

Editorial workflow of a community-led, all-volunteer scientific journal: lessons from the launch of Seismica

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Abstract Seismica is a community-led, volunteer-run, diamond open-access journal for seismology and earthquake science, and Seismica's mission and core values align with the principles of Open Science. This article describes the editorial workflow that Seismica uses to go from a submitted manuscript to a published article. In keeping with Open Science principles, the main goals of sharing this workflow description are to increase transparency around academic publishing, and to enable others to use elements of Seismica's workflow for journals of a similar size and ethos. We highlight aspects of Seismica's workflow that differ from practices at journals with paid staff members, and also discuss some of the challenges encountered, solutions developed, and lessons learned while this workflow was developed and deployed over Seismica's first year of operations.

Resumen (Spanish) Seismica es una revista de sismología y ciencias de la Tierra de acceso abierto tipo Diamante, dirigida por la comunidad y por voluntarios. La misión y los valores fundamentales de Seismica están en consonancia con los principios de la Ciencia Abierta. Este artículo describe el flujo de trabajo editorial que se usa en Seismica, para pasar de un manuscrito enviado a un artículo publicado. De acuerdo con los principios de la Ciencia Abierta, los principales objetivos de compartir esta descripción del flujo de trabajo son: aumentar la transparencia en torno a la publicación académica, y permitir a otros utilizar estos elementos para revistas de un tamaño y ética similares. Destacamos los aspectos del flujo de trabajo de Seismica, que difieren con las prácticas de revistas con personal pagado, y también discutimos algunos de los retos encontrados, las soluciones desarrolladas y las lecciones aprendidas durante el desarrollo y despliegue de este flujo de trabajo en el primer año de operaciones de Seismica.

Özet (Turkish) Seismica, topluluk liderliğinde, gönüllüler tarafından yürütülen, sismoloji ve deprem bilimi için kurulmuş bir elmas açık erişim dergisidir. Seismica'nın misyonu ve temel değerleri Açık Bilim ilkeleriyle uyumludur. Bu makale, Seismica'nın, makale gönderiminden yayınlanmasına uzanan editoryal iş akışını açıklamaktadır. Bu iş akışını paylaşmanın ana hedefleri, Açık Bilim ilkelerine uygun olarak, akademik yayıncılık konusunda şeffaflığı arttırmak ve benzer büyüklük ve amaca sahip dergilerin Seismica'nın iş akış unsurlarını kullanabilmesini sağlamaktır. Bu makalede, Seismica'nın iş akışının, ücretli personeli olan dergilerdeki uygulamalardan farklı yönlerini vurguluyor ve ayrıca Seismica'nın ilk faaliyet yılı boyunca bu iş akışını geliştirip uygularken karşılaşılan bazı zorlukları, geliştirilen çözümleri ve öğrenilen dersleri tartışıyoruz.

Production Editor:
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Copy & Layout Editor:
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Sammendrag (Norwegian) Seismica er et fellesskapsledet, frivillig-drevet tidsskrift for seismologi og jordskjelvvitenskap med diamant åpen tilgang. Seismica's formål og kjerneverdier følger prinsipper for åpen vitenskap. Denne artikkelen beskriver den redaksjonelle arbeidsflyten Seismica bruker til å gå fra innsendt manuskript til publisert artikkel. Hovedmålene med å dele denne arbeidsflytbeskrivelsen er, I henhold til prinsipper for åpen vitenskap, og øke åpenheten rundt vitenskapelig publisering og hjelpe tidsskrifter med lignende størrelse og etos til å bruke deler av Seismica's arbeidsflyt. Vi fremhever elementer av Seismica's arbeidsflyt som skiller seg fra vanlig praksis hos tidsskrifter med betalte ansatte, og diskuterer våre erfaringer, utfordringer vi har møtt, og løsninger vi har funnet under utvikling og implementering av denne arbeidsflyten i Seismica's første driftsår.

Samenvatting (Dutch) Seismica is een "Diamond Open Access" wetenschappelijk tijdschrift voor seismologie en aardbevingswetenschappen dat wordt geleid door vrijwilligers uit de gemeenschap. Seismica's missie en kernwaarden zijn direct in overeenstemming met de principes van Open Science. Dit artikel beschrijft onze redactionele workflow, vanaf het inzenden van een artikel tot de uiteindelijke publicatie. In lijn met de principes van Open Science delen wij deze workflowbeschrijving met het doel om de transparantie rond het academische publicatieproces te vergroten en anderen in staat te stellen om bepaalde elementen van deze workflow te gebruiken voor tijdschriften van vergelijkbare omvang en ethos. We benadrukken aspecten van Seismica's workflow die verschillen van de praktijken bij tijdschriften die niet door vrijwilligers worden geleid, en we bespreken ook een aantal uitdagingen, oplossingen en lessen die zijn geleerd tijdens de ontwikkeling en implementatie van de workflow gedurende het eerste jaar van Seismica's activiteiten.

1 Introduction

What goes on behind the scenes at academic journals typically remains closed to authors and readers. The purpose of this article is to help open up the "black box" of journal editing and operations (Baruch et al., 2008) in order to increase transparency, promote trust in academic publishing, and support the establishment and growth of new journals. Journals established and led by researchers with little or no connection to traditional publishers can benefit from having access to in-depth information on editorial processes beyond what individual researchers may know from personal experience with academic publishing; we hope that sharing this information will enable researchers across disciplines to better understand and optimize editorial workflows over time through further sharing and collaboration.

