



### TABLE OF CONTENTS

---

- **Description** p.1
- **Editorial Board** p.2
- **Guide for Authors** p.3



ISSN: 2590-1974

### DESCRIPTION

---

*Applied Computing & Geosciences* is an **online-only, open access** journal focused on all aspects of computing in the geosciences. Like its companion title *Computers & Geosciences*, *Applied Computing & Geosciences'* mission is to advance and disseminate knowledge in all the related areas of at the interface between computer sciences and geosciences.

*Applied Computing & Geosciences* publishes original articles, review articles and case-studies. Alongside welcoming direct submissions, the journal will benefit from an **Article Transfer Service** which will allow the author(s) to transfer their manuscript online from *Computers & Geosciences* thus saving authors time and effort spent on formatting and resubmitting.

*Applied Computing & Geosciences* offers the community an innovative, efficient and flexible route for the publication of scientifically and ethically sound articles which address problems in the geosciences which includes:

Algorithms; Artificial Intelligence; Computational Methods; Computer Graphics; Computer Visualization; Data Models; Data Processing; Database Retrieval; Distributed Systems; E-Geoscience; Geocomputation; Geographical Information Systems; Geoinformatics; Geomathematics; Image Analysis; Information Retrieval; Modelling; Near and Remote Sensing Data Analysis; Ontologies; Parallel Systems; Programming Languages; Remote Sensing; Simulation; Social Media; Software Engineering; Spatial Analysis and The World-Wide Web.

The term **Geoscience** is used in a broad sense to refer to the physical Earth sciences including: Atmospheric Sciences; Climatology; Economic Geology; Environmental Science; Geochemistry; Geodesy; Geology; Geomatics; Geomorphology; Geological and Geotechnical Engineering; Geophysics; Glaciology; Hydrogeology; Hydrology; Meteorology; Mineralogy; Oceanography; Ore Geology; Paleogeography; Paleontology; Petrology; Physical Geography; Planetary Science; Sedimentology; Seismology; Soil Science; Stratigraphy and Structural Geology.

Our highly experienced and well-respected editorial team ensures that all papers are **promptly, rigorously and fairly peer-reviewed** by the experts in the field.

Research paper (**5,000 words**): Providing an original contribution to the scientific fields of study outlined above. Review paper (**10,000 words**): Critically describing the state-of-the art of applications of computer science in the geosciences, as a stand-alone contribution or to frame a special issue. Application article (**5,000 words**): Describing a real-world case study on the scientific fields of study outlined above.

Criteria for assessment shall be: completeness, depth, novelty, timeliness, quality, and interest to the Journal's readership. Before submitting review paper manuscripts, a review outline should be approved by one of the editors of the Journal.

## **EDITORIAL BOARD**

---

### ***Editor-in-Chief***

**Boyan Brodaric**, Natural Resources Canada Earth Sciences, Ottawa, Ontario, Canada

### ***Associate Editors***

**Natalie Caciagli**, Barrick Gold Corporation, Toronto, Canada

**Mark Engle**, The University of Texas at El Paso, El Paso, Texas, United States

**Shawn Hood**, University of Tasmania Center for Ore Deposit and Earth Sciences, Hobart, Australia

**Xiaogang Ma**, University of Idaho, Moscow, Idaho, United States

**Robert Marschallinger**, University of Salzburg, Salzburg, Austria

**Alessandra Menafoglio**, Polytechnic of Milan, Milano, Italy

### ***Editorial Board***

**Qiyu Chen**, China University of Geosciences, Wuhan, China

**Jeff Harris**, Private Consultant,, Ontario, Canada

**Peter Hofmann**, Technische Hochschule Deggendorf, Technology Campus Freyung, Freyung, Germany

**Grethe Hystad**, Purdue University Northwest Department of Mathematics and Statistics, Hammond, Indiana, United States

**Biswajeet Pradhan**, University of Technology Sydney, Sydney, Australia

**Krishna Kant Singh**, GL Bajaj Institute of Technology and Management, Greater Noida, India

**Wenlei Wang**, Chinese Academy of Geological Sciences, Beijing, China

## GUIDE FOR AUTHORS

---

### *Your Paper Your Way*

We now differentiate between the requirements for new and revised submissions. You may choose to submit your manuscript as a single Word or PDF file to be used in the refereeing process. Only when your paper is at the revision stage, will you be requested to put your paper in to a 'correct format' for acceptance and provide the items required for the publication of your article.

**To find out more, please visit the Preparation section below.**

### *Types of article*

#### **Types of paper**

Original research article (5,000 words): Providing a novel and original contribution to the scientific fields of study outlined above. Application article (5,000 words): Describing a real-world case study on the scientific fields of study outlined above. Scientific review article (10,000 words): Critically describing the state-of-the-art of applications of computer science in the geosciences, as a stand-alone contribution or to frame a special issue. Criteria for assessment shall be: completeness, depth, novelty, timeliness, quality, and interest to the Journal's readership. Review outlines should be pre-approved by an Associate Editor, or Editorial Board Member of the Journal.

