

Copyright Uncertainty in the Geoscience community: What's Free for the Taking?

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Introduction: Why does copyright uncertainty exist in the geoscience information community?

Geoscience information is highly valuable for a wide diversity of users and purposes. Data and information about Earth processes and properties are critical to many sectors of society, from the oil company prospecting for new sources of energy, to the emergency planner evaluating community vulnerability to storm surge; and from the casual trekker, looking for the most efficient trail to scale the next peak, to the farmer concerned about the fertility of his soil beds. In the words of the International Union of Geological Sciences, an understanding of geology is "crucial in protecting human life, health, and assets, and sustaining our environment and resources."ⁱ

Given the vast public interest that geoscience information represents worldwide, it might be supposed that this rich corpus is freely accessible for use, adaptation, and sharing on a broad scale. But, in fact, that is not the case. A considerable amount of geoscience data and information is owned and managed by entities that control its use through copyright restrictions. Additionally, where geoscience information is ineligible for copyright protection (e.g., numerical data or other facts such as geographic coordinates), proprietary interests may control access through licensing agreements that prohibit reuse and redistribution.

It is regrettable that restrictions on access and re-use of geoscience information can inhibit societally-beneficial discoveries and activities, but these barriers are fully legitimate within the US legal system. Copyright law gives owners of scholarly or creative works nearly exclusive control over the reproduction, adaptation, distribution, and public display of those works for an extensive period of time.^{ii, iii}

In addition to copyright restrictions, a vendor's contractual terms and conditions may further limit what uses can be made of works in cases where the information resource is acquired through a license. The combination of usage restrictions presented by copyright law and vendor licenses can create considerable confusion for geoscience information specialists and the communities they serve.

Moreover, another circumstance adding to copyright uncertainty in the geoscience community is the fact that so much relevant information is freely accessible on the Internet, where Web technologies make it so easy to view and copy the information, select it for downloading or printing, and even it forward it on to others. The technological ease with which Internet resources may be accessed and reused gives a misleading impression that they are "free for the taking". In reality, however, much information on the Web is governed by legal restrictions (either copyright and/or licensing terms) that prevent additional uses of the information, such as adapting it and including it in a new work; displaying it in a public lecture; or sharing it with other research collaborators as part of an investigation.

For the above-stated reasons, it is a common point of confusion in the geoscience community (and beyond it) that public access to information equates with the public domain. This is an unfortunate

misunderstanding. Just as most books on a public library shelves are freely accessible for borrowing and reading but are not entirely free for copying and redistributing, so are the words, images or numbers on many Web sites, regardless of their ease of access online.

Examples of free geoscience web resources governed by copyright or licenses include:

- a map or image generated from Google Earth (the license that the user clicks through may prohibit republishing the generated image or map);
- a technical report downloaded from a state agency (state government documents may be subject to copyright);
- a map from a federal agency that incorporates a base map created by a private entity and reused by the government with permission.

Figure 1 below illustrates the latter example. The data supplied by USGS is in the public domain, but the base map is subject to copyright restrictions.

