



Make Open Access Publishing Fair and Transparent!

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Abstract:	<p>Ongoing developments (e.g. Plan S) will possibly lead to major shift towards Open Access (OA) publishing in the near future. We generally support these bold initiatives in favour of this transition, but we argue that they do not adequately address current deficiencies of OA publishing. We identify negative developments – particularly from an academic perspective – associated with OA publishing and present solutions that address these deficiencies and which should ensure that OA publishing can live up to its great potential.</p>

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Make Open Access publishing fair and transparent!

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Abstract

Ongoing developments (e.g. Plan S) will possibly lead to major shift towards Open Access (OA) publishing in the near future. We generally support these bold initiatives in favour of this transition, but we argue that they do not adequately address current deficiencies of OA publishing. We identify negative developments – particularly from an academic perspective – associated with OA publishing and present solutions that address these deficiencies and which should ensure that OA publishing can live up to its great potential.

Key words: FAIR principles, Global OA Partnership, Open Science, Plan S, recommendations, scientific publishing, standards

The recent revolution of scientific Open Access publishing

The scientific publication landscape has dramatically changed in environmental sciences (and beyond) since the onset of this millennium by two closely interconnected trends: the widespread emergence of online-only journals that drastically reduced the costs for scientific publishers (Van Noorden 2013), and the increasing success of Open Access (OA) publishing journals (Tennant et al. 2016), i.e. journals that have reversed the revenue generation from a reader-pays to an author-pays approach. In principle, there are four avenues of OA publishing (Table 1): an increasing number of journals has been established that solely publish OA (gold OA); the vast majority of these journals is online-only. Currently in Ecology and Evolutionary Biology, 25 of 189 journals included in the 2017 Journal Citation Report by Clarivate Analytics are gold OA journals. A second possibility is to publish an article in a conventional toll-access journal, and additionally provide an OA version without journal layout, e.g. in a repository (green OA). Third, authors of many subscription journals can opt to publish an individual article OA (hybrid OA). Finally, “anarchistic” OA publishing through platforms such as ResearchGate (<https://www.researchgate.net/>), Sci-Hub (<https://sci-hub.tw/>) or author personal web pages that provide free access to a large fraction of scientific output (including non-OA publications), a practice that is often illegal, but has so far been largely tolerated by publishers. In total, it has been estimated that 29% of the publications in environmental sciences archived in the World Wide Web are available OA (Khabisa & Giles 2014).

Open Access has become supported by funding agencies, which increasingly require scientific papers resulting from projects they have funded to be made freely accessible. In this context,

the recently proposed Plan S (<https://www.coalition-s.org/>), which has been developed by the EU and several national funding agencies, aims for a rapid transition of scientific publishing to gold and green OA.

A range of arguments in favour of OA publishing are widely accepted: i) unconstrained access to scientific results for everyone (e.g. researchers, countries, institutions, non-scientists), which is particularly important for academics and stakeholders from low- and medium-income countries, and for practitioners without access to scientific evidence that was locked behind paywalls; ii) facilitation of knowledge syntheses including those conducted by the IPCC (www.ipcc.ch) or IPBES (www.ipbes.net); iii) automated extraction of information from scholarly research via text- and data-mining, allowing for analyses at a massive scale (Glennison et al. 2005); iv) facilitation of evidence uptake by decision makers and the wider public; and thus v) contribute to closing the gap separating the wider public from the scientific community (Tennnant et al. 2016).

Open Access Publishing: has it delivered what it promised?

While OA publishing undoubtedly has brought these gains, it also entails risks that are not fully appreciated. For example, OA has led to the emergence of a plethora of predatory journals in biology and beyond (Beall 2012). In addition, it introduced financial incentives to maximize the publication output for publishers, thus creating a fundamental conflict of interest. In cases where editorial decisions are not fully independent of the economic decisions of the publisher, there is a risk of lowering standards of scientific scrutiny and peer review before acceptance of manuscripts.