### *Contact details for submission*

Eric Grunsky  
Editor-in-Chief  
University of Waterloo  
Dept. of Earth and Environmental Sciences  
200 University Avenue West  
N2L 3G1  
Waterloo  
Ontario  
Canada [egrunsky@gmail.com](mailto:egrunsky@gmail.com) More information about the International Association for Mathematical Geosciences can be found on the Internet via <http://www.iamg.org>

### *Submission checklist*

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

**Ensure that the following items are present:** E-mail address of corresponding author Full postal address of corresponding author Authorship statement (for manuscripts with more than one author) Code availability section (for code-related manuscripts) Highlights Make sure that all this information is available on the manuscript first page (see below section "Essential title page information")

All necessary files have been uploaded:

Manuscript: Include keywords All figures (include relevant captions) All tables (including titles, description, footnotes) Ensure all figure and table citations in the text match the files provided Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)

Supplemental files (where applicable)

Include code availability section (for code-related manuscripts)

Further considerations Manuscript has been 'spell checked' and 'grammar checked' All references mentioned in the Reference List are cited in the text, and vice versa Permission has been obtained for use of copyrighted material from other sources (including the Internet) A competing interests statement is provided, even if the authors have no competing interests to declare Journal policies detailed in this guide have been reviewed Referee suggestions and contact details provided, based on journal requirements

For further information, visit our [Support Center](#).

## BEFORE YOU BEGIN

### *Ethics in publishing*

Please see our information pages on [Ethics in publishing](#) and [Ethical guidelines for journal publication](#).

### *Declaration of competing interest*

All authors must disclose any financial and personal relationships with other people or organizations that could inappropriately influence (bias) their work. Examples of potential conflicts of interest include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors should complete the declaration of competing interest statement using [this template](#) and upload to the submission system at the Attach/Upload Files step. **Note: Please do not convert the .docx template to another file type. Author signatures are not required.** If there are no interests to declare, please choose the first option in the template. This statement will be published within the article if accepted. [More information](#).

### *Submission declaration and verification*

Submission of an article implies that the work described has not been published previously (except in the form of an abstract, a published lecture or academic thesis, see '[Multiple, redundant or concurrent publication](#)' for more information), that it is not under consideration for publication elsewhere, that its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder. To verify originality, your article may be checked by the originality detection service [Crossref Similarity Check](#).

### *Preprints*

Please note that [preprints](#) can be shared anywhere at any time, in line with Elsevier's [sharing policy](#). Sharing your preprints e.g. on a preprint server will not count as prior publication (see '[Multiple, redundant or concurrent publication](#)' for more information).

### *Use of inclusive language*

Inclusive language acknowledges diversity, conveys respect to all people, is sensitive to differences, and promotes equal opportunities. Content should make no assumptions about the beliefs or commitments of any reader; contain nothing which might imply that one individual is superior to another on the grounds of age, gender, race, ethnicity, culture, sexual orientation, disability or health condition; and use inclusive language throughout. Authors should ensure that writing is free from bias, stereotypes, slang, reference to dominant culture and/or cultural assumptions. We advise to seek gender neutrality by using plural nouns ("clinicians, patients/clients") as default/wherever possible to avoid using "he, she," or "he/she." We recommend avoiding the use of descriptors that refer to personal attributes such as age, gender, race, ethnicity, culture, sexual orientation, disability or health condition unless they are relevant and valid. These guidelines are meant as a point of reference to help identify appropriate language but are by no means exhaustive or definitive.

### *Author contributions*

For transparency, we encourage authors to submit an author statement file outlining their individual contributions to the paper using the relevant CRediT roles: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Visualization; Roles/Writing - original draft; Writing - review & editing. Authorship statements should be formatted with the names of authors first and CRediT role(s) following. [More details and an example](#)

### *Changes to authorship*

Authors are expected to consider carefully the list and order of authors **before** submitting their manuscript and provide the definitive list of authors at the time of the original submission. Any addition, deletion or rearrangement of author names in the authorship list should be made only **before** the manuscript has been accepted and only if approved by the journal Editor. To request such a change, the Editor must receive the following from the **corresponding author**: (a) the reason for the change in author list and (b) written confirmation (e-mail, letter) from all authors that they agree with the addition, removal or rearrangement. In the case of addition or removal of authors, this includes confirmation from the author being added or removed.

Only in exceptional circumstances will the Editor consider the addition, deletion or rearrangement of authors **after** the manuscript has been accepted. While the Editor considers the request, publication of the manuscript will be suspended. If the manuscript has already been published in an online issue, any requests approved by the Editor will result in a corrigendum.

#### *Article transfer service*

This journal is part of our Article Transfer Service. This means that if the Editor feels your article is more suitable in one of our other participating journals, then you may be asked to consider transferring the article to one of those. If you agree, your article will be transferred automatically on your behalf with no need to reformat. Please note that your article will be reviewed again by the new journal. [More information](#).

#### **Copyright**

Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (see [more information](#) on this). An e-mail will be sent to the corresponding author confirming receipt of the manuscript together with a 'Journal Publishing Agreement' form or a link to the online version of this agreement.

Subscribers may reproduce tables of contents or prepare lists of articles including abstracts for internal circulation within their institutions. [Permission](#) of the Publisher is required for resale or distribution outside the institution and for all other derivative works, including compilations and translations. If excerpts from other copyrighted works are included, the author(s) must obtain written permission from the copyright owners and credit the source(s) in the article. Elsevier has [preprinted forms](#) for use by authors in these cases.

For gold open access articles: Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' ([more information](#)). Permitted third party reuse of gold open access articles is determined by the author's choice of [user license](#).

#### **Author rights**

As an author you (or your employer or institution) have certain rights to reuse your work. [More information](#).

#### *Elsevier supports responsible sharing*

Find out how you can [share your research](#) published in Elsevier journals.

#### **Role of the funding source**

You are requested to identify who provided financial support for the conduct of the research and/or preparation of the article and to briefly describe the role of the sponsor(s), if any, in study design; in the collection, analysis and interpretation of data; in the writing of the report; and in the decision to submit the article for publication. If the funding source(s) had no such involvement then this should be stated.

#### **Open access**

Please visit our [Open Access page](#) for more information.

