OPEN ACCESS PUBLISHING IN THE GEOSCIENCES: CASE STUDY OF THE DEEP CARBON OBSERVATORY

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Abstract – Surveys of geoscientists' attitudes toward open access (OA) publishing have indicated strong support for the ideal of making the results of research accessible to the broadest audience possible, free of charge. While self-archiving ("Green OA") is more prevalent in the Earth sciences than in any other scientific discipline, the number of peer-reviewed geoscience papers in fully open access ("Gold OA") journals is only around 7% of the total number published each year. Lack of awareness of OA publishing options available to them may be a hindrance to OA adoption for many geoscientists.

To better understand authors' publishing preferences relative to OA, the present study was conducted on publications by researchers associated with the Deep Carbon Observatory – an international, multi-disciplinary community of geochemists, geophysics, and geobiologists studying the role of carbon in the deep Earth. The results showed minimal adoption of open access by DCO authors to date. Only two Gold OA journals (3.4%) were among the top 58 journals in which they published research during 2005-2012, and those accounted for less than 1% of the papers in the overall study sample. Lists of topically-relevant OA journals, as well as information on subscription-based geoscience journals that offer sponsored access options, were compiled to assist DCO leadership in their stated goal of encouraging participants to make greater use of OA publishing opportunities.

THE CURRENT LANDSCAPE OF OPEN ACCESS

"Open access" (OA) journals are typically understood to mean those that "use a funding model that does not charge readers or their institution for access" and permit users to "read, download, copy, distribute, print, search, or link to the full texts of these articles" (Directory of Open Access Journals, 2013). In their purest form, known as "Gold Open Access," such journals (e.g., *PLoS ONE* and *Biogeosciences*) provide immediate, free access to all of their articles on the publisher's own website. However, Gold OA is only one part of a spectrum of access types that also includes:

> "Delayed Open Access" – Journals that provide free access to articles after a certain embargo period (typically 6-12 months) has passed; newer articles require a subscription. Examples include *Proceedings of the National Academy of Sciences* and *Astrophysical Journal*.
>
> "Hybrid Open Access" – Journals that provide free access to only certain articles, usually based on the author paying an optional OA processing fee.

Such “sponsored article” arrangements go by various names such as Author Choice, Author Select, and Open Choice. Many commercial and society publishers offer this option. (See Table 3.)

“Green Open Access” – Journals that permit authors to post versions of their articles for free access on personal/institutional websites, in institutional repositories, or in disciplinary repositories (e.g., arXiv, PubMed Central) at the time of publication. Such self-archived versions are typically *preprints* (manuscripts prior to refereeing) but may also be *postprints* (final drafts after refereeing) or even the publisher’s final PDFs.

More than 8280 “free, full text, quality controlled” OA journals were being published worldwide as of October 2012, according to the *Directory of Open Access Journals*. Some six hundred OA titles are numbered among the 12,000 “high impact” journals currently indexed by the Web of Science. Scholarly societies play a significant role in the OA landscape. At the end of 2011, 530 scholarly societies were publishing 616 full-text OA journals – 78% in science, technology, and medicine (Suber, 2011). By September 2012 the tally had topped 600 societies and 700 journals (Suber, 2012). For the past decade, OA publishing has been growing at an astonishing annual rate of 18% in the number of OA journals and 30% in the number of published articles (Laakso et al., 2011).

OPEN ACCESS PUBLISHING IN THE GEOSCIENCES

Overview

While the biological and biomedical sciences have been strongly identified with the establishment and proliferation of the open access movement, the role of OA in the geosciences is significant.

As of October 2012, the *Directory of Open Access Journals* listed some 579 journals in its “Earth and Environmental Sciences” category, representing around 7% of the eight thousand total titles reported. (This category includes geography, oceanography, and meteorology.) The primary bibliographic database for the geosciences, GeoRef, currently indexes around 180 OA journals and series among the ~3000 titles it covers. To merit inclusion in GeoRef, OA journals must “appear to provide stable open-access to current issues, have multiple issues available for use, and appear to plan to continue to be available in an open manner” (American Geosciences Institute, 2013).

