COMPUTERS & GEOSCIENCES

TABLE OF CONTENTS

DESCRIPTION

Computers & Geosciences publishes high impact, original research at the interface between **Computer Sciences** and **Geosciences**. Publications should apply modern computer science paradigms, whether computational or informatics-based, to address problems in the geosciences.

Computational/informatics elements may include: computational methods; algorithms; data structure; database retrieval; information retrieval; data processing; artificial intelligence; computer graphics; computer visualization; programming languages; parallel systems; distributed systems; the World-Wide Web; social media; and software engineering.

Geoscientific topics of interest include: mineralogy; petrology; geochemistry; geomorphology; paleontology; stratigraphy; structural geology; sedimentology; hydrogeology; oceanography; atmospheric sciences; climatology; meteorology; geophysics; geomatics; remote sensing; geodesy; hydrology; and glaciology.

Other fields may be considered but are not regarded as a priority.

Computers & Geosciences does not consider:Pure methodology papers (without computer science)Standard code of already well-established, or previously published methodsGraphical User Interfaces (GUIs), unless they provide an original solution to a non-trivial input-handling problemPapers which use GIS tools in only standard ways, but are otherwise largely focused on the geoscience disciplineSubmissions from fields such as mining engineering, petroleum engineering, geotechnical engineering, rock-mechanics and others, unless such submissions contain a significant geosciences component. For instance, a mining paper only dealing with transport problems, a geotechnical paper on lab experiments, or a paper on rockbolting, would be considered unsuitable.Code and Data:*Computers & Geosciences* 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. The journal uses the github.com platform (search for: CAGEO) which allows the community to publish, maintain, update and comment on published code and data.

Paper Types: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.Book and software reviews (1500 words): Describing and evaluating a new or significant publication or piece of software relevant to aspects of computation or informatics in the geosciences.Letter to the Editor: Commenting on published articles. Criteria for assessment shall be the merit of the question or comment raised. The author(s) of the commented-on article shall be offered the opportunity to prepare a reply, to be published alongside the comment.

AUDIENCE

All geoscientists.

IMPACT FACTOR

2013: 1.562 © Thomson Reuters Journal Citation Reports 2014

ABSTRACTING AND INDEXING

Applied Science and Technology Index
Elsevier BIOBASE
Cambridge Scientific Abstracts
Chemical Abstracts
Compendex
Computer Abstracts
Computer Contents
Current Contents
Current Contents/CompuMath
Current Contents/Physics, Chemical, & Earth Sciences
Current Contents/SciSearch Database
Information Science Abstracts
Engineering Index Monthly
Engineering Index
FLUIDEX
GEOBASE
Geo Bib & Index
GeoRef
INSPEC
OCLC Contents Alert
Petroleum Abstracts
PubMed
Research Alert
Science Citation Index
Web of Science
Wilson Applied Science and Technology Abstracts
CAB International
SciSearch/Science Citation Index Expanded
Scopus
Computer Science Index
Academic Search (EBSCO)
Current Abstracts (EBSCO)
TOC Premier
Computers & Applied Sciences Complete
ProQuest

EDITORIAL BOARD

Editors-in-Chief:
J. Caers, Stanford University, Stanford, California, USA

GUIDE FOR AUTHORS

Your Paper Your Way
ypyw-gfa-banner.gifyour paper your way

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. Book and software reviews (1500 words): Describing and evaluating a new or significant publication or piece of software relevant to aspects of computation or informatics in the geosciences. Letter to the Editor: Commenting on published articles. Criteria for assessment shall be the merit of the question or comment raised. The author(s) of the commented-on article shall be offered the opportunity to prepare a reply, to be published alongside the comment.