#### *Creative Commons Attribution-NonCommercial-NoDerivs (CC BY-NC-ND)*

For non-commercial purposes, lets others distribute and copy the article, and to include in a collective work (such as an anthology), as long as they credit the author(s) and provided they do not alter or modify the article.

The standard gold open access publication fee for this journal is USD 1500, excluding taxes.

**However, for all articles submitted before 31-Dec-2020, there is a 50% discount off the open access publication fee so authors pay USD 750, excluding taxes.**

There is also a 25% discount off the open access publication fee for members of the International Association for Mathematical Geosciences. Learn more about Elsevier's pricing policy: <https://www.elsevier.com/openaccesspricing>

### *Language (usage and editing services)*

Please write your text in good English (American or British usage is accepted, but not a mixture of these). Authors who feel their English language manuscript may require editing to eliminate possible grammatical or spelling errors and to conform to correct scientific English may wish to use the [English Language Editing service](#) available from Elsevier's Author Services.

### **Submission**

Our online submission system guides you stepwise through the process of entering your article details and uploading your files. The system converts your article files to a single PDF file used in the peer-review process. Editable files (e.g., Word, LaTeX) are required to typeset your article for final publication. All correspondence, including notification of the Editor's decision and requests for revision, is sent by e-mail.

### *Referees*

Please submit the names and institutional e-mail addresses of several potential referees. For more details, visit our [Support site](#). Note that the editor retains the sole right to decide whether or not the suggested reviewers are used.

### *Additional information*

Important Items when submitting a manuscript: To be certain that your manuscript contains suitable material for the journal (computing methods in the physical geosciences). Out of scope articles will be returned to authors without review. Please read the journal Aims and Scope. Grammar, spelling and accuracy is considered as the most important screening criterion. If your manuscript contains errors in English, it will be returned. Use decimal points (not decimal commas); use a space for thousands (10 000 and above). Italics are not to be used for expressions of Latin origin, for example, *in vivo*, *et al.*, *per se*. To avoid unnecessary errors, you are strongly advised to use the "spell-check" and "grammar-check" functions of your word processor. Have your manuscript read by another party. Someone who is not familiar with your manuscript will often pick up mistakes that authors commonly overlook. If English is not your native tongue, please have your manuscript checked by a native English speaker or enlist the services of someone or a company that can provide English editing services. Please consult the "Guide for Reviewers" for evaluation criteria. Manuscripts that do not meet the novelty, significance, and competence criteria will be returned to authors at any stage, at the discretion of the Editor. All manuscripts must be submitted as doubled spaced with line numbers. The references must follow the citation format as stipulated in this guide. Your manuscript will be returned if the citation format is not correct. Ensure that figures are adequately labelled (coordinates, scale bar, orientation) and the resolution is sufficient for publication scale. If you are submitting a revised manuscript, CLEARLY explain, point-by-point, to the comments provided by the reviewers. Choose the appropriate article type (Research, Application, Review or Short Note articles). Text and figures must be uploaded separately (TEX documents excepted).

Please provide a covering letter explaining the contribution of the manuscript.

## **PREPARATION**

### **NEW SUBMISSIONS**

Submission to this journal proceeds totally online and you will be guided stepwise through the creation and uploading of your files. The system automatically converts your files to a single PDF file, which is used in the peer-review process.

As part of the Your Paper Your Way service, you may choose to submit your manuscript as a single file to be used in the refereeing process. This can be a PDF file or a Word document, in any format or layout that can be used by referees to evaluate your manuscript. It should contain high enough quality figures for refereeing. If you prefer to do so, you may still provide all or some of the source files at the initial submission. Please note that individual figure files larger than 10 MB must be uploaded separately.

### *References*

There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct.



### *Formatting requirements*

There are no strict formatting requirements, but all manuscripts must contain the essential elements needed to convey your manuscript, for example Abstract, Keywords, Introduction, Materials and Methods, Results, Conclusions, Artwork and Tables with Captions.

Line numbering of the manuscript is mandatory for all submissions.

If your article includes any Videos and/or other Supplementary material, this should be included in your initial submission for peer review purposes.

Divide the article into clearly defined sections.

### **Peer review**

This journal operates a single anonymized review process. All contributions will be initially assessed by the editor for suitability for the journal. Papers deemed suitable are then typically sent to a minimum of two independent expert reviewers to assess the scientific quality of the paper. The Editor is responsible for the final decision regarding acceptance or rejection of articles. The Editor's decision is final. Editors are not involved in decisions about papers which they have written themselves or have been written by family members or colleagues or which relate to products or services in which the editor has an interest. Any such submission is subject to all of the journal's usual procedures, with peer review handled independently of the relevant editor and their research groups. [More information on types of peer review.](#)

### **REVISED SUBMISSIONS**

Have your manuscript read by another party. Someone who is not familiar with your manuscript will often pick up mistakes that authors commonly overlook.

If English is not your native tongue, please have your manuscript checked by a native English speaker or enlist the services of someone or a company that can provide English editing services.

### *Use of word processing software*

Regardless of the file format of the original submission, at revision you must provide us with an editable file of the entire article. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the [Guide to Publishing with Elsevier](#)). See also the section on Electronic artwork.

To avoid unnecessary errors you are strongly advised to use the 'spell-check' and 'grammar-check' functions of your word processor.

### *LaTeX*

You are recommended to use the Elsevier article class [elsarticle.cls](#) to prepare your manuscript and [BibTeX](#) to generate your bibliography.

Our [LaTeX site](#) has detailed submission instructions, templates and other information.