Björk et al. (2010) found that 20% of the peer-reviewed scientific literature published in 2008 was openly accessible on the web: 8.5% on publishers’ sites and 11.9% as full-text versions in repositories and on personal and departmental websites. However, their results revealed significant differences between fields (Figure 1). Of all the major disciplines represented, the Earth sciences had the highest percentage (33%) of articles freely available on the web. (Chemistry and chemical engineering had the lowest, at 19%.) Much of the share of open access geoscience literature consisted of self-archived publications in Green OA repositories (25.9%). Only 7.0% of the papers were in Gold OA journals.

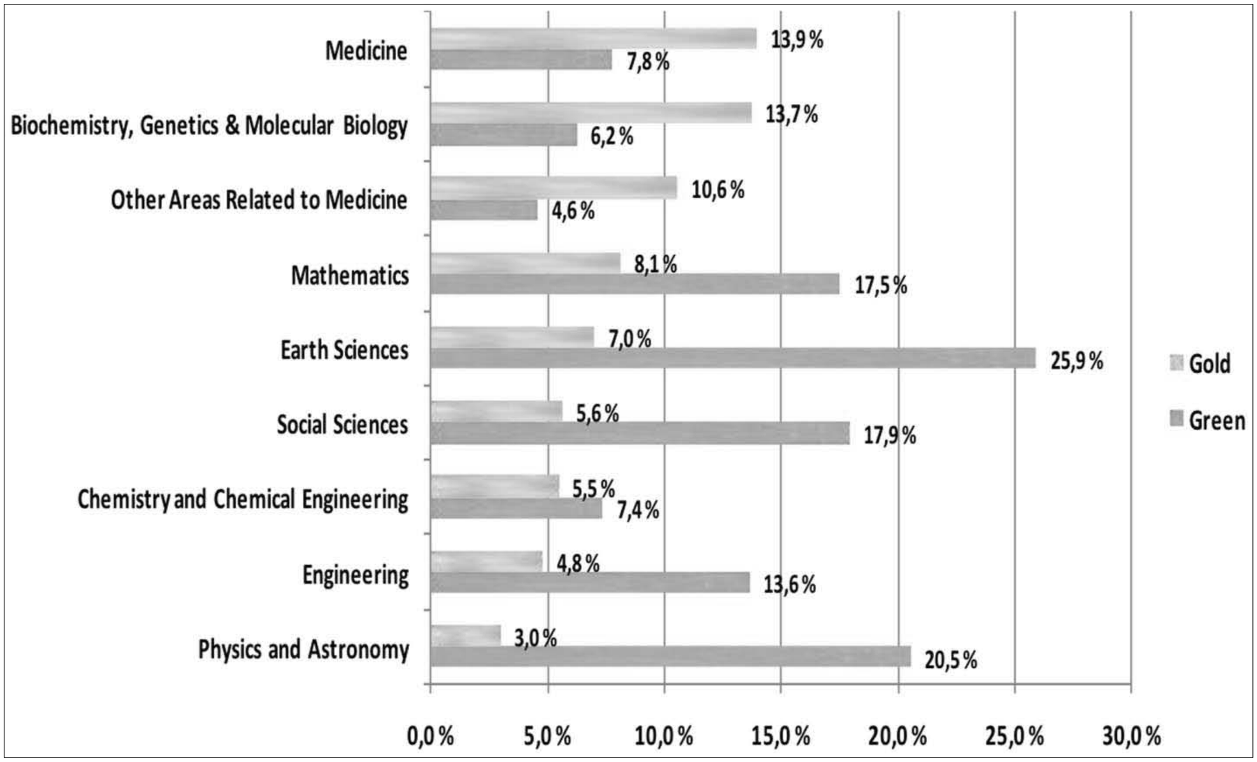

Figure 1. Percentage of 2008 peer-reviewed articles that were openly accessible in 2009, by discipline (from Björk et al., 2010).

