***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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**1.0 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)

* 1. **Aims**

The aims of this paper are threefold: firstly to provide a discussion of the main models of open access publishing**.** This, in turn, willhelp to introduce andinterpret 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.

**2.0 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)](https://www.plos.org/)). 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.

**3.0 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, re-use 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.

**3.1 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 case 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.

**3.2 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.

**4.0 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).

**5.0 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.

**6.0 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 |
| Journal of Geophysical Research | 22 |
| Journal of Glaciology | 15 |
| Cryosphere | 15 |
| Polar Record | 11 |
| Geophysical Research Letters | 10 |
| Marine Geology | 9 |
| Annals of Glaciology | 6 |
| Geology | 6 |
| Nature | 6 |
| Energy Research and Social Science | 5 |
| Journal of Quaternary Science | 5 |
| Cryosphere Discussions | 4 |
| Earth and Planetary Science Letters | 4 |
| Science | 4 |
| Remote Sensing of the Environment | 4 |
| Extractive Industries and Society | 3 |
| Anthropocene | 2 |
| Arctic, Antarctic and Alpine Research | 2 |
| Bulletin of Volcanology | 2 |
| Earth’s Future | 2 |
| Environmental Research Letters | 2 |
| Geochemistry, Geophysics, Geosystems | 2 |
| Geografiska Annaler | 2 |
| Geological Society of America Bulletin | 2 |
| Geo-Marine Letters | 2 |
| International Journal of Remote Sensing | 2 |
| Journal of Ethnology and Folkloristics | 2 |
| Journal of the Royal Anthropological Institute | 2 |
| Marine and Petroleum Geology | 2 |
| Nature Geoscience | 2 |
| Progress in Physical Geography | 2 |
| Soil Biology and Biochemistry | 2 |
| Transcultural Psychiatry | 2 |
| Antarctic Science | 2 |
| Europe-Asia Studies | 2 |
| Geographical Review | 2 |
| Hydrological Processes | 2 |
| Scientific Reports | 2 |
| Boreas | 2 |
| Terrae Incognitae | 1 |
| Arctic Review on Law and Politics | 1 |
| American Journal of Public Health | 1 |
| American Naturalist | 1 |
| Annual Review of Anthrolpology | 1 |
| Antarctic Subglacial Aquatic Environments, Geophysical Monograph series | 1 |
| Anthropocene Review | 1 |
| Anthropology of East Europe Reveiw | 1 |
| Applied Vegetation Science | 1 |
| Arctic | 1 |
| Arctic 21st Century Human Science | 1 |
| Asian Ethnology | 1 |
| Biogeosciences | 1 |
| British Journal of Canadian Studies | 1 |
| Bulletin of Atomic Scientists | 1 |
| Canadian Journal of History | 1 |
| Climate | 1 |
| Diagene | 1 |
| Energy Law Journal | 1 |
| Environmental Ethics | 1 |
| Environmental Humanities | 1 |
| Estudios Irlandeses | 1 |
| Fennia | 1 |
| Folklore | 1 |
| Geomorphology | 1 |
| Geoscientific Model Development | 1 |
| Geoscientist | 1 |
| Global and Planetary Change | 1 |
| Instrumentation Viewpoint | 1 |
| Inter-disciplinary Journal of Siberian Studies | 1 |
| Journal of Biogeography | 1 |
| Journal of Community Engagement and Scholarship | 1 |
| Journal of Environmental Studies and Sciences | 1 |
| Journal of General and Molecular Microbiology | 1 |
| Journal of Hydrology | 1 |
| Journal of Intelliegence and Terrorism Studies | 1 |
| Journal of Natural Science Collections | 1 |
| Journal of Sedimentary Research | 1 |
| Journal of the Geological Society | 1 |
| Journal of the History of Collections | 1 |
| Journal of Volcanology and Geothermal Research | 1 |
| Laboratorium | 1 |
| Land use policy | 1 |
| Mobilities | 1 |
| Museum of History Journal | 1 |
| Nature Communications | 1 |
| Nordic Journal of English Studies | 1 |
| Ocean Modelling | 1 |
| Polar Geography | 1 |
| Polarforschung | 1 |
| Primary Science | 1 |
| Quaternary International | 1 |
| Remote Sensing | 1 |
| Sedimentology | 1 |
| Studies in Contemporary Fiction | 1 |
| Systematics and Biodiversity | 1 |
| Texas Wesleyan Law Review | 1 |
| Transactions of the American Geophysical Union | 1 |
| US Geological Survey Professional Paper | 1 |
| Icarus | 1 |
| Nature Ecolgy & Evolution | 1 |
| Acta Paleobotanica | 1 |
| GFF | 1 |
| Progress in Human Geography | 1 |
| Political Geography | 1 |
| Geological Society, London, Special Publications | 1 |
| Paleooceanography | 1 |
| Science Advances | 1 |
| Marine and Petroleum Geology | 1 |
| Journal of Rural Studies | 1 |
| Earth Science Reviews | 1 |
| Proceedings of the Yorkshire Geological Society | 1 |
| Total | 271 |