### **Article structure**

All manuscripts must be submitted as doubled spaced with line numbers.

### *Subdivision - numbered sections*

Divide your article into clearly defined and numbered sections. Subsections should be numbered 1.1 (then 1.1.1, 1.1.2, ...), 1.2, etc. (the abstract is not included in section numbering). Use this numbering also for internal cross-referencing: do not just refer to 'the text'. Any subsection may be given a brief heading. Each heading should appear on its own separate line.

### *Introduction*

State the objectives of the work and provide an adequate background, avoiding a detailed literature survey or a summary of the results.

### *Material and methods*

Provide sufficient details to allow the work to be reproduced by an independent researcher. Methods that are already published should be summarized, and indicated by a reference. If quoting directly from a previously published method, use quotation marks and also cite the source. Any modifications to existing methods should also be described.

### *Theory/calculation*

A Theory section should extend, not repeat, the background to the article already dealt with in the Introduction and lay the foundation for further work. In contrast, a Calculation section represents a practical development from a theoretical basis.

## Results

Results should be clear and concise.

## Discussion

This should explore the significance of the results of the work, not repeat them. A combined Results and Discussion section is often appropriate. Avoid extensive citations and discussion of published literature.

## Conclusions

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion section.

## Data Availability

Authors are encouraged to include a 'Data Availability' section in their manuscript which is visible in ALL reading formats and may refer to data hosted in ANY repository. It should be placed before the references to provide readers with information about where they can obtain the research data required to reproduce the work reported in the manuscript, and typically consists of a simple sentence giving the URL(s) of and citation(s) to the dataset(s). Full information can be found [here](#).

## Appendices

If there is more than one appendix, they should be identified as A, B, etc. Formulae and equations in appendices should be given separate numbering: Eq. (A.1), Eq. (A.2), etc.; in a subsequent appendix, Eq. (B.1) and so on. Similarly for tables and figures: Table A.1; Fig. A.1, etc.

## Essential title page information

- **Title.** Concise and informative. Titles are often used in information-retrieval systems. Avoid abbreviations and formulae where possible.
- **Author names and affiliations.** Please clearly indicate the given name(s) and family name(s) of each author and check that all names are accurately spelled. You can add your name between parentheses in your own script behind the English transliteration. Present the authors' affiliation addresses (where the actual work was done) below the names. Indicate all affiliations with a lower-case superscript letter immediately after the author's name and in front of the appropriate address. Provide the full postal address of each affiliation, including the country name and, if available, the e-mail address of each author.
- **Corresponding author.** Clearly indicate who will handle correspondence at all stages of refereeing and publication, also post-publication. This responsibility includes answering any future queries about Methodology and Materials. **Ensure that the e-mail address is given and that contact details are kept up to date by the corresponding author.**
- **Present/permanent address.** If an author has moved since the work described in the article was done, or was visiting at the time, a 'Present address' (or 'Permanent address') may be indicated as a footnote to that author's name. The address at which the author actually did the work must be retained as the main, affiliation address. Superscript Arabic numerals are used for such footnotes.
- **Link to the code.** Manuscripts presenting code, software or implementation of described algorithms need to include a link to a repository where the code can be downloaded.
- **Authorship Statement.** Submissions must include a compulsory brief authorship statement that describes the contribution of each author (**maximum one sentence per author and a total of 200 words only**). At the time of publication, this statement will figure in the paper. The main goal is to unambiguously identify the role of each co-author, regardless of the authors order which can vary across disciplines. Furthermore, the contribution statement is the occasion to acknowledge co-first authorships (i.e., two or more authors have made an equal significant contribution to the work) and co-last authorships (i.e., several senior authors have co-supervised a research project with equivalent inputs). It is also the place to specify whether an advisor author is mentioned as second author or as last author. Moreover, the contribution statement aims at ensuring that ghost writing and courtesy authorship do not take place. Authorship should be based fulfilling all of the following criteria: Authors make substantial contributions to the development of ideas, their implementation, the conception of experiments, data acquisition, analysis or interpretation; Authors participate in drafting or critically revisiting the manuscript and take intellectual responsibility for its content; All authors give their final approval of the manuscript version to be submitted and any revised version of it.
- **Highlights.** Highlights are mandatory for this journal. They consist of a short collection of bullet points that convey the core findings of the article and should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point). You can view [example Highlights](#) on our information site.



## Highlights

Highlights are optional yet highly encouraged for this journal, as they increase the discoverability of your article via search engines. They consist of a short collection of bullet points that capture the novel results of your research as well as new methods that were used during the study (if any). Please have a look at the examples here: [example Highlights](#).

Highlights should be submitted in a separate editable file in the online submission system. Please use 'Highlights' in the file name and include 3 to 5 bullet points (maximum 85 characters, including spaces, per bullet point).

## Abstract

A concise and factual abstract is required (maximum length 300 words). The abstract should state briefly the purpose of the research, the principal results and major conclusions. A structured abstract is required. For this, a recent copy of the journal should be consulted. An abstract is often presented separate from the article, so it must be able to stand alone. References should therefore be avoided, but if essential, they must be cited in full, without reference to the reference list. Non-standard or uncommon abbreviations should be avoided, but if essential they must be defined at their first mention in the abstract itself.

Abstracts are not required for Short Notes.

### *Graphical abstract*

Although a graphical abstract is optional, its use is encouraged as it draws more attention to the online article. The graphical abstract should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership. Graphical abstracts should be submitted as a separate file in the online submission system. Image size: Please provide an image with a minimum of 531 × 1328 pixels (h × w) or proportionally more. The image should be readable at a size of 5 × 13 cm using a regular screen resolution of 96 dpi. Preferred file types: TIFF, EPS, PDF or MS Office files. You can view [Example Graphical Abstracts](#) on our information site.

