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Triple Point v16n1

Global Flow of Scholarly Publishing and Open Access

Olivier Pourret[1]

Open access is not a new topic for *Elements*. The topic was addressed by Alex Speer, Kevin Murphy, and Sharon Tahirkheli in 2013 (Speer et al. 2013) and, later, by Christian Chopin in 2018 (Chopin 2018). I fully agree that there is a strong imperative for the geochemistry, mineralogy, and petrology communities to ensure that the research it produces is widely accessible, especially in the increasingly important context of the United Nations Sustainable Development Goals. Indeed, according to the STM Report 2018 (Johnson et al. 2018), two thirds of the scholarly literature in 2016 remains inaccessible to the public because it is hidden behind a paywall. Scholars have been making various cases for wider public access to published research, known as open access (OA), since the late 1980s.

Scientific publishing is currently undergoing a major transformation, with a move towards OA marking a major shift in the financial models of the major publishers. This opens up greater diversity in publishing routes and raises wider issues around publishing ethics. Ensuring that scientists and their institutions do not have to pay more than they currently do to read and publish papers has become critically important. The funder-led open-access science publishing initiative known as "Plan S" —launched in September 2018, aimed at accelerating the full transition to OA. The practices set out in Plan S are now increasing at a systemic level. Currently, there are nine different routes for authors to achieve compliance with Plan S, only some of which have author-facing costs (Pourret et al. 2020). The Plan S funders will provide additional funding to researchers to cover associated article processing charge (APC) expenses. In this way, authors should not face an increased financial burden. If authors are not directly supported by cOAlition S, they have nothing to worry about because they are not forced to follow a policy that does not apply to them. Nevertheless, instead of achieving OA via potentially more sustainable and fair methods, Plan S seems to be directly financially biased towards covering APCs, based on ongoing trends around "transformative agreements" (Pourret et al. 2020). Plan S also entails changing the evaluation system, most notably by promoting wider adoption of the San Francisco Declaration on Research Assessment (DORA) (https://sfdora.org/) and the Leiden Manifesto (Hicks et al. 2015). This coupling between changing both the publishing and the evaluation systems should help to

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get over much of the slow growth and inertia towards more optimal scholarly communication systems.

The capacity of journals and academic groups to transition effectively and sustainably to a dominant model of OA is currently under debate (e.g., https://www.coalition-s.org/coalition-s-consults-on-transformative-journals/). Like other scientific disciplines, geochemistry now has a number of publishing options available to authors, these options being provided by a variety of institutions, commercial publishers, and learned societies, thereby creating a diverse publishing environment. It is even more imperative that individual research communities have a better understanding of the academic publishing landscape and access to reliable information on the options available to researchers as part of this transition. Many of our professional societies are currently evaluating their publishing strategies and economic models. A few are considering an increased role for OA publication in their journals. Pourret et al. (2019) provide an overview and analysis of the current OA practices in 56 "geochemistry" journals. They present an evaluation of the actual practices that encourage further dialogue, raise awareness, and support decision-making processes for the geochemistry community's future development. The practice of publishing journals has significantly changed since the time when learned journals were largely published only by learned societies: many learned journal have now been absorbed by multi-national commercial publishers (e.g., Elsevier, Springer Nature, and Wiley) who make large profits from the intellectual property of the researchers who have "donated" their work in exchange for the potential "prestige" that publication grants them in peer-reviewed journals. Major changes are now becoming more mainstream, including widespread free access to articles (Piwowar et al. 2018) that have been funded not by subscriptions but by an APC. This practice increases the profit-making capacity of commercial publishers and disadvantages authors with lesser financial privileges. More equitable alternatives are required, such as returning to the earlier model by which a research paper is not regarded as a for-profit commodity but as a public-serving good. However, there is a relatively simple and cost- and risk-free option: a majority of the journals in geochemistry have a green colour according to the SHERPA/RoMEO grading system (FIG. 1), indicating that pre-print and post-print of articles submitted to journals can be archived in a repository. According to the *Web of Science* among the 885 articles published in *Elements*, only 56 were OA as Gold or Bronze (data accessed on 01/02/2020). The change started three years ago with an increase of up to 31% total OA articles in 2018. This change was mainly because author institutions required authors to publish articles as OA, and so paid for this.