Geoscientists' Attitudes Toward Open Access

The European Commission-sponsored "Study of Open-Access Publishing" (SOAP) surveyed 1.5 million researchers in 2010 (Dallmeier-Tiessen et al., 2011). One of the primary goals of SOAP was to better understand researchers' attitudes toward OA and their experiences with it. Of the 38,358 respondents who had published at least one peer-reviewed journal article in the past five years, 1485 were earth scientists (3.9% of the total). 90% of these geoscientists – and 89% of the respondents overall – considered open access publishing to be beneficial for their research fields. 53% of the respondents reported having published at least one OA article. Yet overall, only around 10% of research papers are being published in OA journals today.

To try to understand this disconnect between researchers' support of OA publishing in principle and the modest share of the literature actually represented by OA, SOAP collected data on specific reasons why respondents decided *not* to publish in OA journals. The top barriers cited by geoscientists were lack of funding (38%) and the perception that OA journals in the field were not of good quality or lacked impact factors (32%). While these two factors dominated the responses in all fields, strong disciplinary differences were evident: among astronomers and space scientists, journal quality was the dominant concern (49%), while in the biological sciences lack of funding (59%) topped the list.

CASE STUDY: DEEP CARBON OBSERVATORY

Study Rationale

To gain additional insight into the OA publishing practices of geoscientists, the present study was undertaken among participants in the Deep Carbon Observatory (DCO) – a ten-year, international, multi-disciplinary project initiated in 2009 with funding from the Alfred P. Sloan Foundation. The mission of DCO is to transform our understanding of the role of carbon on Earth, particularly in the deep interior, which may hold 90% of the planet's total carbon inventory. DCO investigations focus on the chemical, biological, and physical properties of carbon; where it is found; and how it affects life on Earth. More than 500 researchers in 20+ countries are currently participating in DCO initiatives, which are organized into four research "directorates": Reservoirs and Fluxes; Deep Life; Deep Energy; and Extreme Physics and Chemistry.

Ready access to DCO leadership (its secretariat is headquartered in my building at the Carnegie Institution in Washington, DC), their express interest in open access publishing, and the international character of its research community made DCO a desirable case study. From its inception, DCO has made an explicit commitment to open access:

> "DCO scientists should make every effort to publish in online open access journals such as the Public Library of Science (PLoS) and other open access avenues so that DCO research results are accessible to the broadest scientific audience possible, including scientists from countries where access to paid journal subscriptions is limited. Publishing in such journals committed to making scientific literature available as a public resource allows users to download, print, or reuse individual articles and collections with proper attribution." (Hickox, Crist, and Collins, 2012, p. 53.)

To understand where deep carbon research is being published, and the extent to which DCO scientists have already opted for open access, the journal articles of members of the "scientific steering committee" of each directorate were analyzed. Each committee consists of 10-11 researchers who are recognized authorities in their fields and who have extensive publishing records. Using Web of Science, each author's publications for 2005-2012 were tallied and the journals containing them ranked by frequency. The start of the study period predates the inception of DCO by several years, but was chosen to provide a sample of at least ~300 papers per directorate.

Results

The top 25 journals for each directorate are listed in Table 1. Considerable differences between directorates in the distribution of "core" journals are evident. In Reservoirs and Fluxes (geochemistry, volcanology, mineralogy, and petrology), just six journals garnered nearly half (47%) of the total papers in the sample. Similar results are seen in Extreme Physics and Chemistry (mineral physics, materials science, and physical chemistry), where eight journals hold 48% of the papers. In contrast, the more biologically-oriented literature of the Deep Life directorate (microbiology, biochemistry, biophysics, and biogeochemistry) is less centralized: all 25 titles listed still account for just 55% of the total articles published during the study period. Deep Energy (hydrocarbons, fuels, carbon cycle) represents an intermediate case.

The number of OA journals identified in the sample was surprisingly small. No Gold OA titles were among the top ten journals in any directorate, and only three Delayed OA titles turned up (Figure 2). In fact, the entire list of 58 journals that garnered at least 1% of the articles within any directorate contained only two Gold OA journals (*Biogeosciences* and *Geochemical Transactions*) and five Delayed OA ones *(Applied and Environmental Microbiology, Astrophysical Journal, Biophysical Journal, Journal of Bacteriology,* and *Proceedings of the National Academy of Sciences)*. The Gold OA journals contained 12 articles, representing just 0.8% of the papers in the total study sample.