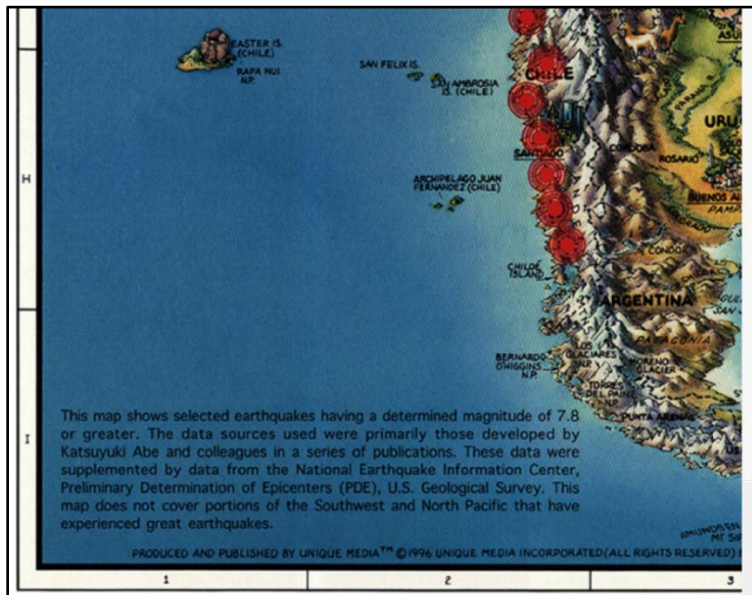


Figure 1. Segment from "Colorful Century Map of Earthquakes from USGS," a printed map sold by USGS, which incorporates a third-party's base map. Note the copyright notice for the third party printed at the bottom of the map. Screen captured from the web at: http://store.usgs.gov/b2c_usgs/

The stark contrast between public expectations of free access to geoscience information and the realities of copyright or licensing restrictions that govern use of these works is a source of copyright confusion and uncertainty in the geoscience community. Unaware that particular information on the Web is either copyrighted, governed by a license, or a combination of the two, users may unknowingly violate the law by making what seem like normal research uses of the content: sharing it with colleagues or students; reposting to a website, adapting it, and including it in a new presentation or publication. Regardless of their innocent intentions, users may put themselves and their institutions at risk of legal, financial and reputational consequences. In this way, the cost of copyright confusion can be considerable.

It is also important to recognize that copyright confusion can have equally significant costs on the other side of the usage spectrum. When scholars and students who are uncertain and fearful about restrictions on information resources choose NOT to reuse relevant information resources in their works, they may be degrading the potential quality of their research and its potential benefit to society. The topic of copyright uncertainty and the costs of copyright confusion are further addressed in the author's recent column in *C&RL News*^{iv}.

The author has been investigating copyright uncertainty and confusion in the geosciences in order to develop effective training and outreach programs to serve researchers, students and professionals in this discipline. To that end, a series of papers are being developed that highlight the causes of confusion, along with myths and misunderstanding most prevalent in this community of practice. It is hoped that this work will help geoscience information professionals effectively recognize the sources of copyright uncertainty in their communities and devise effective strategies for addressing users' confusion and concerns.

The present paper focuses on the "lowest hanging fruit" by highlighting the copyright-free (or at least, copyright-reduced) zone within the corpus of geoscience information. The examples provided here illustrate information resources that are "free for taking," or nearly so, meaning they may be re-used, adapted and re-published non-commercially without concerns for legal restrictions. Resources that fall into the "free for the taking" category may be simply ineligible for copyright protection in the first place, or they may be in the public domain because of the nature of the work, its authorship, or its publication history. Resources in the "Nearly Free for the Taking" category are copyrighted, but have been shared under an open license (e.g., Creative Commons) that gives users the right to reuse the work in ways that are typical for scholars, researchers, students and other members of the geoscience community.

At the end of the paper, a list of suggested readings are provided for those wishing a more in-depth examination of the issues touched on here. Readers are encouraged to send additional recommendations for resources or readings to the author for inclusion in the next edition of this paper, which will be updated and maintained as an open access publication through the Texas A&M Digital Repository at <http://repository.tamu.edu/>.

Finally, readers may be interested in knowing that successive papers in this series are being designed to address more complex issues within the general subject of copyright uncertainty within the geosciences. Topics to be included in future works include: Best practices in evaluating and applying copyright exceptions (Fair Use, TEACH, etc.); Understanding terms in licensing agreements that could prohibit research and educational uses; and Retaining authors' rights in negotiations with publishers. Readers interested in suggesting additional topics relating to copyright uncertainty in the geosciences are most welcome to write to the author.