The standard process of publishing an academic paper has multiple steps. It starts with authors preparing and submitting a manuscript to a journal, continues with journal editors shepherding the manuscript through peer review, and if the article is accepted, concludes with the journal publishing and distributing the paper. Prior to launching the Diamond Open-Access journal (DOAJ) Seismica, we, members of the founding Editorial Board, knew this process primarily from experience as authors, reviewers, and editors for other journals. However, within that broad framework from manuscript submission through peer review to publication, a community-led, all-volunteer journal such as Seismica necessarily does some things differently than a professionally staffed journal. To launch and build Seismica, we adapted existing frameworks and opensource tools, and developed additional tools and workflows during the first year of journal operation to meet both anticipated and unexpected operational and editorial needs.

This editorial describes how we at Seismica have de-

signed and implemented a paper handling workflow and highlights how a community-led, all-volunteer journal operates in ways both similar to, and distinct from, professionally staffed journals. Here "professionally staffed" refers to journals that have paid full-time editors and/or paid staff who handle aspects of author and reviewer communications, copy-editing, article layout, and media promotion. We hope to assist future community-led journals by sharing the processes and tools developed by *Seismica* before the journal launched and refined through *Seismica*'s first year of operations, and by discussing how these processes and tools may continue to evolve with the journal.

This editorial does not cover the philosophical and scientific aspects of journal building (see, e.g., Rowe et al., 2022; Ndungu, 2021; Graf et al., 2007; Thomas et al., 2023; Farquharson and Wadsworth, 2018; Fernández-Blanco et al., 2023) although the core values of a journal, its disciplinary focus, and its organizational structure will influence practical aspects of paper handling. Rather, we focus on the practical workflow steps and tools we have developed to handle papers at Seismica, and will describe the technical infrastructure that supports our workflow. Seismica uses the Open Journal System (OJS) for paper handling (version 3.2.1.1, Public Knowledge Project, 2023); we will not cover OJS setup or configuration here, but will describe the in-house technical tools that we developed to facilitate paper handling that are complementary to those provided by OJS. Seismica's OJS installation is hosted and maintained by the McGill University Library as part of the in-kind support provided by the McGill Library to the journal (Rowe et al., 2022).

2 Submission to acceptance

Seismica processes submitted articles following the standard framework for academic publishing (Mabe, 2009) (Figure 1). Submissions are assessed against the journal's scope, checked for adherence to minimum manuscript formatting requirements, assigned to a handling editor (HE), and sent out for anonymous (or double-anonymous, at the authors' request) peer review. One or more rounds of reviewer reports and a subsequent HE judgment informs a decision on whether to accept the article for publication. Accepted manuscripts are formatted according to Seismica's requirements and then forwarded to production.

2.1 Article submission

Submitted manuscripts are first assigned to a production editor who performs initial checks to ensure that the manuscript is within journal scope. For the majority of articles, this production editor will be one of Seismica's executive editors. Articles submitted as Fast Reports go to the Fast Reports editorial team, and articles submitted to special issues may go to associated guest editors. If an article is within scope, the production editor will also check to ensure the submission adheres to minimum formatting requirements. Submitted articles must be in PDF format with a minimum font size of 12 pt, double line spacing, and line numbers. Formatting requirements for submission are intentionally minimal, and this is a policy choice intended to reduce the burden on authors in line with Seismica's core value of inclusivity (Clotworthy et al., 2023; Kozlov, 2023). We provide Seismica-specific document templates for several different word processing programs for authors' convenience¹, but authors are not required to use them at the submission stage.

Required sections for submitted articles include an English-language abstract (maximum 200 words), a list of author contributions using the Contributor Roles Taxonomy (CRediT, Brand et al., 2015), a complete reference list with digital object identifiers (DOI) included where available, and a Data and Code Availability statement (Callaghan, 2014). Seismica encourages authors to include a non-technical summary and up to two additional translations of the abstract into languages other than English to make their work accessible to broader communities.

Seismica publishes standard research articles and several types of reports, as well as occasional editorials and reviewed opinion pieces. Articles submitted in one category might be better suited to another, particularly as report-type articles are less common and may be unfamiliar to authors. Editors may discuss changing the article type with authors if they believe a submission belongs in a different category.

2.1.1 Author contributions and identifiers

While developing journal policies for Seismica, we identified transparency as a key guiding value, including

1https://seismica.library.mcgill.ca/templates/

transparency in terms of authorship (Rowe et al., 2022). To this end we require an Author Contributions statement in each manuscript specifying the role(s) played by each author, using the 14 potential roles defined by the CRediT taxonomy (Brand et al., 2015). In the operations of *Seismica* to date, the Author Contributions statement is a common omission from initial submitted manuscripts; in such cases, we require modification of the manuscript before a HE is assigned and the review process can be initiated.

To assist with indexing of author contributions, we request that each author includes their Open Researcher and Contributor ID (ORCID, https://orcid.org/) in the text of their submission, and supplying an ORCID is mandatory for the lead author. Author ORCIDs are hyperlinked in published article PDFs. Additionally, we use the OJS ORCID plugin to link to author ORCIDs on article webpages, provided authors authenticate and link their ORCID accounts to *Seismica*. *Seismica*'s host, McGill University Library, is a member of ORCID, so *Seismica* is also able to add publication metadata to authors' ORCID profiles using the ORCID member API.

2.1.2 Facilitating Open Science through sharing of data and codes

Open Science is an ethos promoting free and open access to scientific data, tools for scientific inquiry, scholarly communications and educational materials (e.g., UNESCO, 2021). As such, the mission of a DOAJ like *Seismica* has significant overlap with the principles of Open Science. As we designed and built *Seismica*, we recognized that we had an opportunity to build Open Science principles into the journal from the outset. We created a senior editorial position, the Executive Editor for Open Science, to facilitate implementation of Open Science practices and track developments in the field, and we codified requirements for sharing of data and the codes necessary to analyze and/or model results into our editorial policies (Rowe et al., 2022).