While an increasing number of funding agencies urge or require OA publishing (Schlitz 2018, van Noorden 2018), the substantial costs of OA publications that authors have to incur are often not fully covered. For instance, the Austrian Science Foundation FWF has established a limit of a maximum of 2500 € for gold OA, and of 1500 € for hybrid OA that will be provided to authors to cover OA publication costs (<https://www.fwf.ac.at/de/forschungsfoerderung/open-access-policy/>), which is well below what many OA journals request per article. The German Research Foundation DFG currently provides 750 € per project year for publication costs, hence for a typical three-year project only about one OA publication is covered. While being insufficient, these funds dedicated to

cover OA publishing costs redirect money from Science Foundations that would otherwise have been available for funding science (Poynder 2019).

Indeed, the article processing charges for journals with high impact factors in environmental sciences are often staggeringly high. For instance, *PLOS One* asks for 1,595 US\$ per article, *PLOS Biology* for 3,000 US\$, *Nature Communications* for 5,200 US\$ (4,290 € in Europe; plus VAT or local taxes where applicable), and *Science Advances* for 4,500 US\$. If these article processing charges are not (or only partly) covered by funding agencies, they may be prohibitive – in particular for researchers from low- and medium-income countries (Schlitz 2018). For the latter, waivers are neither systematically, nor transparently given – potentially establishing a kind of “academic imperialism” (Burgman et al. 2019). Although solid estimates remain scarce, it is generally assumed that these fees are disproportionate to the article processing charges. For example, the average revenue per article of the science-publishing industry is estimated at approximately 5,000 US\$, generating about 10 billion US\$ in revenue yearly (Schimmer et al. 2015). In comparison, the cost is estimated to be around 3,000 US\$ per subscribed article and between 70 to 200 US\$ per OA article (Brembs 2015), implying in all cases a striking profit for publishers, at the expense of research and tax payers. In essence, in many cases, OA has put additional financial burdens on authors, while publishers have adapted to the changing environment, without losing their superior negotiating position, or their excessive benefits. Particularly beneficial for publishers is the above-described hybrid OA, where they receive subscription fees and additionally cash in OA fees (“double-dipping”) (Jeschke et al. 2019). In a nutshell, OA has not lived up to the expectation that it will reverse the flow of public money to private publishers, i.e. effectively subsidizing publishers with tax money.

Establishing a safe operating space for OA

For making OA truly fair – i.e. inclusive, affordable, transparent and the role model of scientific publishing for the future – such deficiencies need to be solved. We believe addressing these issues has become particularly important and timely, as there are large initiatives such as Plan S that aim to make OA publishing mandatory for publications they have funded. If implemented, Plan S may have a transformative impact on scientific publishing. We believe that several key points and potential solutions have not received appropriate attention, and

are also not yet adequately included in Plan S. We consider five key issues particularly relevant (Table 2).

First, those institutions and stakeholders (e.g. publishers, science funders, scientists) that have a vital interest in OA should strive for a joint agreement that settles key questions and provides guidance (similar to the DORA-declaration, <https://sfdora.org/>). Such an agreement should take into account the 10 principles of Plan S (<https://www.coalition-s.org/10-principles/>), but we believe that a broader discussion is needed that considers legitimate concerns of all parties involved, i.e. authors (e.g. NN 2018, Burgman et al. 2019), users, funding agencies, publishers, referees and editors. It should explicitly address the question of appropriate costs of OA publishing, and should recommend benchmarks for author charges. On the other hand, funding agencies should agree on covering the full costs of OA publishing that are in line with these recommendations. In addition, clear principles how waivers are provided to researchers that do not have the necessary funds for covering OA costs should be established. Both these principles and their implementation should be transparent. As part of such an agreement, standards that allow for identifying high quality and predatory OA journals should be agreed upon. Such a whitelist approach could expand the Directory of Open Access Journals (<https://doaj.org/>), while the complementary blacklist approach could expand and continue the privately established “Beall’s List of Predatory Journals and Publishers” (<https://beallslist.weebly.com>) (Beall 2015). Recently, the Chinese government has announced that it will create such a national blacklist of journals that it considers poor quality or those seeking excess profit (Cyranoski 2018). Further, OA agreements between publishers and funding agencies should be fully transparent by making the terms of agreements public. Non-disclosure agreements – which are often requested by publishers – are incompatible with such an approach as they create an environment where pricing is opaque and everyone except the publishers is put at a disadvantage (Poynder 2019).