Authors can make use of Elsevier's [Illustration Services](#) to ensure the best presentation of their images and in accordance with all technical requirements.

## Keywords

Immediately after the abstract, provide a maximum of 6 keywords, using American spelling and avoiding general and plural terms and multiple concepts (avoid, for example, 'and', 'of'). Be sparing with abbreviations: only abbreviations firmly established in the field may be eligible. These keywords will be used for indexing purposes.

### *Abbreviations*

Define abbreviations that are not standard in this field in a footnote to be placed on the first page of the article. Such abbreviations that are unavoidable in the abstract must be defined at their first mention there, as well as in the footnote. Ensure consistency of abbreviations throughout the article.

### *Acknowledgements*

Collate acknowledgements in a separate section at the end of the article before the references and do not, therefore, include them on the title page, as a footnote to the title or otherwise. List here those individuals who provided help during the research (e.g., providing language help, writing assistance or proof reading the article, etc.).

### *Formatting of funding sources*

List funding sources in this standard way to facilitate compliance to funder's requirements:

Funding: This work was supported by the National Institutes of Health [grant numbers xxxx, yyyy]; the Bill & Melinda Gates Foundation, Seattle, WA [grant number zzzz]; and the United States Institutes of Peace [grant number aaaa].

It is not necessary to include detailed descriptions on the program or type of grants and awards. When funding is from a block grant or other resources available to a university, college, or other research institution, submit the name of the institute or organization that provided the funding.

If no funding has been provided for the research, please include the following sentence:

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### *Units*

Follow internationally accepted rules and conventions: use the international system of units (SI). If other units are mentioned, please give their equivalent in SI.

#### *Math formulae*

Please submit math equations as editable text and not as images. Present simple formulae in line with normal text where possible and use the solidus (/) instead of a horizontal line for small fractional terms, e.g., X/Y. In principle, variables are to be presented in italics. Powers of e are often more conveniently denoted by exp. Number consecutively any equations that have to be displayed separately from the text (if referred to explicitly in the text).

#### *Equations and symbols*

Use punctuation after mathematical equations (i.e. use a period (.) if the equation ends a sentence). Please note that equations and symbols may be incorrectly converted in Evisu. Therefore, these should be supplied in one of the following ways: As a .pdf file As a 2003 Word .doc file. If the source file was a Microsoft Word 2007 document (.docx), re-save the original document as a Word 2003 file (.doc) by opening the document and selecting 'Save As', then 'Word 97-2003 Document'.

#### *Footnotes*

Footnotes should be used sparingly. Number them consecutively throughout the article. Many word processors can build footnotes into the text, and this feature may be used. Otherwise, please indicate the position of footnotes in the text and list the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

### **Artwork**

#### *Electronic artwork*

##### *General points*

- Make sure you use uniform lettering and sizing of your original artwork.
- Embed the used fonts if the application provides that option.
- Aim to use the following fonts in your illustrations: Arial, Courier, Times New Roman, Symbol, or use fonts that look similar.
- Number the illustrations according to their sequence in the text.
- Use a logical naming convention for your artwork files.
- Provide captions to illustrations separately.
- Size the illustrations close to the desired dimensions of the published version.
- Submit each illustration as a separate file.
- Ensure that color images are accessible to all, including those with impaired color vision.

A detailed [guide on electronic artwork](#) is available.

**You are urged to visit this site; some excerpts from the detailed information are given here.**

#### *Formats*

If your electronic artwork is created in a Microsoft Office application (Word, PowerPoint, Excel) then please supply 'as is' in the native document format.

Regardless of the application used other than Microsoft Office, when your electronic artwork is finalized, please 'Save as' or convert the images to one of the following formats (note the resolution requirements for line drawings, halftones, and line/halftone combinations given below):

EPS (or PDF): Vector drawings, embed all used fonts.

TIFF (or JPEG): Color or grayscale photographs (halftones), keep to a minimum of 300 dpi.

TIFF (or JPEG): Bitmapped (pure black & white pixels) line drawings, keep to a minimum of 1000 dpi.

TIFF (or JPEG): Combinations bitmapped line/half-tone (color or grayscale), keep to a minimum of 500 dpi.

#### **Please do not:**

- Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); these typically have a low number of pixels and limited set of colors;
- Supply files that are too low in resolution;
- Submit graphics that are disproportionately large for the content.

### *Color artwork*

Please make sure that artwork files are in an acceptable format (TIFF (or JPEG), EPS (or PDF), or MS Office files) and with the correct resolution. If, together with your accepted article, you submit usable color figures then Elsevier will ensure, at no additional charge, that these figures will appear in color online (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version.

**This is an online only journal, so all figures images are in colour with no added cost.**

Do not use the definite article (the) in figure or table captions.

[Further information on the preparation of electronic artwork.](#)

### *Figure captions*

Ensure that each illustration has a caption. A caption should comprise a brief title (**not** on the figure itself) and a description of the illustration. Keep text in the illustrations themselves to a minimum but explain all symbols and abbreviations used.

### *Text graphics*

Text graphics may be embedded in the text at the appropriate position. If you are working with LaTeX and have such features embedded in the text, these can be left. See further under Electronic artwork.

### **Tables**

Please submit tables as editable text and not as images. Tables can be placed either next to the relevant text in the article, or on separate page(s) at the end. Number tables consecutively in accordance with their appearance in the text and place any table notes below the table body. Be sparing in the use of tables and ensure that the data presented in them do not duplicate results described elsewhere in the article. Please avoid using vertical rules and shading in table cells.