One of the ways that authors submitting to Seismica signal compliance with these policies is through the inclusion of a 'Data and Code Availability' statement at the end of their manuscript; if no data or codes are involved in the study, we ask for the inclusion of an affirmative statement to that effect. Data citation requirements and practices are not consistent across seismology and earthquake science, but formal citations of data factor into operational and funding decisions for future data collection and curation, so it is in our community's best interests to consistently cite data in our work (Staats et al., 2023). If data were obtained from a public domain archive, such as the Federation of Digital Seismograph Networks (FDSN, https://www.fdsn.org/), we ask that the archive be named and appropriately cited in the statement. If the data are not available in a public domain archive, we ask that they be uploaded to a DOI-citable public domain archive such as Zenodo² or figshare³. Similarly, if codes used for a study are not published in a stable and long-term citable form, we require that a

²https://zenodo.org

³https://figshare.com

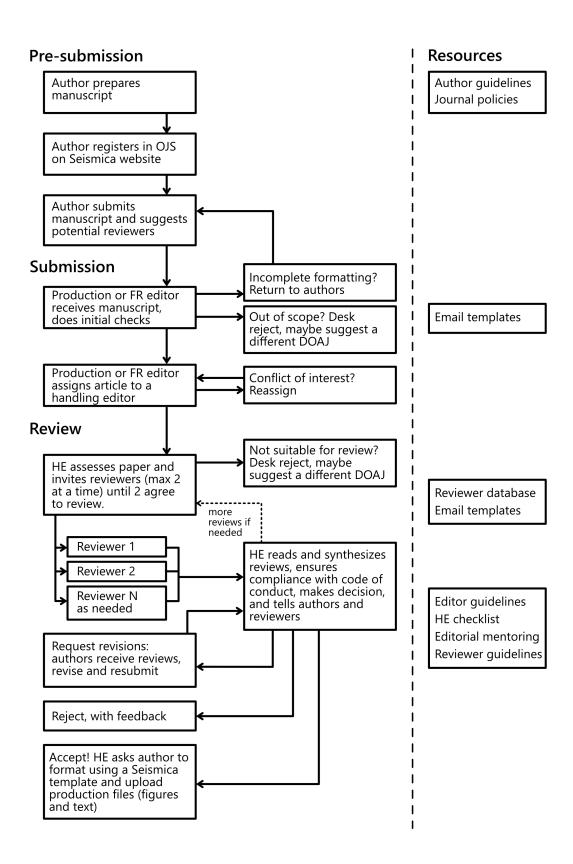


Figure 1 Paper handling flowchart from article submission through peer review. HE: handling editor; FR: Fast Reports; OJS: Open Journal System; DOAJ: Diamond Open Access Journal.

full snapshot of the code and scripts used in the study be uploaded to a DOI-citable archive to facilitate reproduction of the authors' original workflow and replication of their results. While reviewers may not always be able to verify that software works as reported (for example, when codes require high-performance computing resources), data and codes associated with soft-ware or data report manuscripts are subject to scrutiny as part of the review process. As with Author Contributions statements, Data and Code Availability statements have been frequently omitted from initial submissions to *Seismica*, adding delays to the handling of those submissions.

Seismica does not provide archiving services for data or code in-house. Instead, we encourage authors to share data and codes on widely-used platforms such as figshare and Zenodo. If Zenodo is selected, we ask authors to upload their data to the Seismica Zenodo Community⁴ in an effort to organize Seismica contributions in a central location. These and several other options for archiving are listed in Seismica's Author Guidelines, and authors are invited to contact Seismica editors prior to submission for advice and consultation.

2.2 Peer-review process

Submissions that are within scope and compliant with minimum formatting requirements are assigned by the production editor to a HE with relevant expertise. The HE assesses the manuscript and decides whether it meets our scientific criteria for being sent for review.

HEs draw on author suggestions, personal knowledge, and a tagged reviewer database⁵ to find potential peer reviewers. The reviewer database was built by Seismica's Tech Team, as OJS's native functionality for tagging and filtering registered users by expertise did not fully meet our needs. OJS allows users registering as reviewers to self-assign expertise tags, but does not limit those tags to any pre-defined list, so users could self-assign a wide variety of tags with similar meanings: for example, 'seismic imaging' and 'tomography'. This presents a difficulty to HEs, who would need to come up with creative and expansive search terms to filter users by these tags. In contrast, Seismica's reviewer database has a simple interface where potential reviewers can register by signing in with their ORCID and can then self-assign tags for their areas of expertise from a predefined list. HEs have access to filter registered reviewers by field. Personal information is not collected in the reviewer database to ensure compliance with the European Union's General Data Protection Regulation (GDPR, European Commission, 2016).

Seismica's HEs have started with varying levels of experience with managing the editorial process. Resources for HEs include extensive guidelines on philosophical and practical aspects of the editorial process, task checklists, email templates for communicating with authors and reviewers, and access to editorial mentors on the Seismica board (Mark et al., 2023). The editorial mentors are members of the HE team with prior experience in journal editing, and they are available to guide those who are new to managing the review process from the editorial side.

We also provide guidelines for reviewers that describe both the general process of peer review and the specifics of reviewing for *Seismica* (Mark et al., 2023).

The guidelines list potential questions to consider when reviewing a paper, outline the timeline for peer review at *Seismica*, and discuss ethical aspects of peer review, including confidentiality, conflicts of interest, and signing reviews. *Seismica* publishes reviewer reports alongside accepted articles, and reviewers are informed of this policy when they are asked to review.

Upon receipt of reviews, HEs can choose to accept, decline, or more commonly, request further revisions. A revised manuscript may or may not be subject to a further round of review. Generally, the HE will decide whether a manuscript will be subject to another review round after reading the revised version. Authors are not given a strict due date for revisions. While it is generally in authors' best interests to return revisions as soon as possible, we do not want to put pressure on authors to rush through the revising process.