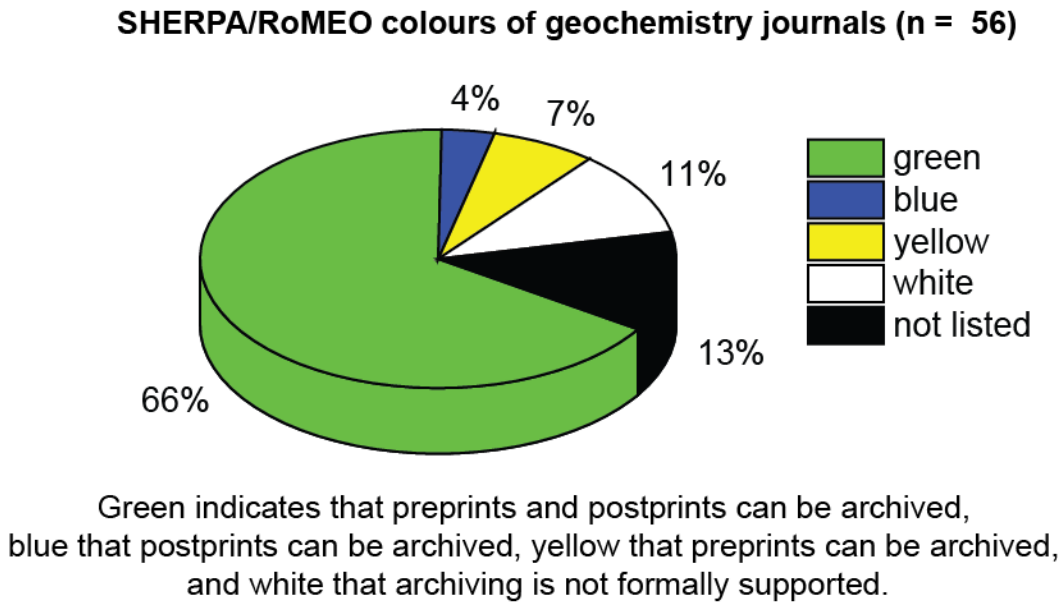

FIGURE 1 SHERPA/RoMEO colours of geochemistry journals. MODIFIED FROM POURRET ET AL. (2019).

Pourret et al. (2020) note that OA is often conflated with just one way to achieve it: the author-facing business model of APC, whereby authors (or their respective organizations or research funding agencies) pay an APC to cover the cost of publishing. This has often resulted in the cry of "I can't afford to pay fees to make my work open access!"

However, in reality, there are a variety of routes to OA. Typically, these are identified as Gold, Bronze, Green or Diamond/Platinum: the latter two have no APCs. Green OA refers to the self-archiving on a personal website, or on an archive of a near-final and peer-reviewed version, of their work (usually the approved manuscript or post-print before any type-setting or copy-editing by the publisher). Due to better long-term preservation, publishing in a trusted archive is usually preferable. Diamond/Platinum OA refers to the free distribution of content on a journal website without any APCs being paid, with the running costs for the journals usually being covered by external means. Gold OA requires additional APCs to be paid for immediate publishing access (i.e., all APC-based OA is Gold OA, but not all Gold OA is APC-based). Bronze OA applies to free-to-read papers on the website of the publisher, but without any formal open license (such as "CC BY") that could hinder their potential reuse. The highest APCs are typically those leveraged by the large commercial publishers (Pourret et al. 2019). But what's the real cost of publication? Around US$500 to $600, as estimated by Grossmann and Brembs (2019). When APCs are significantly higher, we need to ask, "What is the money being used for?" Real for-profit, or is it for redistribution via fee waivers for low-income countries, student grants, and so on?

For as long as science publication continues to move from the paywall model to the OA model, it is possible that individual researchers will face problems with the APC scheme, irrespective of any future waiver or discount system in place. Therefore, the APC-driven elements of OA typically restrict the available journal option for those individuals who want, or need, to publish OA papers but have limited funding. In many cases, publishing their work in a high-impact journal without paying the APC and putting their paper behind a paywall is one of the only choices. It results in a complex system around OA. This scheme tends to spread across the research community and produces two classes of researcher: 1) those who can afford to publish in OA journals, and particularly in those journals who charge high APCs; 2) those who do not benefit from such financial resources and are forced to publish behind a paywall. It will be important to explore the effect that APC-related restrictions have had on researchers' publication choices across different disciplines, and, in particular, the potential impact that this may have on the visibility and reuse of geochemistry research.

Finally, in parallel to traditional journal publication, there is a clear role for self-archiving of peer-reviewed accepted manuscripts (post-print): the Green OA route. The policy of making research available to the wider public in some countries has essentially set up institutional repositories to do just this [e.g., the Hyper Articles en Ligne (HAL) repository in France]. The Green route is cost-free for authors, and numerous platforms and collaborative tools for pre-prints (e.g., EarthArXiv) are available for researchers to pursue Green OA. However, the pre-print model remains little-known and is not being routinely used by geochemists. Another problem is that the current APC model has additional restrictions on the publication of research from developing countries where OA fees are beyond reach, resulting in authors seeking out the lower- or no-cost options found in "predatory journals", i.e., those journals that lack the support from academic societies, use unvalidated review processes, and have a for-profit approach with little clear consideration for what is written. Unfortunately, there are ample opportunities to publish scientific research as OA papers in such journals. The publishing practices of these types of journal challenge the long-term future of full peer review and of publishing ethics. There is currently much discussion between professional and learned societies and academic publishers on this subject (e.g., the Society Publishers Accelerating Open Access and Plan S project) (Wise and Estelle 2019). I encourage the geochemical community to be active; to consult and take action; and to prioritize our research with straightforward, open and rigorous peer review, and visibility.

THE "TAKE HOME" MESSAGE

In the light of the rapid development of scientific publishing models, it seems important to draw attention to the situation of hybrid journals, including most of the

conventional/historical geochemical journals in which we used to publish (such as *Elements*). Plan S advocates full support for OA papers, but excludes hybrid journals. This officially discourages researchers and institutions from paying additional fees in a subscription-based journal and asks us not to accept a double-dipping scheme. Publishing in a hybrid journal is, indeed, possible without paying for APCs and disseminating the text on an open archive repository. The final published article would only be available to members on the journal's website, but the peer-reviewed version would be free to everyone on the repository. The value of a journal is the community it creates, not just the papers it publishes. *Elements* is a good example!

Continue to do great work. Choose where you want it to be published. But don't place it behind a paywall! Like me, choose the Green route!

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