### **Reference Style**

*Text:*All citations in the text should refer to: Single Author:the Author's family name (without initials, unless there is ambiguity) and the year of publication; Two Authors:both Authors' names and the year of publication; Three or more Authors:first Author's name followed by "et al." and the year of publication.

Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically.

Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have recently shown ...."

List: References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same Author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication.

### *Examples:*

#### *Journal article*

Srivastava, D.C., Lisle, R.J., 2004. Rapid analysis of fold shape using Bezier curves. *Journal of Structural Geology* 26, 1553-1559 (Note: spell out journal names in full).

Xu, S. J, Lu, X. C, Zhao, L. Z., 2001. Earth science curriculum redesign and multimedia courseware development. *China Geology Education* 40(4), 12-15 [in Chinese].(Note: Article published in another language).

Pinnegar, C., Eaton, D. W., 2003. Application of the S-transform to prestack noise attenuation filtering. *Journal of Geophysics Research* 108(B9), 2422-2431. <https://doi.org/10.1029/2002JB002258>.(Note: doi is cited)

**Book** Johnson, A.M., Fletcher, R.F., 1994. *Folding of Viscous Layers*, 1st edn. Columbia University Press, New York, NY, 461pp.(Note: Note capitalize first letters of words in books and give total pages in book.)

Richardson, J.L., Vepraskas, M.J. (Eds.), 2001. *Wetland Soils. Genesis, Hydrology, Landscapes and Classification*, Lewis Publishers, Boca Raton, London, New York, Washington, 417pp.

McGuinness, D., da Silva, P., 2003. *Infrastructure for Web Explanations*. International Semantic Web Conference 2003, Published in: *Lecture Notes in Computer Science*, Vol. 2870, Springer: Berlin, pp. 113-129.

**Article in edited book** De Paor, D. G., 1996. Bezier curves and geological design in structural geology and personal computers, In: De Paor D.G. (Ed.) *Structural Geology and Personal Computers*, Pergamon Press, Oxford, pp. 389-417. (Note capitalize first letters of words in books and give page range of cited article.)

**Conference Proceedings** Deutsch, C.V., 1997. Direct assessment of local accuracy and precision. In: Baafi, E.Y., Schofield, N.A. (Eds.), *Geostatistics Wollongong '96*, Kluwer Academic Publishers, Dordrecht, pp. 115-125.

Sandberg, S. K., Corso, W., Levine, J. R., Newhart, G., Powell, G., 2001. Mapping a paleochannel system controlling contaminant migration at a wood-treating facility using electromagnetics. In: *Proceedings Symposium on the Application of Geophysics to Engineering and Environmental Problems*, Denver, CO, paper ASP-2 (on CDROM) p. 1-12.

Ainsworth, S. E., Peevers, G. J., 2003. The interaction between informational and computational properties of external representations on problem-solving and learning, In: Alterman, R., Kirsh, D. (Ed.), *Proceedings 25th Annual Conference of the Cognitive Science Society*, Boston, Massachusetts, USA. 67-72, URL: <http://www.cogsci.rpi.edu/CSJarchive/proceedings/2003/pdfs/35.pdf>.

**Thesis** Apel, M., 2004. A 3d geosience information system framework. Ph.D. Dissertation, Technische Universitaet Freiberg, Freiberg, Germany, 105 pp.(Note: include total pages.)

Peternell, M., 2002. Geology of syntectonic granites in the Itapema Regiona SE Brazil - Magmatic structures of the Rio Pequeno Granite SE Brazil and analyses with methods of fractal geometry. Unpublished M.Sc. Thesis, Technische Universitt Mnchen, Munich, 90 pp.

**Technical report** Reimann, C., 1998. Environmental geochemical atlas of the central Barents region. Geological Survey of Norway, Trondheim, Norway, 745 pp.(Note: include total pages.)

National Science Foundation (NSF), 2003. Revolutionizing science and engineering through cyberinfrastructure: Report of the National Science Foundation Blue Ribbon Advisory Panel on Cyberinfrastructure, Arlington, Virginia. URL:

**Software Reference** MySQL Reference Manual, 2007. Version 5.0, MySQL AB, Cupertino, CA, USA, p. 1574.

Spectra Vista Co, 2005. GER 3700 User Manual. Spectra Vista Co., New York, USA, p. 45.

#### *Citation in text*

Please ensure that every reference cited in the text is also present in the reference list (and vice versa). Any references cited in the abstract must be given in full. Unpublished results and personal communications are not recommended in the reference list, but may be mentioned in the text. If these references are included in the reference list they should follow the standard reference style of the journal and should include a substitution of the publication date with either 'Unpublished results' or 'Personal communication'. Citation of a reference as 'in press' implies that the item has been accepted for publication.

#### *Citing and listing of Internet/Web references*

Published standards, data released as an official publication, software or software manuals (see examples below) are to be included in the Reference section. Publication details including author names, dates, reference to a source publication, etc. should also be given and followed by the full URL and last date of access. Website data or descriptions do not qualify as references and are to be shown within the text as footnotes. Internet links should not be embedded in the text. Footnote or move to References, as appropriate, formatting according to styles provided in the examples below.

#### *Data references*

This journal encourages you to cite underlying or relevant datasets in your manuscript by citing them in your text and including a data reference in your Reference List. Data references should include the following elements: author name(s), dataset title, data repository, version (where available), year, and global persistent identifier. Add [dataset] immediately before the reference so we can properly identify it as a data reference. The [dataset] identifier will not appear in your published article.