At *Seismica*, we have intentionally assembled and curated a team of HEs whose expertise spans the journal's scope. At the time of writing, *Seismica*'s Editorial Board includes 28 HEs, some of whom are also executive editors or members of operational teams. Sharing the workload among this group helps ensure both that individual volunteers are not overburdened, and that each submission is highly likely to be handled by a subject matter expert, so that confident executive decisions can be made on submissions and unnecessary rounds of review can be avoided.

2.3 Accepted manuscripts

If a manuscript is accepted, HEs inform authors that at this stage they are required to format their work using one of Seismica's document templates⁶ if they have not yet done so. Required files for production include an editable article file (docx, odt, or TeX) in a Seismica template, individual high-resolution figure files, and supplementary materials (if applicable). As noted previously, not requiring template-formatted manuscripts at the time of submission may save authors some effort in the event that a manuscript is declined, but accepting arbitrarily formatted articles for production would impose an unsustainable burden on volunteer copy/layout editors. HEs are also encouraged to proofread accepted articles during the review process to expedite article production and reduce the workload of the copy/layout editors. Once accepted manuscript files are uploaded in the required format, they are forwarded to production.

2.4 Appeals

Seismica has a transparent process for authors who want to appeal an editorial decision or dispute a review, in alignment with Seismica's core values. A clearly described process for handling complaints and appeals is also a core practice of the Committee on Publication Ethics (COPE, https://publicationethics.org). Appeals first go to Seismica's standing appeals team, which is comprised of one executive editor, one early-career HE, and one other HE. An alternative HE is recruited on a case-by-case basis if an appeals team member has

⁴https://zenodo.org/communities/seismica-journal/

⁵https://seismica.eu.pythonanywhere.com/

⁶https://seismica.library.mcgill.ca/templates/

already been handling the manuscript or has another conflict of interest. This internal appeal board will render a decision to either uphold the original decision, or make a new decision in light of information provided in the appeal. Their decision should not be a re-review of the manuscript, but rather an assessment of the complaint made in the appeal, that acknowledges any mistakes that may have been made in the editorial process.

The appeal board's decision is communicated to the author making the appeal, and the original HE. If appropriate, one or more original reviewer(s) may also be notified. If any procedures need to be reviewed in light of issues highlighted in the appeal, then that will be raised with the *Seismica* board. The author can challenge the appeal board's decision, in which case the question will be passed up to a multi-journal appeals committee. The committee is composed of representatives from the journals *Geomorphica*, *Sedimentologika*, *Seismica*, and *Tektonika* (as of July 2023), and will assess the merit of any appeals with respect to the journals' policies and scientific community standards. The decision of the multi-journal appeals committee is considered final.

3 Article production and promotion

After an article is accepted, three main tasks remain: (1) finalize the text of the article through copy-editing, (2) generate final files of the completed article for publication, and (3) promote the published paper to readers (Figure 2). Most journals delegate copy-editing and layout tasks to paid professionals separate from editorial staff (e.g., Mabe, 2009), and article promotion will often be a paid service offered by press or media offices. In contrast, Seismica's HEs oversee the production process in collaboration with copy and layout editors from Seismica's Standards and Copy-editing (S&CE) team and members of the Media & Branding (M&B) team, who are all also researchers with expertise in Seismica's core disciplines. The production process at Seismica, just like editorial work and reviewing, is undertaken by volunteers from the scientific community. We aim to provide high-quality article production services while remaining respectful of the time and effort of volunteers.

The final products of the editorial workflow are a PDF article, a machine-readable web-page displaying the same article, PDFs of peer-review reports and supplementary materials, coordinated social media posts, and an optional press release.

3.1 Production to publication

Once an article has been accepted for publication, HEs assign the manuscript to the chairs of the S&CE and M&B teams. In turn, the chairs then assign an S&CE team member as copy/layout editor for the manuscript, and one or more M&B team members to coordinate media and promotion. Manuscript assignment to copy/layout editors is based on expected work hours needed for the manuscript, experience, previous workload, and availability; and copy/layout editors may decline to handle a manuscript. M&B team members are on stand-by

until proofs are validated, unless the article is a Fast Report, in which case M&B will start corresponding with the author immediately. The promotion workflow is detailed in Section 3.3.

The copy/layout editors read and typeset each accepted article with the procedures and tools detailed in Section 3.2. They exchange typeset PDF proofs of the accepted manuscript with the authors as many times as necessary to arrive at a version that meets with the authors' approval. Currently, authors are not asked to check or approve the machine-readable web-page version of the article, mainly because the OJS system does not allow it. There are no strict time constraints for authors to check proofs - authors are typically motivated to get articles published quickly, but flexibility allows people to take extra time if they need it and will hopefully lead to fewer missed typographical errors. Similarly, there are no strict deadlines for copy-/layout editors to produce and update proofs, although the S&CE team does expedite making proofs for fast reports. Standard copy-editing is intended to catch spelling and grammar mistakes. S&CE also offers copyediting beyond proofreading, including writing style recommendations, to authors who are interested. This is inspired by Volcanica's copy-editing philosophy (Farquharson and Wadsworth, 2018).

HEs step back into the process when the authors approve the article proofs. The HE sets a target publication date that is communicated to both the copy/layout editor and the M&B team members. Target publication dates default to 7 working days after proofs are approved by authors, or 3 days for fast reports. The HE, copy/layout editor, or M&B team members may delay the target publication date if they anticipate needing more time due to either operational or personal reasons. The HE then communicates the target date to the corresponding author, and the M&B team corresponds with authors to solicit images and text for publicity posts (see Section 3.3).