	Reservoirs and Fluxes	Deep Life	Deep Energy	Physics & Chemistry
1	Earth Planet. Sci. Lett.	Appl. Environ. Microbiol.	Geochim. Cosmochim. Acta	Phys. Rev. B
2	Geochim. Cosmochim. Acta	Biophys. J.	Earth Planet. Sci. Lett.	Phys. Rev. Lett.
3	Am. Mineral.	Environ. Microbiol.	Int. J. Syst. Evol. Microbiol.	Earth Planet. Sci. Lett.
4	Chem. Geol.	Geochim. Cosmochim. Acta	Chem. Geol.	J. Chem. Phys.
5	Contrib. Mineral. Petrol.	Org. Geochem.	G-Cubed	Am. Mineral.
6	J. Petrol.	PNAS	Geology	J. Phys. Chem. B
7	G-Cubed	Geomicrobiol. J.	J. Phys. Chem. C	Appl. Phys. Lett.
8	J. Volcanol. Geotherm. Res.	ISME J.	Science	J. Phys. Condens. Matter
9	Science	ChemPhysChem	Environ. Microbiol.	PNAS
10	Geology	J. Phys. Chem. B	FEMS Microbiol. Ecol.	High Pressure Res.
	JGR - Solid Earth		PNAS	
	Nature			

Figure 2. Top ten journals in each DCO directorate. Delayed open access titles are highlighted. (Two of the lists contain more than ten titles due to ranking ties.)

The situation with Hybrid OA was quite different. All but five of the 58 journals in Table 1 offer some form of "sponsored" open access via payment of optional article processing fees. It is not known how many of the individual articles in the sample were actually sponsored through this method, as article-level analysis was beyond the scope of the present study. Anecdotal evidence gathered through personal communication with authors suggests that number is minimal. Broad-based studies indicate that overall uptake among major hybrid journals is small, with only 1%-2% of articles being sponsored (Björk and Solomon, 2012).

Advocating for Open Access

At the invitation of DCO leadership, a "primer" on scholarly open access was prepared for distribution to the DCO research community. The goal was two-fold: to foster understanding among researchers of what OA is and how it works; and to make potential authors aware of publishing options (e.g., Gold OA journals) they might not have considered previously. The results of this study indicate that most of DCO's research output is currently published in traditional, subscription-based journals. To realize the organization's stated goal of supporting OA, DCO authors can either continue to publish in their preferred journals (many of which offer sponsored access, as discussed below) and pay the associated article processing charges; opt to publish new work in fully open access journals (though again, most require payment of article fees); or exercise their rights to self-archive, where permitted, in a systematic way.

Since perceived lack of quality was found by the 2010 SOAP study to be one of the major obstacles to OA adoption by geoscientists, only journals that were peer-reviewed, international in scope, and from reputable publishers with established track records were included in the list of OA titles compiled for DCO consideration (Table 2). Impact factors were included, when available, in order to demonstrate that many OA journals fare well against subscription-based competitors. Article processing fees were also tabulated and found to vary widely, from $31/page to $3000/article. The list is not intended to be exhaustive, but represents a selection relevant to DCO's core focus on geophysics, geochemistry, geobiology, and energy. Hybrid journals are well represented in the offerings of geoscience and related publishers (Table 3).

As in the case of fully open access journals, article processing fees in the hybrid journals investigated spanned an enormous range – from a low of around $250/page to a high of $5000/article. A recent innovation by some of these publishers has been the introduction of "membership" plans that offer discounts on article processing charges to authors in organizations that prepay flat, annual fees. Examples include the Royal Society's Membership Programme and Liebert's Author Advocacy Program.

Green OA provides opportunities for authors to post their works online, typically in institutional or subject repositories. Wirth (2009) reviewed both the advantages and caveats connected with self-archiving and identified useful resources for "green" authors. While still small, the number of discipline-based repositories in Earth and planetary sciences is growing. Only 28 such repositories existed worldwide in early 2010 (Wirth, 2009). As of March 2013, the *Directory of Open Access Repositories* listed 45.