Geoscience information resources that are "Free for the Taking"

Facts

According to US Copyright Law, facts are ineligible for copyright protection because they do not meet the statute's threshold for creativity and originality^v. In essence, facts are merely copied from the world around

It is important to keep in mind that facts, while not protected by copyright law, may still need to be cited in accordance with academic and research integrity

us. While a researcher may make considerable investments to uncover certain facts, US Copyright law simply does not provide for the effort, time or money invested in such activity. This concept, known as the "sweat of the brow" doctrine, was directly addressed by the US Supreme Court in their ruling on the case *Feist Publications, Inc., v. Rural Telephone Service Co.*^{vi}

A few examples of facts in the geosciences include the geographic coordinates for Old Faithful (44°27'24"N 110°49'54"W); the volume leaked in the Exxon Valdes oil spill (10.8 million gallons, or 257 barrels^{vii}); and the radiocarbon date for our hominid ancestor Lucy (3.18 million years old^{viii}). When facts are included in a copyrighted work, such as a map, web page, or research article, users are free to extract and reuse the facts from the source with impunity. The copyright secured by the author for the larger work does not apply to the facts embodied within it. This point is illustrated in the web page shown in Figure 2. Although the page itself is copyrighted by Climate-Charts.com, the latitude and longitude of Old Faithful (as well as the monthly climate data contained within the table) included on the page are not covered by the copyright.

Figure 2. Web page at the site <http://www.climate-charts.com/USA-Stations/WY/WY486845.php>, indicating that the page is copyrighted. But the facts contained in the page are not and therefore may be freely used without restrictions.

US Federal Works

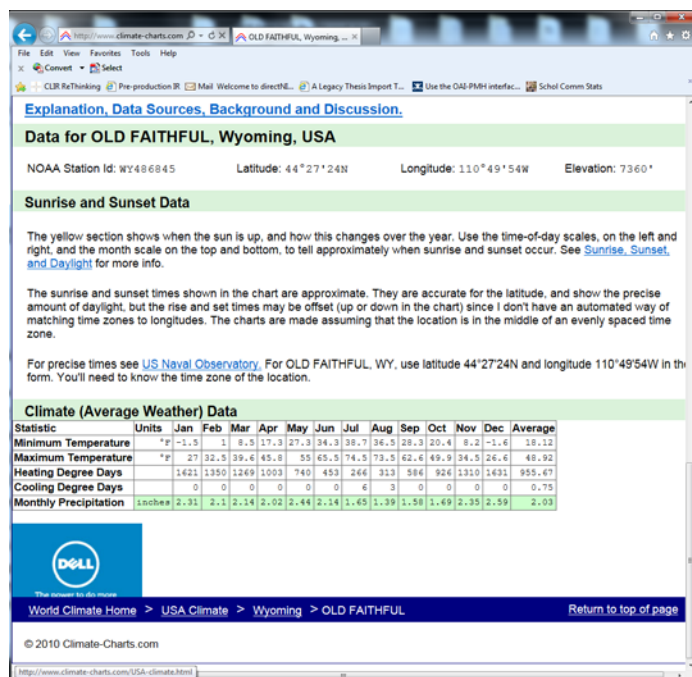
A common point of copyright confusion in the geosciences (and other fields) is that all government works are in the public domain and therefore free for the taking. In fact, however, only those works created by US federal employees, as part of their regular assignments, are free of copyright restrictions according to US Copyright law.

The statutory provision covering federal government works states^{ix}:

"Copyright protection under this title is not available for any work of the United States Government..."

Examples of US federal works that are free of copyright restrictions include the following

- Photo entitled "Deepwater Horizon Controlled Oil Burn" taken 06/09/2010, Credit: U.S. Coast Guard, Photographer: Petty Officer First Class John Masson, U.S. Coast Guard
- The Geologic Atlas of the United States, originally published by xxx and digitally republished and distributed worldwide by the . Note that digitization of a public domain work does not, in and of itself, qualify the digital version for copyright protection
- Published, peer-reviewed article authored by three USGS scientists



An example of the latter is shown in Figure 3 below. Note that the publisher -- in this case Elsevier -- can not claim copyright in the article because all the authors are employees of a US federal agency.



Figure 3. This article, authored by three USGS scientists, was published copyright-free by Elsevier in the *International Journal of Coal Geology* 94 (2012) 337–348.