Second, there should be additional incentives for authors to publish in journals that fulfil the criteria (incl. full refund of OA publishing processing charges also for publications not funded by project money), and funding institutions should routinely check if publications that have arisen from projects they have funded have been published in predatory journals. Such an approach should also consider the possibility of penalties for authors when violating established criteria.

Third, the role of academic editors and reviewers has to be reconsidered. Both usually serve

the scientific community in kind, and the rapid increase of publication output in most fields of scientific inquiry has brought this system to a limit. We argue that increased efforts are necessary to better acknowledge the crucial roles that reviewers and academic editors have. This problem has been started to be addressed by initiatives such as Peercommunity (<https://peercommunityin.org/>) and Publons (<https://publons.com>) which provide visibility to reviewers. However, Publons is owned by Clarivate, hence a commercial company having financial interests collecting these valuable data. We believe that the steps taken so far fall short in addressing the full scale of the challenge that services provided by reviewers and editors (typically without costs for the publisher) have become a critical bottleneck for scientific publishing. Most of us believe that fully paying the work of reviewers and editors would have unintended side-effects, but we suggest doing such work for OA journals should be acknowledged by providing adequate discounts or waivers for future publications in these journals. In any case, it would certainly be fruitful to conduct a deep reflexion on what type of rewards for this free work for benefit-based companies would be adequate while devoid of side effects.

Fourth, to counterbalance the increasing negotiating power on the side of OA publishers (which deal with individual authors rather than large institutions), we suggest that the negotiating partners of the publishers unite, e.g. at a national (or even higher, like European Union) level. Such an approach has recently been taken up by universities and research institutes for negotiating with large conventional publishers (e.g. Projekt DEAL in Germany, <https://www.projekt-deal.de>). Building on these experiences, we advocate the idea of establishing an *International Union of Funding Agencies* (which could be established by expanding the cOAlition S which backs Plan S) and an *International Interest Group of OA Publishing Authors*, which would allow for negotiating more equitable terms with OA publishers.

Fifth and finally, a global OA Partnership should be established. We believe that cOAlition S could serve as a nucleus for developing such a broad partnership, which should incorporate the relevant actors in the field, and whose governance structure should reflect the diversity of interests. Its governance structure should be equitable, transparent and accountable. Its primary role should be to oversee the development and implementation of global standards regarding OA publishing, and it should be open to appeals if OA standards are not met. Establishing such a partnership is a delicate and ambitious task, and will demand substantial

commitment and leadership of interested parties. We should now take the first steps towards this longer-term goal.

Conclusions

Open Access publishing has entered a phase of disillusion. Hopes of contributing to a democratization of society have only been realized to a limited extent, and unexpected developments have shown to be able to undermine these. We believe that agreeing upon and establishing standards for OA publishing that appropriately reflect the legitimate interests of all actors – including those of scientists – is necessary to ensure that OA publishing can live up to widely held expectations. We acknowledge that our suggestions to address these problems are ambitious – progress will be incremental, needs to be adaptive and responsive to challenges, and in doing so goals that are currently out of reach will become achievable.

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Figures and Tables

Table 1: Key characteristics of the four avenues of OA publishing, and their advantages (+) and disadvantages (-) for the wider public, authors, publishers and funding agencies compared to conventional toll-access publishing.