ROLES FOR GEOSCIENCE LIBRARIANS

Geoscience librarians can play important roles in the OA movement in the areas of education, assessment, and advocacy. Librarians can debunk persistent myths ("OA is free", "OA has no peer review", etc.) and point authors to valuable sources of information on institutional deposit mandates (e.g., ROARMAP), funding agency requirements (SHERPA/JULIET), and self-archiving policies (SHERPA/RoMEO) – all particularly important in a discipline like the geosciences whose literature already has a considerable Green OA component. They can provide recommendations on OA titles, costs, and impact metrics as shown here, as well as cautionary advice on "predatory" publishers (Beall, 2013). Many librarians are already working with institutional repositories; advocating for stronger deposit policies and making users aware of relevant disciplinary repositories are natural extensions.

Emerging OA funding models are providing librarians with new opportunities for engagement in outreach and administration. More than two dozen university libraries in North America have already established special open access publishing funds to support authors' article processing fees as a means of encouraging publication in OA journals (SPARC, 2013). Developing policies for implementation and management of these funds and helping authors make well-informed use of them draws on expertise that librarians can provide. Participation in large-scale consortial initiatives like SCOAP3, which aims to facilitate open access to peer-reviewed articles in high-energy physics through re-engineering the funding model of the discipline's core journals, is yet another way to contribute professionally.

CONCLUSIONS

The discrepancy between geoscientists' supportive attitude toward open access in principle and their actual choices on where to publish their work is evidenced by the example of the Deep Carbon Observatory. This apparent disconnect provides meaningful opportunities for geoscience librarians to engage authors in dialogue about open access. While limited in scope, the sample considered here provides useful insights into the current locus of published deep carbon research and may be a reasonable indicator of the publishing choices of the DCO community (geochemists, geophysicists, and geobiologists) at large. It is hoped that through education and advocacy efforts considerably more DCO scientists will choose to submit papers to OA journals or at least actively self-archive them. Geoscience librarians can play a significant role in influencing geoscientists' understanding of OA publishing and the new options it presents to them.

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Table 1. Journals in which DCO Steering Committee members published papers, 2005-2012 (by Directorate)

Carbon Reservoirs and Fluxes
(325 papers analyzed, 2005-2012)

	articles	% of total	cumul. %
Earth Planet. Sci. Lett.	45	13.8	13.8
Geochim. Cosmochim. Acta	33	10.2	24.0
Am. Mineral.	22	6.8	30.8
Chem. Geol.	19	5.8	36.6
Contrib. Mineral. Petrol.	17	5.2	41.8
J. Petrol.	17	5.2	47.0
G-Cubed	15	4.6	51.6
J. Volcanol. Geotherm. Res.	14	4.3	55.9
Science	14	4.3	60.2
Geology	11	3.4	63.6
JGR-Solid Earth	11	3.4	67.0
Nature	11	3.4	70.4
Geophys. Res. Lett.	9	2.8	73.2
Phys. Earth Planet. Inter.	6	1.8	75.0
Proc. Natl. Acad. Sci.	5	1.5	76.5
Doklady-Earth Sciences	3	0.9	77.4
Exp. Astron.	3	0.9	78.3
Geochem. J.	3	0.9	79.2
High Pressure Res.	3	0.9	80.1
J. Alloys Compounds	3	0.9	81.0
J. Phys. Chem. B	3	0.9	81.9
Lithos	3	0.9	82.8
Meteorit. Planet. Sci.	3	0.9	83.7
Phys. Rev. Lett.	3	0.9	84.6
Can Mineral.	2	0.6	85.2

Deep Life
(380 papers analyzed, 2005-2012)

	articles	% of total	cumul. %
Appl. Environ. Microbiol.	23	6.1	6.1
Biophys. J.	16	4.2	10.3
Environ. Microbiol.	16	4.2	14.5
Geochim. Cosmochim. Acta	14	3.7	18.2
Org. Geochem.	11	2.9	21.1
Proc. Natl. Acad. Sci.	11	2.9	24.0
Geomicrobiol. J.	10	2.6	26.6
ISME J.	9	2.4	29.0
ChemPhysChem	8	2.1	31.1
J. Phys. Chem. B	8	2.1	33.2
Biogeosciences	7	1.8	35.0
Geobiology	7	1.8	36.8
Angew. Chemie Int. Ed.	6	1.6	38.4
Earth Planet. Sci. Lett.	6	1.6	40.0
Journal Bacteriol.	6	1.6	41.6
J. Am. Chem. Soc.	6	1.6	43.2
Langmuir	6	1.6	44.8
Science	6	1.6	46.4
Biochim. Biophys. Acta, Proteins Proteomics	5	1.3	47.7
Environ. Microbiol. Rep.	5	1.3	49.0
FEMS Microbiol. Ecology	5	1.3	50.3
Nature	5	1.3	51.6
Biochim. Biophys. Acta, Membra	4	1.1	52.7
Environ. Sci. Technol.	4	1.1	53.8
J. Mol. Biol.	4	1.1	54.9

