechanisms (e.g. wikipedia)
- ◆ The importance of information that has not passed quality control should not be underestimated
 - The user is able to judge himself/herself
 - There are examples of successful open archives (e.g. arXiv.org by Cornell University: Open access to 362 000 e-prints in Physics, Mathematics, Computer Science and Quantitative Biology)

The function of journals in the era of the Internet

- ◆ Traditionally the scientific journals had a double role:
 - Quality control
 - Dissemination
- ◆ In the new reality established by the Internet the dissemination role of journals has been put into question (if not negated):
 - If I publish my work in my own web site or in an open archive, anyone can access it
 - If I publish it in a journal, only the subscribers will access it
- ◆ Thus, the two roles from synergistic have become antagonistic

The function of journals in the era of the Internet (2)

- ◆ The issue could be seen as a multicriteria optimization problem whose control variables could be the allocation of costs to different actors (authors, readers, organizations of authors and readers, societies, publishers)
- ◆ The views of the different actors imply different components of the objective function in the optimization
- ◆ The Pareto front should be explored
- ◆ On the one end of the Pareto front lies the open/free access (HESS example)
 - The author pays all costs directly or through his/her organization
- ◆ On the other end of the Pareto front lies the free authorship (JoH example)
 - No allocation of cost to the author
- ◆ Perhaps a multi-option system with different journals implementing different solutions in the Pareto front is the most advantageous from the authors' viewpoint

The Internet as an open environment of the review process

- ◆ The Internet provides the option that the review process (manuscripts, reviews, editor decisions) be open and accessible to everyone interested
- ◆ Question: should scientific journals implement this option
 - Answer 1 (HESS): Yes
 - Answer 2 (other journals): No (or not yet)
- ◆ Arguments for 'Yes'
 - The authors have their works published immediately and openly
 - Nobody can steal their ideas
 - The reviews, if done eponymously, become open comments ('tiny publications') rather than secret advices to the editors (accountability)
 - Any interested scientist (in addition to formal reviewers) can post comments on the articles

The Internet as an open environment of the review process (2)

- ◆ Arguments for 'No'
 - The readers are not interested on the "kitchen" (development of the paper and reviews) but on the "dining room" (final paper)
 - The authors may not be sure for their papers and may wish to have advice from reviewers before publication
 - The authors may not wish to have their errors published eternally
... cf. the story of Poincaré and the prize by King Oscar of Sweden
 - If anonymous reviews are allowed, the errors of authors are associated to their names – in contrast to the anonymous reviewers' errors (disparate treating)
 - The authors may wish to submit their papers elsewhere if rejected from one journal

The Internet as an open environment of the review process (3)

- ◆ Personal opinion from an author's viewpoint
 - I have the right to choose the open or the closed review option
 - I wish that each of the journals would allow both options
 - If this is impossible in a specific journal, I can exercise my right choosing among different journals
 - Thus, a multi-option system with different journals implementing different options is preferable from the authors' viewpoint
 - If I choose the open review option, I demand that reviews are fully open, which means eponymous
 - ... anonymous reviews have no place in an **open** professional environment (there exist weblogs where they could be posted – as opinions, not as formal reviews)

Eponymous vs. anonymous reviewing

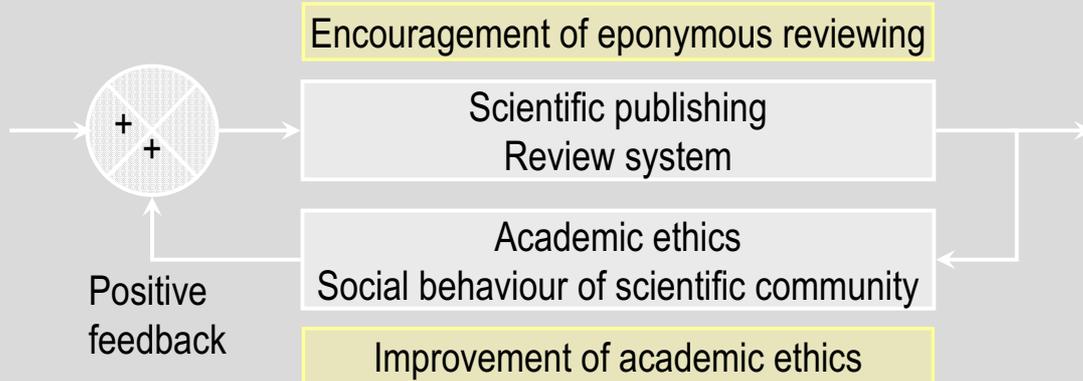
- ◆ Eponymous reviewing seems to have advantages over anonymous reviewing, on grounds:
 - ethical (more fair, equitable and courageous)
 - social (more cooperative, productive and accountable)
 - political (more open, democratic and responsible)
 - esthetical →



From anonymous to eponymous/open reviewing

~~Adoption of eponymous reviewing as the only review system~~

Too radical (will cause bloodshed ...)
Will not resolve the problems at once
Will create other problems



Optimistic conclusion

- ◆ The review system is a great achievement of the scientific community: voluntary, collective and democratic
- ◆ Discussion of problems (even with publishing personal experiences) is a necessary condition for any improvement
 - The discussion may be enhanced into a real dialogue if we are ready to change established behaviours and abandon past stereotypes
- ◆ A gradual movement from anonymous reviewing toward eponymous and open dialogue (with the help of Internet) is possible and will receive positive feedback from improved academic ethics
- ◆ As happens with science, in scientific publishing ...
 - ... personal contributions and examples matter
 - ... small improvements (e.g. each of us playing his/her role a little bit better) are important and built an infrastructure for larger improvements