In considering the public domain status of US federal works, it is important to keep in mind that some works *owned* by the government may in fact be copyrighted, as indicated by the concluding sentence of Section 105: “the United States Government is not precluded from receiving and holding copyrights transferred to it by assignment, bequest, or otherwise”. It is therefore possible (although uncommon) to encounter U.S. federal publications, images and websites that are copyrighted.

Another category of geoscience information that may be copyrighted are works created with grant funding from federal agencies. For example, university researchers who successfully apply for NSF grant funding to underwrite their investigations generally retain the copyright in their research deliverables. Nothing in the federal agencies’ policy prevents the university scientists from transferring their copyright in federally-funded works to a commercial publisher, who may then charge fees for access to the published version of the work. Essentially, this situation means that US taxpayers pay for the research twice – once in funding the research, and a second time in buying research results from the publisher. The fact that federally funded research is not, at present, “free for the taking” has raised the ire of both lawmakers and citizens who have banded together to improve this situation with new legislation. Known as the “Federal Research Public Access Act” or “FRPAA” (H.R. 4004 and S. 2096), this proposed law would “ensure free, timely, online access to the published results of research funded by eleven U.S. federal agencies”³ Additional information about FRPAA is included in the readings list at the end of this paper.

Other geoscience works in the public domain

Works may also be in the public domain if their terms of copyright have expired, or if they were never copyrighted in the first place. It is sometimes difficult to determine whether a work eligible for copyright protection is, at present, in the public domain and the assistance of a local copyright specialist or the US Copyright Office may be needed.

For those intending to research the copyright status of a given work themselves, one straightforward principle to keep in mind is that all works published and copyrighted in the United States before 1923 are now in the public domain. Beyond that category, a more complex calculation must be made to determine if an eligible work is copyrighted or not. Factors in making in this determination include whether the work was published or not; whether a work, if published in the US before 1989, complied with statutory requirements of copyright notice and registration; and whether a work copyrighted under the 1909 Copyright Statute (in effect until 1978) was renewed for a second term. A useful tool for assessing whether a work is in the public domain is Peter Hirtle's chart "Copyright Term and the Public Domain in the United States"^{xi}.

Numerous classic geoscience works from the pre-1923 era are now in the public domain, and many can be found as full text digital editions freely available for downloading, reading, printing and redistribution from digital library sites such as the Internet Archive (<http://archive.org/>) and the HathiTrust (<http://www.hathitrust.org/>).

The title page from one such book – Dana's *Manual of Mineralogy and Petrography, Twelfth Edition*, originally published in 1908 and now digitally available from the Internet Archive, is shown here in Figure 4.

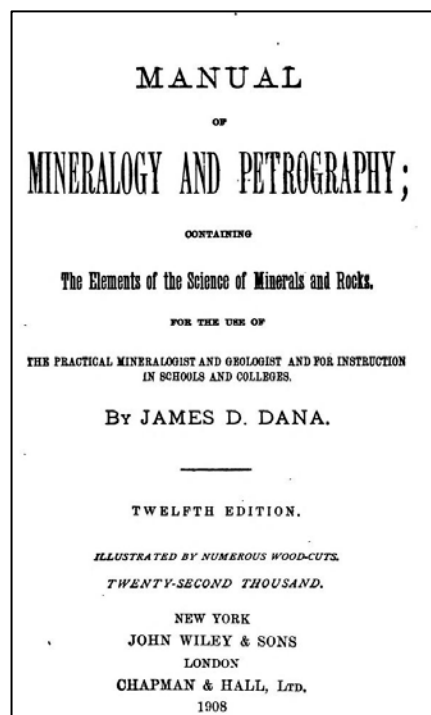


Figure 4: Formerly copyrighted monograph that has been digitally republished by the Internet Archive.