#### *References in a special issue*

Please ensure that the words 'this issue' are added to any references in the list (and any citations in the text) to other articles in the same Special Issue.

### *Reference management software*

Most Elsevier journals have their reference template available in many of the most popular reference management software products. These include all products that support [Citation Style Language styles](#), such as [Mendeley](#). Using citation plug-ins from these products, authors only need to select the appropriate journal template when preparing their article, after which citations and bibliographies will be automatically formatted in the journal's style. If no template is yet available for this journal, please follow the format of the sample references and citations as shown in this Guide. If you use reference management software, please ensure that you remove all field codes before submitting the electronic manuscript. [More information on how to remove field codes from different reference management software.](#)

### *Reference formatting*

There are no strict requirements on reference formatting at submission. References can be in any style or format as long as the style is consistent. Where applicable, author(s) name(s), journal title/book title, chapter title/article title, year of publication, volume number/book chapter and the article number or pagination must be present. Use of DOI is highly encouraged. The reference style used by the journal will be applied to the accepted article by Elsevier at the proof stage. Note that missing data will be highlighted at proof stage for the author to correct. If you do wish to format the references yourself they should be arranged according to the following examples:

### *Name and year system*

**Text:** All citations in the text should refer to: Single author: the author's name (without initials, unless there is ambiguity) and the year of publication; Two authors: both authors' names and the year of publication; Three or more authors: first author's name followed by "et al." and the year of publication. Citations may be made directly (or parenthetically). Groups of references should be listed first alphabetically, then chronologically. Examples: "as demonstrated (Allan, 1996a, 1996b, 1999; Allan and Jones, 1995). Kramer et al. (2000) have recently shown ...."

**Listing References:** References should be arranged first alphabetically and then further sorted chronologically if necessary. More than one reference from the same author(s) in the same year must be identified by the letters "a", "b", "c", etc., placed after the year of publication.

Examples:

Reference to a journal publication:

Van der Geer, J., Hanraads, J.A.J., Lupton, R.A., 2000. The art of writing a scientific article. *J. Sci. Commun.* 163, 51-59.

Reference to a book:

Strunk Jr, W., White, E.B., 1979. *The Elements of Style*, third ed. Macmillan, New York.

Reference to a chapter in an edited book:

Mettam, G.R., Adams, L.B., 1999. How to prepare an electronic version of your article, in: Jones, B.S., Smith, R.Z. (Eds.), *Introduction to the Electronic Age*. E-Publishing Inc., New York, pp. 281-304.

Reference to Mendeley Data:

Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T., 2015. Mortality data for Japanese oak wilt disease and surrounding forest compositions. *Mendeley Data*, v1. <http://dx.doi.org/10.17632/xwj98nb39r.1>.

### **Video**

Elsevier accepts video material and animation sequences to support and enhance your scientific research. Authors who have video or animation files that they wish to submit with their article are strongly encouraged to include links to these within the body of the article. This can be done in the same way as a figure or table by referring to the video or animation content and noting in the body text where it should be placed. All submitted files should be properly labeled so that they directly relate to the video file's content. In order to ensure that your video or animation material is directly usable, please provide the file in one of our recommended file formats with a preferred maximum size of 150 MB per file, 1 GB in total. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including [ScienceDirect](#). Please supply 'stills' with your files: you can choose any frame from the video or animation or make a separate image. These will be used instead of standard icons and will personalize the link to your video data. For more detailed instructions please visit our [video instruction pages](#). Note: since video and animation cannot be embedded in the print version of the journal, please provide text for both the electronic and the print version for the portions of the article that refer to this content.

## Data visualization

Include interactive data visualizations in your publication and let your readers interact and engage more closely with your research. Follow the instructions [here](#) to find out about available data visualization options and how to include them with your article.

## Supplementary material

Supplementary material such as applications, images and sound clips, can be published with your article to enhance it. Submitted supplementary items are published exactly as they are received (Excel or PowerPoint files will appear as such online). Please submit your material together with the article and supply a concise, descriptive caption for each supplementary file. If you wish to make changes to supplementary material during any stage of the process, please make sure to provide an updated file. Do not annotate any corrections on a previous version. Please switch off the 'Track Changes' option in Microsoft Office files as these will appear in the published version.

## Research data

This journal requires and enables you to share data that supports your research publication where appropriate, and enables you to interlink the data with your published articles. Research data refers to the results of observations or experimentation that validate research findings. To facilitate reproducibility and data reuse, this journal also encourages you to share your software, code, models, algorithms, protocols, methods and other useful materials related to the project.

Below are a number of ways in which you can associate data with your article or make a statement about the availability of your data when submitting your manuscript. When sharing data in one of these ways, you are expected to cite the data in your manuscript and reference list. Please refer to the "References" section for more information about data citation. For more information on depositing, sharing and using research data and other relevant research materials, visit the [research data page](#).

### Data linking

If you have made your research data available in a data repository, you can link your article directly to the dataset. Elsevier collaborates with a number of repositories to link articles on ScienceDirect with relevant repositories, giving readers access to underlying data that gives them a better understanding of the research described.

There are different ways to link your datasets to your article. When available, you can directly link your dataset to your article by providing the relevant information in the submission system. For more information, visit the [database linking page](#).

For [supported data repositories](#) a repository banner will automatically appear next to your published article on ScienceDirect.

In addition, you can link to relevant data or entities through identifiers within the text of your manuscript, using the following format: Database: xxxx (e.g., TAIR: AT1G01020; CCDC: 734053; PDB: 1XFN).