HEs communicate article metadata to the copy/layout editors, including the volume and issue of the article, dates of article submission and acceptance, and the names of all volunteers involved in each article. In the published version of each article, we credit the production editor; the HE; the copy/layout editor; translators for multiple-language abstracts, if any; and nonanonymous reviewers. Authors of accepted articles are also encouraged to acknowledge reviewers in their Acknowledgments section, including both anonymous reviewers and those who choose to sign their comments. Other volunteers, such as members of the M&B team, are acknowledged in the cover of each issue when the issue is finalized.

Copy/layout editors produce final article versions (see Section 3.2) and upload them in OJS, along with any supplements to the article and a plain-text list of references for proper indexing by Crossref (a DOI registration agency and indexing organization, Hendricks et al., 2020). Reviewer reports are compiled by the HE and uploaded by either the HE or the copy/layout editor. The HE is responsible for double-checking the article metadata in OJS and the final versions of the article. Finally,

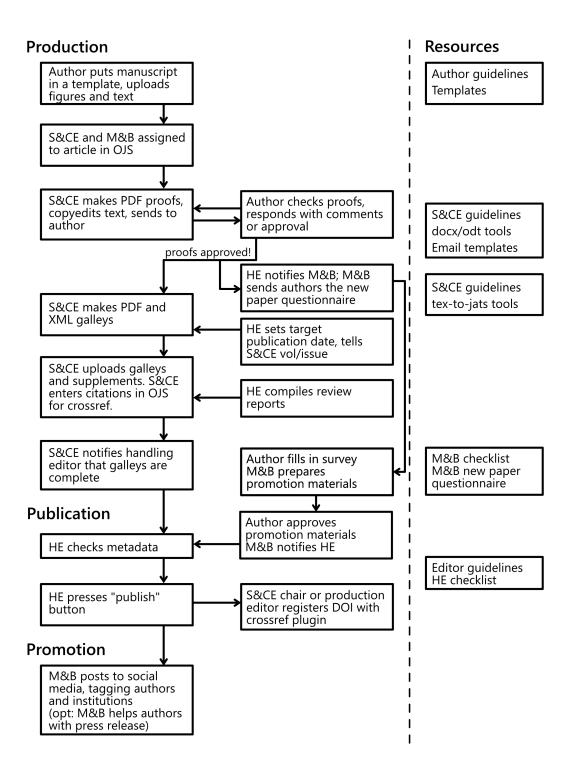


Figure 2 Paper handling flowchart from article production through publication. HE: handling editor; S&CE: Standards and Copy-Editing team; M&B: Media and Branding team.

the HE presses the "publish" button once all the files are in place, and an S&CE chair or the production editor registers the article DOI with Crossref. DOI registration via Crossref is provided by the McGill Library as in-kind support, at no cost to *Seismica*.

3.2 Workflow and software tools for formatting and layout

Seismica's articles are published in two formats: PDF and Journal Article Tag Suite (JATS), which is a eXtensible Markup Language (XML) format specifically designed for describing scientific literature. We chose to offer a JATS version of the final article because it is

machine-readable (unlike the PDF format) and therefore enhances indexing by search engines. Also, JATS is required for indexing services on third-party online repositories such as PubMed (e.g., Huh, 2016).

Articles are typeset for PDF publication in LuaTeX (Hagen, 2005), and then converted to JATS. The accepted version of an article will thus go through three main stages of modification and formatting prior to publication: (1) generating a typeset PDF proof from a template-formatted manuscript; (2) copy-editing iterations until the PDF proofs are approved by the author(s); and (3) converting the TeX file used to make the PDF into JATS.

The technical problem of converting article files from one format to another while preserving the metadata is unfortunately fairly complex (e.g. for a docx or odt file to JATS, Gebhard and Rosenblum, 2016). Many proprietary and some free solutions exist for the conversions we are interested in, but open-source codes that can be modified and tailored to our needs, or free software packages that guarantee data protection, are rare. We therefore rely on a set of open-source and homebrewed codes, including Pandoc (a Haskell library for converting from one markup format to another, Mac-Farlane, 2006) and custom Python and shell scripts, to automate as much of the process as possible. Below, we describe in detail our TeX templates and our conversion workflows and tools to go from docx/odt to TeX and from TeX to JATS.

3.2.1 Seismica Templates

Seismica's TeX template for publication is designed to be user-friendly, flexible, and aligned with the journal's brand identity (Rowe et al., 2022). Importantly, TeX is free and open-source, unlike some other commonly used tools for generating publication-quality PDFs like Adobe InDesign. The first version of the template was based on the *Volcanica* template (Volcanica, 2023), which was converted to a TeX class for flexibility. Macros for article metadata help copy/layout editors to easily include and format key information such as article submission, acceptance, and publication dates; article DOIs; volume and issue numbers; and editor names. The template is designed primarily for a 2column format for ease of reading (Doumont, 2009) but also includes a 1-column option for articles with many long equations. Seismica's brand identity is expressed through the use of a color palette, a set of fonts, and journal banner in the first page header (Rowe et al., 2022). There is also a TeX submission template which uses a 1-column format, double line spacing, and line numbers, and it has an option for producing a preprint-ready PDF⁷. We continue to update the *Seismica* TeX templates regularly, based on user suggestions and on our needs.

Templates for article submission are also available in docx and odt formats. The docx and odt templates make use of document styles and section ordering for metadata, with the goal of generating documents that retain some amount of structure when converted to generic

TeX using *Pandoc*. The template documents contain instructions prompting authors to fill in metadata and use the appropriate styles for section headings.