Geoscience information resources that are “Nearly Free for the Taking”

The last category of works that are generally available for reuse, adaptation and redistribution are those issued under an open content license. “Open content” refers to works that are copyrighted but have been made available, with the owner’s permission, “in a manner that provides users with the right to make more kinds of uses than those normally permitted under the law - at no cost to the user.”^{xii}

One popular type of open content license in use today is the set developed by Creative Commons, “a nonprofit organization that enables the sharing and use of creativity and knowledge through free legal tools”^{xiii}. Creative Commons licenses may be found on myriad works of scholarship and creativity: doctoral dissertations, peer reviewed articles, open textbooks and course materials, music, videos, and more.

Examples of CC-licensed works in the geosciences include the photograph and the peer reviewed article shown in Figures 5 and 6 below. Additional information about cc licensing is available from the organization's website. Related readings are also included in the references section of this paper.



Figure 5. According to the website of Mark A. Wilson, Department of Geology at the College of Wooster (<http://sedstrat.voices.wooster.edu/>), this picture of Triassic breccia is licensed under the Creative Commons Attribution-Share Alike 3.0 United States License. This license allows users to copy and redistribute the photograph for any purpose. The "Share Alike" designation in this license allows the user to also modify the image, as long as the new version is disseminated under the same CC license as the original.

Figure 6. Segment from the first page of a peer-reviewed geoscience article published in the open access, peer-reviewed *Journal of Geological Research* from Hindawi Publishing Corp. Note that the copyright statement identifies the authors, not the publisher, as the owner of the work. Also note that the copyright statement includes a Creative Commons license, allowing extensive reuse of the article as long as the work is properly cited.

Hindawi Publishing Corporation
Journal of Geological Research
Volume 2011, Article ID 791815, 15 pages
doi:10.1155/2011/791815

Research Article
Methane Hydrate Distribution from Prolonged and Repeated Formation in Natural and Compacted Sand Samples: X-Ray CT Observations

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Received 16 June 2011; Revised 12 August 2011; Accepted 13 August 2011
Academic Editor: Xuewei Liu

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To study physical properties of methane gas hydrate-bearing sediments, it is necessary to synthesize laboratory samples due to the limited availability of cores from natural deposits. X-ray computed tomography (CT) and other observations have shown gas hydrate to occur in a number of morphologies over a variety of sediment types. To aid in understanding formation and growth patterns of hydrate in sediments, methane hydrate was repeatedly formed in laboratory-packed sand samples and in a natural sediment core from the Mount Elbert Stratigraphic Test Well. CT scanning was performed during hydrate formation and decomposition steps, and periodically while the hydrate samples remained under stable conditions for up to 60 days. The investigation revealed the impact of water saturation on location and morphology of hydrate in both laboratory and natural sediments during repeated hydrate formations. Significant redistribution of hydrate and water in the samples was observed over both the short and long term.

1. Introduction

Gas hydrates (herein called "hydrate" or "hydrates") are non-stoichiometric inclusion compounds formed from a network of hydrogen bonded water molecules encapsulating small gas molecules [1]. Hydrates typically form at high pressures and

resulting in veins, nodules, and layers [13]. Hydrate distributions in natural sediments are attributed to variations in chemistry, lithology, local tectonic activity, and nature of the gas supply in a hydrate-bearing region [1].
Hydrate redistribution in porous media following initial

Conclusion

Considerable amounts of quality geoscience information are freely available on the Internet and in research libraries, but these works are not necessarily free of copyright or licensing restrictions. Users are responsible for understanding the copyright status of a work they intend to use, and for complying with legal restrictions governing the work. Gaining a clear understanding of copyright, however, is often a challenging task leaving users confused about whether a work is okay to use, or what restrictions may apply.

