



Where researchers at the Scott Polar Research Institute are publishing and the implications of the associated Article Processing Charges (APCs) incurred

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Abstract

The open access movement has led to a diversification in the business models adopted in scholarly publishing with a growing number of journals moving away from the traditional subscription model. This is particularly true of polar science journals: *Polar Research*, the journal of the Norwegian Polar Institute, became a gold open access journal in 2011 and in 2016 *Annals of Glaciology* and the *Journal of Glaciology* also moved to open access relying on Article Processing Charges (APCs) charged to authors for their publishing revenue. This paper will describe the main publishing business models (subscription, gold open access and hybrid) now being used by academic publishers and will report the results of an analysis on where SPRI's researchers have published since 2010, based on over 220 journals articles. The paper also identifies the Article Processing Charges for the top 15 journals in which SPRI authors have published. Since these are mainly hybrid journals this may indicate that hybrid journals are now the dominant business model in journal literature affecting polar science. It raises some issues for librarians seeking to manage cost effective access to relevant journals and articles, some of which are open access and some of which are not. The costs provided may also help inform the researchers' decision making process in choosing where to publish their research.

Introduction

The advent of the World Wide Web has enabled scholarly journals to become available in electronic formats. Many thousands of titles from the leading academic publishers are now available electronically to institutions through annual subscriptions with academic libraries typically bulk purchasing e-journals titles from the larger publishers. Such *big deals* have been attractive to academic libraries since ostensibly at least they are cost efficient compared with the cost per title and administration costs of handling individual subscriptions. However even with negotiations undertaken through consortia or nationally the costs of such big deals have consistently risen steeply. UK universities' journal subscription costs have risen 20 per cent in three years during a period when they have simultaneously paid far more to make research open access. According to a recent report on *Monitoring the transition to open access* (Universities UK, 2017), in 2016 a sample of 10 UK universities paid £16.1 million for subscriptions to seven of the biggest publishers, yet these universities also spent £3.4 million on article processing charges (APCs), the fees required to publish an article open access.

Open access may offer a more sustainable path for scholarly publishing to take, however costs of APCs have also been rising sharply. The average APC payment rose from £1,699 in 2013 to £1,969 in 2016, a rise of 16% (as compared with a rise of 5% in the Consumer Price Index (CPI) (Universities UK, op cit.)

As alternatives to the traditional subscription, open access publishing has developed or embraced a diverse range of business models. These can include green, gold and diamond (or platinum) open access. There is some discussion as to how these models will evolve, see for instance Popova, (2015) and Laakso and Björk, (2012)

Aims

The aims of this paper are threefold: firstly to provide a discussion of the main models of open access publishing. This, in turn, will help to introduce and interpret an analysis of the Scott Polar Research Institute's journal article publishing since 2010. Thirdly, the paper will give an indication of the costs associated with article processing charges (APCs) for those journals in which our researchers most commonly publish. The results were obtained in order to inform authors' decisions on where to publish in the future. By shedding some light on this subject this paper may provide some clarity for researchers, administrators and librarians in the polar community facing a plethora of financial decisions relating to the overall cost of publishing a scholarly article.

Open access-publishing models

Articles can be published as open access in various ways. If they appear in a journal which publishes all of its' contents as fully open access the journal may absorb the cost of open access publishing - many learned society journals or university presses are good examples whilst others may charge authors, their institutions or their funding bodies (e.g. Public Library of Science (PLOS)). The "author pays model" can involve significant article processing charges. APCs are increasingly being considered as part of the total cost of journal acquisition (Lawson, 2015 and Pinfield, Salter and Bath, 2015). According to a recent Jisc report (Shamash, 2016), APCs currently make up at least 12% of institutions' journal spend and are likely to grow.

Many journals retain the traditional subscription model. This is usually borne by a University's academic library. However many of these journals now also provide the facility for individual articles to be made available as open access on payment of an article processing charge. Such journals are known as *hybrid*

journals. By offering authors an open access route for their publications hybrid authors satisfy requirements of research associations or other government agencies charged with the allocation of research funding. This has had a profound effect in the UK where the Research Councils (RCUK) introduced a policy on open access (RCUK, 2013). In order to help implement the policy, research councils introduced a new funding mechanism - a block grant made available to universities and eligible research organisations to cover the cost of APCs. In turn, this has influenced the Research Excellence Framework (REF) by requiring authors to make their research outputs available as open access in order to be considered for funding. Other countries have similar processes for determining research funding in their universities e.g. the Performance Based Research Funding (PBRF) in New Zealand, ERA (Excellence in Research for *Australia*) in Australia and NSF funding in the USA but have less stringent requirements for open access.