We note that TeX PDFs and JATS versions are not fully compliant with Universal Accessibility standards. We are encouraged that the LaTeX Project is actively working on implementing accessibility features (Mittelbach and Rowley, 2020), and we will incorporate these improvements as they become available. On the other hand, XML files can be structured and tagged, and we are working towards using these features to produce accessible galleys.

3.2.2 Conversion tools

From docx/odt to TeX Submissions received in Seismica's docx and odt templates have to be converted to TeX for copy-editing and layout. The primary goal of the docx/odt-to-TeX conversion process is to link in-text citations to bibliographic entries automatically, as replacing parenthetical citations with reference tags manually would otherwise be the most time-consuming and error-prone part of article production. Importantly, while Pandoc is able to convert the bulk of a docx or odt file to TeX syntax, citation linking is not a Pandoc functionality. We therefore use Pandoc to convert docx and odt manuscript files to generic TeX and then post-process the *Pandoc* output into the *Seismica* template using Python, relying on document structure cues to identify section headings, figure captions, tables, equations, and other document elements. Plaintext reference lists are converted to bibtex entries using anystyle (a machine learning-based citation parser, Fenton et al., 2023), and in-text citations are found and pattern-matched to references in the bibtex file using Python. The success of this process depends strongly on authors using the docx and odt templates in a predictable way. Copy/layout editors will correct some small errors in template usage as needed, but authors who submit article files for production that are clearly not in a Seismica template are asked to reformat their work before article production can proceed. Even in perfectly formatted documents, there are some elements that cannot be parsed automatically and must be manually corrected by copy/layout editors. The tools for converting docx and odt manuscript files to TeX are available for others to use or adapt (Mark et al., 2023).

From TeX to JATS A second set of scripts are used by the copy/layout editors to convert the final TeX version of the article to JATS. While *Pandoc* is able to convert basic TeX syntax to JATS, it will not parse article metadata, cross-references, complex hyperlinks, or locally defined commands. We designed scripts that rely on the expected JATS document structure to include article metadata and correct the output of *Pandoc* for, among other things, mathematical formulas, cross-references, figure file extensions, and author CRediTs. The process presents similar challenges to those that arise in converting docx or odt to TeX.

The OJS system relies on a plugin embedding the eLife Lens open-source JATS viewer to display the con-

⁷https://www.overleaf.com/latex/templates/seismica/bvnbjbkycdjb and https://seismica.library.mcgill.ca/templates/

tents of JATS files on webpages, and this plugin has known issues with displaying code and some forms of metadata. We therefore do not offer a final JATS version for articles with large amounts of code quoted in the text where a significant portion of the article cannot be displayed with the OJS reader. The scripts for running the TeX to JATS conversion are available for others to use or adapt (Mark et al., 2023).

3.3 Media and promotion

Once the authors have approved the article proof, the HE contacts the M&B team and adds them to the OJS workflow. M&B then contacts the author with a questionnaire to solicit information for article publicity materials aimed at a general scientific audience. This information typically includes an image (and/or video) representative of their work, and a short text describing the work with minimal jargon. This material helps the M&B team optimize the announcement for a wider audience and to stay within certain social media character limits. Once the M&B team receives the responses from the authors, they prepare posts for *Seismica*'s social media accounts by adjusting the text and imagery for different platforms (Figure 3). The final version (mock-up graphics and text) is sent back to the authors for approval.

M&B announces the publication of each new paper on *Seismica*'s social media accounts. At the time of writing, *Seismica* has social media channels on Twitter, Facebook, Instagram, and Mastodon. M&B also suggests that authors contact their home institutions in case they want to publish a press release for articles that are anticipated to have high impacts outside of the scientific community (e.g., USC, 2023), and the M&B team is available to help with structuring the press release and providing any additional information that the host institution might need. M&B works with the HE to promptly announce the manuscript after publication, but we do not attempt to exactly synchronize M&B's posts with the publication of an article through OJS as team members are often working in different time zones.

At *Seismica*'s present size, it is still feasible for M&B to work with the authors of every article on promotional posts. The purpose is to make science more accessible and inclusive by communicating the value of the research to broader audiences worldwide. Helping authors share and promote their work is part of how *Seismica* is building a brand and, hopefully, growing an audience of both readers and potential future authors and volunteers.

4 Using the workflow and measuring workload

4.1 Who reads the guidelines?

The processes and guidelines developed for *Seismica* theoretically provide support to journal volunteers tasked with a wide variety of different jobs, but having support structures in place does not guarantee that they will be used. While the S&CE and M&B team tools and

guidelines are consistently used, it is less clear whether HEs use *Seismica*'s tools and guidelines or rely primarily on their expectations and/or previous experiences in scientific publishing.

We surveyed Seismica's HEs about their awareness and use of several resources, specifically template text for email communications, a flowchart of the editorial workflow, written editor guidelines, and editorial mentoring. The response rate was approximately 38%. The survey results generally indicate that these resources are actively used by HEs. All of the survey respondents were aware of the email template text and the editor guidelines, and most were aware of the flowchart and the availability of editorial mentoring. HEs who reported using the resources gave strongly positive feedback on them. Editorial mentoring had the least reported use among respondents, with almost all saying they had not needed to consult editorial mentors. We also asked respondents where they looked for answers when they had questions about editorial tasks, and the two most-selected options were the Seismica resources previously listed, and the Seismica Slack group. We acknowledge that there may be some selection bias in the survey results, in the sense that HEs who are strongly engaged with the Editorial Board are more likely both to know about available resources and to take the time to fill out a survey.

4.2 How much time and effort do we put into Seismica?

Tracking the workload of Editorial Board members and balancing assignments accordingly has proved challenging. Anecdotally, time commitments vary widely between different people, articles, and editorial tasks. Through handling the first two issues' worth of papers we have learned that there is not necessarily a standard amount of time required for any stage of paper handling. We strive to be flexible and have some redundancy of skills on the board, so that people can cover for each other if an article ends up requiring more time than one person has to spare.