### Mendeley Data

This journal supports Mendeley Data, enabling you to deposit any research data (including raw and processed data, video, code, software, algorithms, protocols, and methods) associated with your manuscript in a free-to-use, open access repository. During the submission process, after uploading your manuscript, you will have the opportunity to upload your relevant datasets directly to *Mendeley Data*. The datasets will be listed and directly accessible to readers next to your published article online.

For more information, visit the [Mendeley Data for journals page](#).

**To maximise the visibility of your data, authors are invited to add a citation to their datasets by including a data reference in their Reference List as per the 'Data References' instructions elsewhere on this page.**

### Data in Brief

You have the option of converting any or all parts of your supplementary or additional raw data into one or multiple data articles, a new kind of article that houses and describes your data. Data articles ensure that your data is actively reviewed, curated, formatted, indexed, given a DOI and publicly available to all upon publication. You are encouraged to submit your article for *Data in Brief* as an additional item directly alongside the revised version of your manuscript. If your research article is



accepted, your data article will automatically be transferred over to *Data in Brief* where it will be editorially reviewed and published in the open access data journal, *Data in Brief*. Please note an open access fee of 600 USD is payable for publication in *Data in Brief*. Full details can be found on the [Data in Brief website](#). Please use [this template](#) to write your Data in Brief.

#### *MethodsX*

You have the option of converting relevant protocols and methods into one or multiple MethodsX articles, a new kind of article that describes the details of customized research methods. Many researchers spend a significant amount of time on developing methods to fit their specific needs or setting, but often without getting credit for this part of their work. MethodsX, an open access journal, now publishes this information in order to make it searchable, peer reviewed, citable and reproducible. Authors are encouraged to submit their MethodsX article as an additional item directly alongside the revised version of their manuscript. If your research article is accepted, your methods article will automatically be transferred over to MethodsX where it will be editorially reviewed. Please note an open access fee is payable for publication in MethodsX. Full details can be found on the [MethodsX website](#). Please use [this template](#) to prepare your MethodsX article.

#### *Data statement*

To foster transparency, we require you to state the availability of your data in your submission if your data is unavailable to access or unsuitable to post. This may also be a requirement of your funding body or institution. You will have the opportunity to provide a data statement during the submission process. The statement will appear with your published article on ScienceDirect. For more information, visit the [Data Statement page](#).

#### *Computer Code*

This journal aims to publish code and supporting data from accepted manuscripts using state-of-the-art technologies. Code should be original and demonstrate a development in research. It should also have clear design and be reproducible, reusable, extensible and maintainable. Manuscripts presenting code, software or implementation of described algorithms need to include a link to a repository where the code can be downloaded. In such cases the open source license should be clearly indicated in submitted manuscripts. Manuscripts that describe code that is not open source are desk rejected.

Computer code should provide the following information: A readme.txt file (or equivalent) providing the name of the program, the title of the manuscript along with the author details. This will assist in correctly assigning the program code and associated files to the correct submission. A user manual or instruction guide that provides information on how to use the program. The source code for any programs that have been written. Test data that can be used to assure that the program is working correctly. Test data should not be overly large so that there are problems downloading the program code and data. Output files should also be provided that will allow a user to check if a compiled program is working properly. Executable program code is not encouraged because of difficulty in transmitting .exe files past Virus scanners and the limited life of executable code.

## **AFTER ACCEPTANCE**

#### *Availability of accepted article*

This journal makes articles available online as soon as possible after acceptance. This concerns the Journal Pre-proofs (both in HTML and PDF format), which have undergone enhancements after acceptance, such as the addition of a cover page and metadata, and formatting for readability, but are not yet the definitive versions of record. A Digital Object Identifier (DOI) is allocated, thereby making it fully citable and searchable by title, author name(s) and the full text. The article's PDF also carries a disclaimer stating that it is an unedited article. Subsequent production stages will simply replace this version.

#### **Online proof correction**

To ensure a fast publication process of the article, we kindly ask authors to provide us with their proof corrections within two days. Corresponding authors will receive an e-mail with a link to our online proofing system, allowing annotation and correction of proofs online. The environment is similar to MS Word: in addition to editing text, you can also comment on figures/tables and answer questions from the Copy Editor. Web-based proofing provides a faster and less error-prone process by allowing you to directly type your corrections, eliminating the potential introduction of errors.

If preferred, you can still choose to annotate and upload your edits on the PDF version. All instructions for proofing will be given in the e-mail we send to authors, including alternative methods to the online version and PDF.

We will do everything possible to get your article published quickly and accurately. Please use this proof only for checking the typesetting, editing, completeness and correctness of the text, tables and figures. Significant changes to the article as accepted for publication will only be considered at this stage with permission from the Editor. It is important to ensure that all corrections are sent back to us in one communication. Please check carefully before replying, as inclusion of any subsequent corrections cannot be guaranteed. Proofreading is solely your responsibility.

### **Offprints**

The corresponding author will, at no cost, receive a customized [Share Link](#) providing 50 days free access to the final published version of the article on [ScienceDirect](#). The Share Link can be used for sharing the article via any communication channel, including email and social media. For an extra charge, paper offprints can be ordered via the offprint order form which is sent once the article is accepted for publication. Both corresponding and co-authors may order offprints at any time via Elsevier's [Author Services](#). Corresponding authors who have published their article gold open access do not receive a Share Link as their final published version of the article is available open access on ScienceDirect and can be shared through the article DOI link.

### **AUTHOR INQUIRIES**

Visit the [Elsevier Support Center](#) to find the answers you need. Here you will find everything from Frequently Asked Questions to ways to get in touch.

You can also [check the status of your submitted article](#) or find out [when your accepted article will be published](#).

© Copyright 2018 Elsevier | <https://www.elsevier.com>