Frustratingly and paradoxically, APC's for hybrid journals tend to be higher than for fully open access journals (Björk and Solomon, 2014). Publishers of hybrid journals also run the risk of charging twice for the same articles (an approach known as “double dipping”) by taking subscription fees paid by the institution's library, but not reducing their licence fees for the corresponding decrease in subscription only content. As Björk and Solomon (2014) point out, this dilemma can be solved either by lowering subscriptions to all institutions globally to reflect hybrid earnings, or locally by lowering subscription costs to the institution that paid the APCs. Publishing in a fully open access or hybrid journal and paying APCs is known as the Gold route to open access. Diamond or platinum open access is a variant where no APCs are charged to the author.

The green route is an alternative way to achieve open access. This route requires a manuscript version (usually either the pre-print version created prior to refereeing or the post print produced after refereeing) to be deposited in a suitable subject or institutional repository on acceptance by the journal publisher. To maximise the possible citations and to be considered for the REF, the University of Cambridge requires SPRI authors to deposit the manuscript version of their papers with the University Library for uploading into the Institutional Repository. Librarians at Cambridge University Library use the SHERPA / ROMEO website (n.d.) of publishers' policies regarding self-archiving to ascertain which version of a paper can be uploaded to the repository and to observe any embargo periods stipulated by the publisher.

Where SPRI authors Publish

But to what extent have open access business models impacted on scholarly publishing within polar science? The launch of the partnership between the International Glaciological Society (IGS) and Cambridge University Press coincided with the IGS journals becoming fully Gold Open Access (OA) beginning with 2016 volumes. Articles in the *Journal of Glaciology* and *Annals of Glaciology* are “freely and permanently accessible online, immediately upon publication, under licensing that allows anyone to redistribute, reuse and adapt the content as long as they provide attribution.” (IGS, 2016). Similarly, *Polar Research*, the journal established by the Norwegian Polar Institute in 1982, adopted open access as a business model in 2011. Further anecdotal evidence from the Director and senior academics at the Scott Polar Research Institute suggested that polar science may be witnessing a particularly strong movement towards open access publishing.

The author was interested in where researchers at the Scott Polar Research Institute choose to publish, not least to ensure that journals subscriptions are appropriate to the needs of the Institute.

Methodology

The author has investigated 271 of the most recent papers published by authors at the Scott Polar Research Institute. These papers are listed in the annual *SPRI Reviews* for 2010-2017. This data was analysed to determine where SPRI authors most often publish. Where it was available on the publication's website, information is provided on other fees (either page charges or publication fees) made by hybrid journals – in some cases these are described as publication charges and are made as an alternative to the APC when the author's institution does not wish to pay extra charges for open access. (Thus the journal *Geology* charges either \$1750 as a mandatory publication fee or \$2500 if open access is required). In some other cases e.g. *Quaternary Science Reviews* there is a colour page charge of unspecified amount, which is in addition to the APCs.

Results and Discussion

The twelve journals in which SPRI researchers have most commonly published since 2010 are listed in Figure 1. All of these titles except *Nature* support open access to some extent: three are fully open access (OA) whilst eight are hybrid journals. Open access publishing is changing rapidly and this information will no doubt change quickly. Nevertheless, the data supplied may help inform both researchers and librarians interested in where researchers in the polar community publish.