	Gold OA	Green OA	Hybrid OA	Anarchistic OA
Definition	Journals publish only OA	Articles are available OA on repository after publication in toll-access journal	Subscription journals that have some OA articles in their issues	Non institutional or non-legal OA platforms
Wider public	<div><div>+: Higher accessibility</div><div>-: Difficulties to identify predatory journals, potential for conflicts of financial versus editorial interests</div></div>	<div><div>+: Higher accessibility</div><div>-: Difficulties to locate repositories</div></div>	<div><div>+: Higher accessibility, but only for articles published OA</div><div>-: Some publications behind a paywall, potential for conflicts of interest</div></div>	<div><div>+: Higher accessibility</div><div>-: Legal concerns; not supported by publishers, no centralized availability and not systematically updated</div></div>
Authors	<div><div>+: Higher visibility, larger readership and higher citation rate</div><div>-: Expensive, lack of transparency for waivers</div></div>	<div><div>+: Higher visibility, larger readership and higher citation rates</div><div>-: Legal concerns</div></div>	<div><div>+: Higher flexibility for authors, as more journals to choose from; higher citation rates of OA articles compared to non-OA articles in the same journal</div><div>-: Expensive, lack of transparency for waivers</div></div>	<div><div>+: Free and flexible (e.g. authors can host their full publishing record on one website), higher visibility, larger readership and higher citation rate</div><div>-: Legal concerns, lower accessibility</div></div>
Publishers	<div><div>+: Secure and rapid revenue as payment of OA publishing charge is</div></div>	<div><div>+: None</div><div>-: Possibly reduced revenue, as</div></div>	<div><div>+: Higher flexibility, OA papers are paid twice (double-</div></div>	<div><div>+: None</div><div>-: Possibly reduced revenue, as</div></div>

	due upon acceptance -: No subscription fees possible	manuscripts are accessed via freely available websites	dipping) -: None	manuscripts are accessed via freely available websites
Funding agencies	+ : Possibly cheaper, as authors pay OA publishing processing charge, co- benefits such as easier access to scientific results -: Possibly more expensive due to refunding of author publication costs	+ : Co- benefits such as easier access to scientific results -: Toll-access journal fees still apply	+ : Co- benefits such as easier access to scientific results -: More expensive, as OA publication processing charges and toll-access journal fees apply (double-dipping)	+ : Co- benefits such as easier access to scientific results -: Legal concerns

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Table 2: Five elements that we consider necessary to ensure a safe operating space for the future of OA publishing. For details, please see main text.

No	Recommendation	Justification and added value	Necessary steps	Responsibility
1	Establish widely accepted agreements on essential OA standards	Accepted criteria on a range of central aspects of OA are highly needed	Develop, agree on and promote criteria that should set widely accepted standards	Funding agencies, OA publishers, scientists, academic institutions
2	Encourage authors not to publish in OA journals that do not fulfil the OA standards, and monitoring publishing in predatory OA journals	Reducing publications in OA journals that do not meet criteria is vital to improve the value and acceptance of OA publishing	Develop, establish and promote standards and procedures for tracking publications in predatory OA journals	Funding agencies, scientists, academic institutions
3	Improve recognition of the work of editors and reviewers for OA journals	Providing incentives via discounts or waivers for future publications in OA journals	Establish a system that monitors editorial and reviewing work, and that results in improved recognition (e.g. waivers for future OA publications)	OA publishers, scientists
4	Establish international bodies for OA publishing authors and funding agencies	Improve the negotiating position of OA authors and funding agencies	Develop and establish international bodies that represent OA authors and funding agencies (e.g. <i>International Union of Funding Agencies, International Interest Group of OA Publishing Authors</i>)	Funding agencies, OA publishers, scientists, academic institutions
5	Establish a Global OA Partnership	Establish a body that oversees the development and implementation of global standards of OA publishing, and to handle appeals if OA standards are not met	Establish a partnership that represents the different relevant actors and institutions in OA publishing	Funding agencies, OA publishers, scientists, academic institutions