The HE survey included an open-ended question asking respondents to describe how much time they spent on each article they have handled. Responses ranged from 3-20 hours, with several around 8-10. Respondents who described how that time was allocated generally included time for reading the paper, finding reviewers, reading reviews/making decisions, and handling communications with authors. The S&CE team has found that the time required for copy-editing and layout varies widely between papers, with copy-editing time depending primarily on the length of the paper. Processing for articles received in the docx or odt templates requires at least 2 additional hours to convert the manuscript to TeX, and the conversion may take much longer if the template has not been used correctly. Additional time is required to convert TeX files to JATS XML, and to upload files and add metadata in OJS. For the M&B team, manuscript promotion and other tasks like content creation and messaging, social media communications and meetings, and conference planning, takes

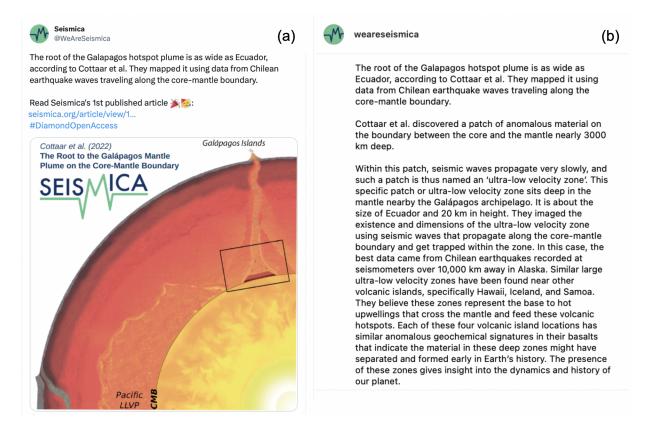


Figure 3 (a) Social media announcement used on Twitter for *Seismica*'s first published paper. (b) Instagram announcement text, where a less restrictive character limit allows for the plain summary of the article to be posted. Both panels advertise Cottaar et al. (2022).

about 4 hours per week. This workload varies over time, depending on how many papers are in production and the timing of upcoming conferences. In the future we hope to do some more detailed workload tracking to better understand how volunteers manage their *Seismica* commitments.

Seismica's volunteers decide to freely give their time to the journal for a variety of reasons. Many are motivated by the opportunity to promote equity in scientific publishing and to bring cutting-edge scientific publishing practices and philosophy to our disciplines. Serving on the editorial side of a journal also gives volunteers the opportunity to keep up with new research. Building community, both within the Editorial Board and in a larger sense that includes reviewers, authors, and readers, can provide tangible benefits to volunteers including expanded professional networks and a shared sense of purpose.

5 Lessons learned so far

With the first few papers submitted to *Seismica*, we quickly learned that the second half of the paper handling process (post-acceptance through production) was, unsurprisingly, much less familiar to everyone on the Editorial Board than the pre-acceptance stage. Practicing with OJS in a sandbox site and developing copyediting and layout tools before journal launch helped, but not all volunteers had the time to take advantage of training opportunities. As a result, there was a steep on-the-job learning curve for many editors which has

begun to level off as most members of the Editorial Board have now had experience completing their roles' core tasks. Below, we describe several key lessons learned during the early weeks and months after *Seismica*'s launch.

We have found that regular communication is crucial at all stages of paper handling: authors and reviewers greatly appreciate regular communication regarding paper status; and HEs, copy/layout editors, and the M&B team have to coordinate article production and promotion. Most of this communication can be kept within OJS using the "discussion" feature. Notably, the OJS dashboard gives minimally detailed automatic updates to authors about submission status, so authors must rely on editors to keep them informed throughout the process.

Maintaining editorial consistency is a crucial task for any journal, and consistency of approach and standards in editorial handling is highly valued at *Seismica* as a mechanism for pursuing our goals of inclusivity and transparency. Toward this end, the entire *Seismica* Editorial Board is invited to virtual meetings (approximately monthly) to discuss policies and values, organizational planning, Open Science principles, and other topics relevant to operations and growth of the journal. Each meeting has two sessions separated by ~12 hours to enable participation by board members in different time zones. This effective line of communication enables adaptability of editorial policies as needed and supports consensus in the management of the journal.

For small, volunteer-run journals similar to Seismica,

developing robust tools for copy-editing and layout work is important for ensuring that volunteers do not burn out on repetitive tasks. This includes designing production templates that do not require too many modifications for special cases and, if manuscript files will need to be converted between different formats, automating as much of that process as possible. We can't control whether authors use our docx and odt templates correctly, which adds uncertainty to the conversion process. Overall, though, having software tools which automate much of the process has saved Seismica's S&CE team many hours of work already. Providing training and support for copy/layout editors is crucial since their tasks require an especially broad skill set, ranging from strong spelling and grammar skills to using and developing software in multiple coding languages.

The amount of work involved in copy-editing and production spurred us to begin asking HEs to contribute to copy-editing if possible. The HEs already have to read manuscripts in detail, and any corrections that they are able to provide to authors during review and revisions help to share a bit of the burden of the S&CE team. We note that many authors submit very clean files for copyediting and production that require relatively minimal work, but even then an extra layer of scrutiny is useful for catching as many errors as possible.

Seismica's article promotion process is not standard compared to many other journals in the field, so the M&B team was initially unsure of how authors would respond to questionnaires and how the overall promotion process would work. Encouragingly, M&B has found that authors usually respond to requests for promotion information favorably and in a timely fashion. By establishing practical communication between HEs and authors and setting up internal checklists and guidelines for the article promotion process, M&B has been able to set up an effective routine.