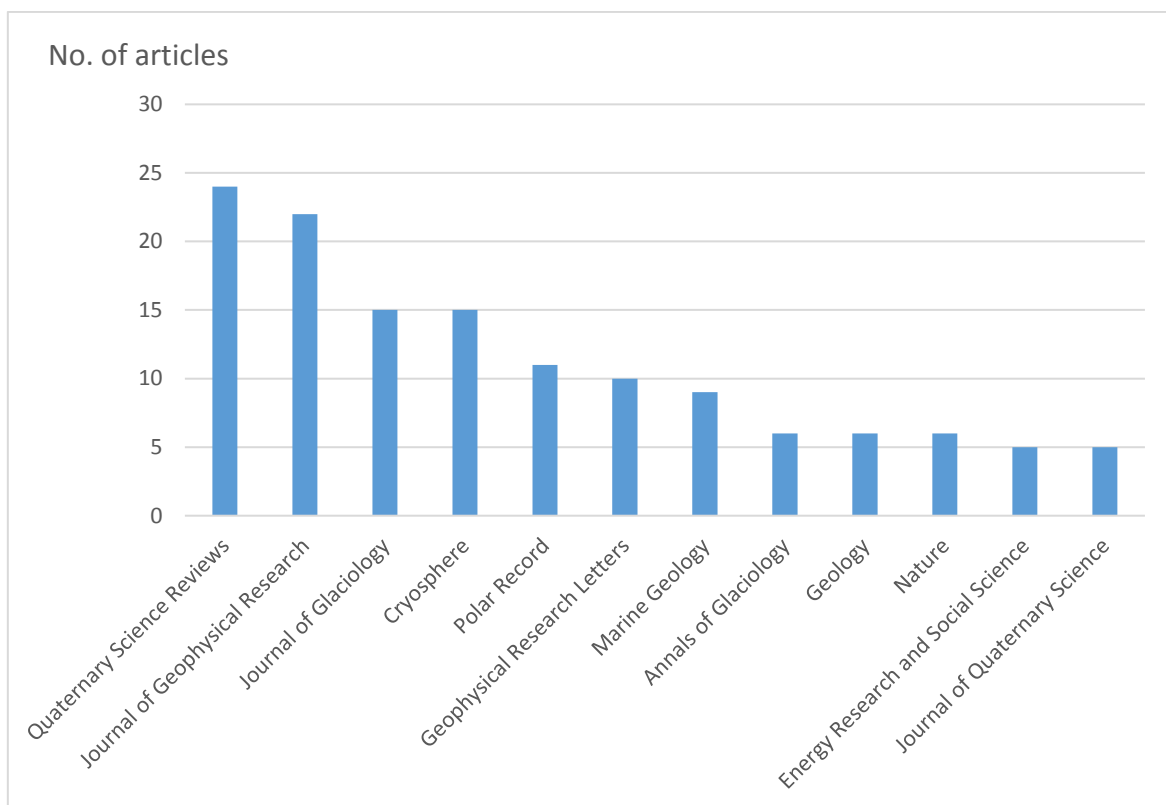


Figure 1. Journals in which SPRI authors most regularly publish (at least 5 times since 2010)
See Appendix 1 for a full list.

Indicative costs and implications of publishing in open access in polar science journals

Having established where SPRI researchers are publishing over the most recent 7 years, a further investigation was made to determine the indicative costs of publishing in these journals. The costs of publishing in these twelve journals of most relevance to SPRI are shown in the Table 1.

Table 1.

Journal Title	Type of journal	APC (for open access)	Page Charges or Publication fee
Quaternary Science Reviews	Hybrid	\$2850	extra costs for colour artwork (priced after article is accepted)
Journal of Geophysical Research	Hybrid	\$3500 (replaces Publication fee)	\$1000
Journal of Glaciology	Gold OA	Articles: £1200 (£1080 IGS members) Letters: £600 (£540 IGS members)	N/A
Cryosphere	Gold OA	€120 net per page	
Polar Record	Hybrid	£1780 / \$2835	
Geophysical Research Letters	Hybrid	\$2500 (replaces Publication fee) NB University of Cambridge pays 100% for selected RLUK funded papers	\$500
Marine Geology	Hybrid	\$3300	
Geology	Hybrid	\$2500 (replaces publication fee)	\$1750 mandatory fee
Annals of Glaciology	Gold OA	Articles: £1200 (£1080 IGS members) Letters: £600 (£540 IGS members)	N/A
Energy Research and Social Science	Hybrid	USD 2700, excluding taxes	
Nature	Subscription		
Journal of Quaternary Science	Hybrid	\$3,000	

Authors in many institutions can make use of the green open access route to ensure their research is considered for funding exercises such as the REF by self-archiving manuscript versions in open access institutional repositories. An example is the University of Cambridge Institutional repository (Apollo) which accepts articles from University of Cambridge authors on acceptance for publication. The SHERPA / ROMEO website is used to illustrate conditions under which a hybrid journal may permit Green

archiving. For instance in the Journal of Quaternary Reviews authors *can* archive the pre-print (ie pre-refereeing); authors *can* archive post-print (ie final draft post-refereeing). Details of green archiving is given for other journals on the SHERPA / ROMEO website (no date).

Library role in open access

Providing financial information on APCs at an institution level may be particularly useful since it brings together dispersed costs, often obscured in large organisations. It can also inform debate on the management of the overall cost of publication and the role that librarians can play in this process.

Some institutions are seeking to support researchers in this process by providing funding assistance to researchers. A significant number of university libraries have schemes to support open access publication in some way. These can take the form of administering the block grant given by the research councils in the UK or may take the form of more bespoke funds. The author helped establish the University of Canterbury Library Fund for open access publication (University of Canterbury, 2015). This fund seeks to support corresponding authors at the institution who have no access to grants or have insufficient funds available for APCs. In administering this fund preference is given to early career researchers. (University of Canterbury, 2015). Other examples of funds include those of : the University of Leicester, University of Manchester, University of California Berkeley, University of California San Francisco and Sheffield Hallam University.