Deep Energy
(297 papers analyzed, 2005-2012)

	articles	% of total	cumul. %
Geochim. Cosmochim. Acta	30	10.1	10.1
Earth Planet. Sci. Lett.	28	9.4	19.5
Int. J. Syst. Evol. Microbiol.	11	3.7	23.2
Chem. Geol.	10	3.4	26.6
G-Cubed	7	2.4	29.0
Geology	7	2.4	31.4
J. Phys. Chem. C.	7	2.4	33.8
Science	7	2.4	36.2
Environ. Microbiol.	6	2.0	38.2
FEMS Microbiol. Ecol.	6	2.0	40.2
Proc. Natl. Acad. Sci.	6	2.0	42.2
Appl. Environ. Microbiol.	5	1.7	43.9
Geochem. Trans.	5	1.7	45.6
JGR-Solid Earth	5	1.7	47.3
Nature	5	1.7	49.0
Acta Petrol. Sinica	4	1.3	50.3
Am. Mineral.	4	1.3	51.6
Extremophiles	4	1.3	52.9
Appl. Geochem.	3	1.0	53.9
Astrobiology	3	1.0	54.9
Astrophys. J.	3	1.0	55.9
Elements	3	1.0	56.9
Environ. Sci. Technol.	3	1.0	57.9
Geobiology	3	1.0	58.9
Geophys. Res. Lett.	3	1.0	59.9

Physics and Chemistry of Carbon
(500 papers analyzed, 2005-2012)

	articles	% of total	cumul. %
Phys. Rev. B	78	15.6	15.6
Phys. Rev. Lett.	37	7.4	23.0
Earth Planet. Sci. Lett.	31	6.2	29.2
J. Chem. Phys.	27	5.4	34.6
Am. Mineral.	19	3.8	38.4
J. Phys. Chem. B	17	3.4	41.8
Appl. Phys. Lett.	16	3.2	45.0
J. Phys.: Cond. Matter	16	3.2	48.2
Proc. Natl. Acad. Sci.	16	3.2	51.4
High Pressure Res.	15	3.0	54.4
Chem. Geol.	10	2.0	56.4
Nano Lett.	9	1.8	58.2
Solid State Commun.	9	1.8	60.0
JETP Lett.	8	1.6	61.6
Phys. Earth Planet. Interior.	8	1.6	63.2
J. Phys. Chem. C	7	1.4	64.6
Phys. Chem. Mater.	7	1.4	66.0
Fullerenes, Nanotubes, Carbon Nanostruct.	6	1.2	67.2
Geochim. Cosmochim. Acta	6	1.2	68.4
J. Appl. Phys.	6	1.2	69.6
Science	6	1.2	70.8
Phys. Chem. Chem. Phys.	5	1.0	71.8
Geofluids	4	0.8	72.6
Geophys. J. Int.	4	0.8	73.4
Inorg. Chem.	4	0.8	74.2

Table 2. Peer-Reviewed Gold OA journals that publish papers in geophysics, geochemistry, geobiology, and energy (as of December 2012)