One way to reduce copyright confusion in the geoscience community is to help users identify those information resources that are free of legal restrictions, allowing the kinds of uses typical of these workers. This category includes materials that are either ineligible for copyright protection or are in the public domain. Additionally, works that are copyrighted but distributed with a Creative Commons license are also good candidates for reuse by geoscience users. Thanks to advanced features in Internet search engines, it is getting easier to find and locate works that are "free for the taking." For example, using Google's Advanced Search feature, a search on the term "gas hydrates" with the "usage rights" field set to "Free to use, share or modify, even commercially" yields almost 8000 results. Included in this set are high-resolution photographs, animations, distribution maps, agency fact sheets, and peer reviewed journal articles. Each of these items may be not only downloaded and printed for free, but also shared with colleagues and students, included in presentations and lectures, adapted for future use, and reprinted in a new publication. By understanding what information is "free for the taking," geoscience users will be less confused, more confident, and better empowered to take advantage of other's works while remaining fully compliant with copyright law.

Suggested Readings & Resources

Association of Research Libraries (2012) *Federal Research Public Access Act (FRPAA) of 2012*, Online, URL: <http://www.arl.org/pp/access/frpaa-2012.shtml>; last accessed 6-22-1012.

Gordon-Murnane, L. (2010). Creative Commons: Copyright Tools for the 21st Century. *Online (Weston, Conn.)*, 34(1), 18-21.

Kleinman, M. (2008). The beauty of "Some Rights Reserved": Introducing Creative Commons to librarians, faculty, and students. *College & Research Libraries News*, 69(10), 594-597.

Karjala, Dennis (1995). Copyright in Electronic Maps, *Jurimetrics Journal* 35, 395-415.

Scholarly Publishing and Academic Resources Coalition (SPARC), *Call to Action*. Online, URL: <http://www.arl.org/sparc/media/FRPAA2012.shtml>; last accessed 6-22-1012.

US Copyright Office, *How to Investigate the Copyright Status of a Work*, Circular 22, Online, URL: <http://www.copyright.gov/circs/circ22.pdf>; last accessed 6-22-2012.

NOTES

ⁱ Commission for the Management and Application of Geoscience Information, "Objectives", Online, URL: <http://www.cgi-ugs.org/objectives.html>; last accessed 6-22-2012.

ⁱⁱ The phrase "nearly exclusive control" refers to the existence of several exceptions in the law, such as Fair Use or the TEACH Act (Section 107 and 110(2), respectively), that permit socially beneficial uses of copyrighted works without the owner's permission. These exceptions are available only where the particular use meets very specific criteria, as specified in the law.

ⁱⁱⁱ Owners' rights are represented in the US Copyright Statute as USC Title 17, Section 106; the term of copyright is represented in USC Title 17, Sections 302-305. The US Copyright Statute may be found in full text online at the US Copyright Office, URL: <http://www.copyright.gov/title17/>; last accessed 6-22-2012.

^{iv} Clement, Gail, 2011, The copyright self-help movement: Initiatives in the library community, *College & Research Libraries News*, 72(7), 404-415, URL: <http://crln.acrl.org/content/72/7/404.full>; last accessed 6-22-2012.

^v USC, Title 17, Section 102, "Subject matter of copyright: In general"

^{vi} 499 U.S. 340 1991.

^{vii} Source: Exxon Valdez Oil Spill Trustee Council, "Questions and Answers," Online, URL: <http://www.evostc.state.ak.us/facts/qanda.cfm>; last accessed 6-20-2012.

^{viii} Greene, Kevin and Moore, Tom (2010). Dating the past, page 177 in *Archaeology: An Introduction* (Taylor & Francis, 394 pages)

^{ix} USC Title 17, Section 105, "Subject matter of copyright: United States Government works"

^x Alliance For Tax Payer Access, Website, Online, URL: http://www.taxpayeraccess.org/action/action_frpaa/FRPAA2012.shtml; last accessed June 22, 2012).

^{xi} Hirtle's chart is regularly updated on the website of the Copyright Information Center at Cornell University, Online, URL: <http://copyright.cornell.edu/resources/publicdomain.cfm>; last accessed 6-20-2012.

^{xii} "Defining the "Open" in Open Content," *The Open Content Website*, <http://opencontent.org/definition/>; last accessed 6-22-12.

^{xiii} "About Creative Commons," Creative Commons Web site, Online, URL: <http://creativecommons.org/about>; last accessed 6-22-2012.