Conclusion

This paper has described the business models used by open access and has shown where researchers in the Scott Polar Research Institute have been publishing in recent years. The data illustrates how dominant open access journals have become and has given an indication of the costs of publishing articles in polar science. This has implications for researchers as they need to have, or develop, a strong grasp of the financial implications of where they publish. Researchers are in effect assuming a greater role in supporting the costs of publication of academic journals. In this transition to open access many academic libraries are seeking to augment their role in the provision of journal access by administering funds to support open access publication and polar libraries may wish to consider whether they can support open access publication in a similar way.

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Appendix 1

Full list of Journals in which SPRI Authors have published 2010–2017

Journals with SPRI authorship 2010–2017	No. of articles		
Quaternary Science Reviews	24	Geological Society of America Bulletin	2
Journal of Geophysical Research	22	Geo-Marine Letters	2
Journal of Glaciology	15	International Journal of Remote Sensing	2
Cryosphere	15	Journal of Ethnology and Folkloristics	2
Polar Record	11	Journal of the Royal Anthropological Institute	2
Geophysical Research Letters	10	Marine and Petroleum Geology	2
Marine Geology	9	Nature Geoscience	2
Annals of Glaciology	6	Progress in Physical Geography	2
Geology	6	Soil Biology and Biochemistry	2
Nature	6	Transcultural Psychiatry	2
Energy Research and Social Science	5	Antarctic Science	2
Journal of Quaternary Science	5	Europe-Asia Studies	2
Cryosphere Discussions	4	Geographical Review	2
Earth and Planetary Science Letters	4	Hydrological Processes	2
Science	4	Scientific Reports	2
Remote Sensing of the Environment	4	Boreas	2
Extractive Industries and Society	3	Terrae Incognitae	1
Anthropocene	2	Arctic Review on Law and Politics	1
Arctic, Antarctic and Alpine Research	2	American Journal of Public Health	1
Bulletin of Volcanology	2	American Naturalist	1
Earth's Future	2	Annual Review of Anthropolpogy	1
Environmental Research Letters	2	Antarctic Subglacial Aquatic Environments, Geophysical Monograph series	1
Geochemistry, Geophysics, Geosystems	2	Anthropocene Review	1
Geografiska Annaler	2	Anthropology of East Europe Reivew	1

Applied Vegetation Science	1	Journal of Volcanology and Geothermal Research	1
Arctic	1	Laboratorium	1
Arctic 21st Century Human Science	1	Land use policy	1
Asian Ethnology	1	Mobilities	1
Biogeosciences	1	Museum of History Journal	1
British Journal of Canadian Studies	1	Nature Communications	1
Bulletin of Atomic Scientists	1	Nordic Journal of English Studies	1
Canadian Journal of History	1	Ocean Modelling	1
Climate	1	Polar Geography	1
Diagene	1	Polarforschung	1
Energy Law Journal	1	Primary Science	1
Environmental Ethics	1	Quaternary International	1
Environmental Humanities	1	Remote Sensing	1
Estudios Irlandeses	1	Sedimentology	1
Fennia	1	Studies in Contemporary Fiction	1
Folklore	1	Systematics and Biodiversity	1
Geomorphology	1	Texas Wesleyan Law Review	1
Geoscientific Model Development	1	Transactions of the American Geophysical Union	1
Geoscientist	1	US Geological Survey Professional Paper	1
Global and Planetary Change	1	Icarus	1
Instrumentation Viewpoint	1	Nature Ecology & Evolution	1
Inter-disciplinary Journal of Siberian Studies	1	Acta Paleobotanica	1
Journal of Biogeography	1	GFF	1
Journal of Community Engagement and Scholarship	1	Progress in Human Geography	1
Journal of Environmental Studies and Sciences	1	Political Geography	1
Journal of General and Molecular Microbiology	1	Geological Society, London, Special Publications	1
Journal of Hydrology	1	Paleoceanography	1
Journal of Intelligence and Terrorism Studies	1	Science Advances	1
Journal of Natural Science Collections	1	Marine and Petroleum Geology	1
Journal of Sedimentary Research	1	Journal of Rural Studies	1
Journal of the Geological Society	1	Earth Science Reviews	1
Journal of the History of Collections	1	Proceedings of the Yorkshire Geological Society	1
		Total	271