Journal	Impact Factor	Year established	Publisher	Subject Coverage	OA fee per article
Advances in Geosciences		2003	Copernicus/EGU	geology, geochemistry, geophysics, biogeosciences, geodesy, hydrology, ocean sciences, atmospheric sciences	$31-$51/page
AIP Advances		2011	AIP	physical sciences	$1,350
Algorithms for Molecular Biology	[1.40]	2006	BioMed Central	molecular biology, genomics	$1,700
Annals of Geophysics	0.567	1978	INGV, Italy	earth sciences, seismology, geodesy, volcanology, oceanography, climatology, geomagnetism, paleomagnetism	no charge
Atmospheric Chemistry and Physics	[5.520]	2001	Copernicus/EGU	gases, aerosols, clouds and precipitation, isotopes, radiation, dynamics, biosphere interactions, hydrosphere interactions	$31-$51/page
Biogeosciences	3.859	2004	Copernicus/EGU	astrobiology, exobiology, biodiversity and ecosystem function, biogeochemistry, biogeophysics, paleobiogeoscience	$31-$51/page
Biology Direct	4.017	2006	BioMed Central	biology	$1,975
BMC Biochemistry	1.988	2000	BioMed Central	biochemistry	$1,930
BMC Biology	5.750	2003	BioMed Central	biology, biochemistry, biomedical science, cell biology, chemical biology, ecology, genetics, neurobiology	$2,285
BMC Chemical Biology	[2.00]	2001	BioMed Central	chemical biology, biochemistry	$1,945
BMC Ecology		2001	BioMed Central	environmental ecology, behavioral ecology, population ecology, plants, animals, microbes	$1,945
BMC Genomics	4.070	2000	BioMed Central	genomics, genetics	
BMC Microbiology	3.044	2001	BioMed Central	microbiology	$1,930
Carbon Balance and Management		2006	BioMed Central	global carbon cycle, climate, atmospheric carbon dioxide, terrestrial biospheres, oceanic biospheres	$1,700
Climates of the Past	[3.509]	2005	Copernicus/EGU	dynamics in ocean, atmosphere, ice, vegetation, carbon cycle, greenhouse gases, climate modelling	$31-$51/page
DNA Research	5.164	1994	Oxford U. Press	structure and function of genomes, gene analysis, methods and tools for DNA research, bioinformatic analysis of genomic data	$500
Earth Perspectives		2013	Springer	earth system science, earth-human interactions, global change, sustainability	$1,270
Elementa		2013	BioOne	earth system science, earth-human interactions, sustainability	TBA
eLife		2012	HHMI/MPG/Wellcome Trust	life sciences and biomedicine	no charge
Genome Biology and Evolution	4.618	2009	Oxford U. Press	evolutionary biology, genomics, molecular biology	$1,450
Geochemical Transactions	1.500	2006	BioMed Central	geochemistry, marine and aquatic chemistry, chemical oceanography, biogeochemistry, astrobiology	$1,690
Journal of Applied Volcanology		2012	Springer	applied volcanology, societal impact and response	$1,270
Journal of Physics: Conference Series		2004	IOP	physics (all areas); publishes conference proceedings only	
mBio	5.311	2010	ASM	microbiology	$1,000-$3,000
Microbiology Open		2012	Wiley	microbiology	$2,175
New Journal of Physics	4.177	1998	IOP/DPG	physics (all areas)	$1,440
Open Biology		2011	Royal Society	cell biology, developmental biology, molecular biology, biochemistry, immunology, microbiology	$1,932
Physical Review X		2011	APS	physics (all areas)	$1,500+
PLoS Biology	11.452	2003	Public Library of Science	biology, molecular biology, ecology	$2,900
PLoS Genetics	8.694	2005	Public Library of Science	biological sciences, gene discovery, population genetics, genome projects, comparative genomics, functional genomics, , evolution, gene expression, chromosome biology, epigenetics	$2,250
PLoS ONE	4.092	2006	Public Library of Science	science, medicine	$1,350
PoS - Proceedings of Science		2005	SISSA	astronomy, biophysics, physics, science communication; publishes conference proceedings only	no charge
Scientific Reports		2011	Nature Publishing Group	natural sciences, biology, chemistry, earth sciences, physics	$1,360

Impact Factors are from 2011 Thomson Reuters *Journal Citation Reports* ; values in square brackets are self-reported by publisher

Table 3. Publishers of Hybrid OA (sponsored access) journals relevant to the geosciences (as of October 2012)

Publisher	Sponsored OA program	Self-archiving		Terms	OA fee per article	Examples checked
		preprint	postprint			
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