6 Looking forward

Seismica did not need to create an academic publishing process from first principles. However, we have designed the details of our paper-handling workflow to suit the specific requirements of a volunteer-run, community-led, diamond open-access journal – not reinventing the wheel, but building the best possible wheel for our metaphorical cart to roll along.

Designing the paper handling workflow and developing the technical tools described here took a significant amount of effort on the part of the Editorial Board, and we strongly believe that this was a worthwhile investment for the future of *Seismica*. We need credible submissions to sustain and grow *Seismica*, and we need to attract those submissions within a publishing ecosystem where authors have many choices for where to send their work: in other words, we need to build a reputation as a viable (or even preferable) option for publishing (Rindova et al., 2005). Having a robust system for handling papers in line with our values of transparency, credibility, and respect is key to building *Seismica*'s reputation within the seismology and earthquake science community.

Looking to the future, we do not expect our paperhandling workflow to change dramatically, but some aspects may change or evolve as the journal grows, as well as in response to OJS updates. The Executive Editor for Production originally checked and assigned every submission; as our submission rates have increased we now have the Executive Editor for Operations sharing this task. Implementation of different review modes, including double-anonymous review as standard practice for all submissions, is a topic of ongoing conversation on the Editorial Board, and the way that we offer and promote different review options to authors may be updated in the future. Any changes in policy must trigger a workflow review: for example, implementing doubleanonymous review would require a check for identifying information in the manuscript before review and in the reviews before sharing with the authors.

As our S&CE team is responsible for design, coding, and implementation of much of the post-acceptance publishing workflow outside of OJS, the process is very agile and changes can role out near instantaneously in response to any issues or new ideas. The workflow has been dynamic in the first year, with continual improvements often made in response to feedback from authors, reviewers, and readers of *Seismica*. We expect future adaptations will be less frequent, but will continue to update our workflow to adapt to policy changes, and arising needs, and to incorporate new tools for efficiency and accessibility as they become available.

Sustaining a volunteer-run journal requires a significant amount of time and effort from the scientific community. We have an enthusiastic and committed Editorial Board at present, but are mindful of the potential for burnout, particularly as we are depending on volunteers to perform tasks that are typically compensated labor (tech support, copy-editing and layout, media promotion) in their spare time. Having volunteers work on these tasks has some tangible benefits, such as that the people who proofread articles and prepare promotional materials have specialized knowledge related to article content and discipline-specific vocabulary, but it also comes with some downsides in terms of the imposed workload. Further, Seismica intends to have Editorial Board members rotate off after defined terms a few years in length, so the organization will need a steady supply of new volunteers willing to step in. Establishing processes for onboarding and training new Editorial Board members is important for ensuring that journal operations run smoothly as people rotate on and off the board. Seismica has brought on several new Editorial Board members since journal launch: we have added HEs to better balance our portfolio of expertise, and have added members of the S&CE and M&B teams to spread out the workload of the operational teams. New Editorial Board members were found by soliciting applications through Seismica's social media channels, mailing lists, and word of mouth. A committee of current board members reviewed applications and recruited new members based on applicants' scientific expertise, past experience in editorial roles, technical skills, and diversity. The number and enthusiasm of applicants was encouraging, as there will be more calls

for new board members in the future.

As we near the one-year mark of post-launch journal operations, there are several open questions surrounding Seismica's future plans and growth: specifically, how far can this workflow scale, and how much do we as an organization want to grow? In theory, we can increase our paper-handling capacity by recruiting additional HEs and members of operational teams (S&CE, M&B), but this approach has limits as it requires training and managing larger editorial boards (Farquharson and Wadsworth, 2018), and intake of papers through initial checks is likely to become a bottleneck. The rate of submissions to Seismica has increased from one submission per week in 2022 to more than three per week in 2023, and we are excited to see this sign of support from the research community. At the same time, we have to carefully consider what our limits are as a volunteer organization.

Assuming the rate of submissions continues to increase, we have a few options, including the following: (1) recruit more volunteers to handle papers; (2) limit submissions with paper quotas or limited time windows when submissions are accepted; (3) desk reject more submissions; and (4) hire some paid staff to assist with specific tasks like formatting checks, sending reminder emails, and document format conversions. We do not plan to continue with option (1) indefinitely because, as mentioned above, this adds more work in the form of training and managing a larger Editorial Board and makes it more complicated to maintain the board's consensus-based decision-making practice. The other three options are all possibilities, and the Editorial Board may implement one or more of them in the future, but none of these is an easy or obvious solution hiring paid staff requires a stable funding source, which we don't have currently, and we don't want to make it so difficult to submit a paper that authors decide to send their work elsewhere.

Seismica is part of a cohort of diamond open access Earth science journals following in the footsteps of Volcanica (Farquharson and Wadsworth, 2018), including Tektonika (Fernández-Blanco et al., 2023), Sedimentologika (Thomas et al., 2023), and Geomorphica (Geomorphica, 2023); and more are nascent, including a geochemistry DOAJ. These journals are all independent and unique but have a common philosophy in regards to academic publishing; similarly, they share some common operational needs and challenges that are inherent to running a journal. A group interested in starting a journal following this model could likely make use of most of Seismica's paper-handling workflow with very few modifications. While our processes are designed around OJS, we expect that this workflow could be translated to other journal management systems. The distribution of tasks among people might vary according to how a journal defines different editorial roles, and the exact mechanics of article layout and publication will depend on the publishing formats and platform being used. In general, however, our processes and tools for getting from a manuscript to an open-access, peerreviewed article are portable to other organizations of similar size and scope.

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Data and code availability

The codes discussed in Section 3.2, copies of *Seismica*'s current guidelines, operational team checklists, and HE email resources are available on Zenodo (Mark et al., 2023).

Competing interests

The authors have no competing interests.

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