Contact details for submission

For general information about the submission of computer code, or inquiries on access to the ftp site for computer code http://www.iamg.org for the journal, contact:

Dr. Jef Caers
Editor-in-Chief
Stanford University
Dept. of Energy Resources Engineering
367 Panama Street
Stanford, CA 94305
USA
Tel: +1 650 723 1774
Email: jcaers@stanford.edu

More information about the *International Association of Mathematical Geology* can be found on the Internet via http://www.iamg.org

BEFORE YOU BEGIN

Ethics in publishing

For information on Ethics in publishing and Ethical guidelines for journal publication see http://www.elsevier.com/publishingethics and http://www.elsevier.com/journal-authors/ethics.

Conflict of interest

All authors are requested to disclose any actual or potential conflict of interest including any financial, personal or other relationships with other people or organizations within three years of beginning the submitted work that could inappropriately influence, or be perceived to influence, their work. See also http://www.elsevier.com/conflictsofinterest. Further information and an example of a Conflict of Interest form can be found at: http://help.elsevier.com/app/answers/detail/a_id/286/p/7923.

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 or as part of a published lecture or academic thesis or as an electronic preprint, see http://www.elsevier.com/postingpolicy), 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 CrossCheck http://www.elsevier.com/editors/plagdetect.

Changes to authorship

This policy concerns the addition, deletion, or rearrangement of author names in the authorship of accepted manuscripts:

Before the accepted manuscript is published in an online issue: Requests to add or remove an author, or to rearrange the author names, must be sent to the Journal Manager from the corresponding author of the accepted manuscript and must include: (a) the reason the name should be added or removed, or the author names rearranged and (b) written confirmation (e-mail, fax, 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. Requests that are not sent by the corresponding author will be forwarded by the Journal Manager to the corresponding author, who must follow the procedure as described above. Note that: (1) Journal Managers will inform the Journal Editors of any such requests and (2) publication of the accepted manuscript in an online issue is suspended until authorship has been agreed.

After the accepted manuscript is published in an online issue: Any requests to add, delete, or rearrange author names in an article published in an online issue will follow the same policies as noted above and result in a corrigendum.

Copyright

This journal offers authors a choice in publishing their research: Open access and Subscription.

For subscription articles
Upon acceptance of an article, authors will be asked to complete a 'Journal Publishing Agreement' (for more information on this and copyright, see http://www.elsevier.com/copyright). 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 (please consult http://www.elsevier.com/permissions). 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: please consult http://www.elsevier.com/permissions.

For open access articles
Upon acceptance of an article, authors will be asked to complete an 'Exclusive License Agreement' (for more information see http://www.elsevier.com/OAauthoragreement). Permitted reuse of open access articles is determined by the author's choice of user license (see http://www.elsevier.com/openaccesslicenses).

Retained author rights

As an author you (or your employer or institution) retain certain rights. For more information on author rights for:

Subscription articles please see http://www.elsevier.com/journal-authors/author-rights-and-responsibilities.

Open access articles please see http://www.elsevier.com/OAauthoragreement.

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.

Funding body agreements and policies

Elsevier has established agreements and developed policies to allow authors whose articles appear in journals published by Elsevier, to comply with potential manuscript archiving requirements as specified as conditions of their grant awards. To learn more about existing agreements and policies please visit http://www.elsevier.com/fundingbodies.

Open access

This journal offers authors a choice in publishing their research:

Open access
• Articles are freely available to both subscribers and the wider public with permitted reuse
• An open access publication fee is payable by authors or their research funder

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our access programs (http://www.elsevier.com/access)
• No open access publication fee

All articles published open access will be immediately and permanently free for everyone to read and download. Permitted reuse is defined by your choice of one of the following Creative Commons user licenses:
Creative Commons Attribution (CC BY): lets others distribute and copy the article, to create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), to include in a collective work (such as an anthology), to text or data mine the article, even for commercial purposes, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, and do not modify the article in such a way as to damage the author's honor or reputation.
Creative Commons Attribution-NonCommercial-ShareAlike (CC BY-NC-SA): for non-commercial purposes, lets others distribute and copy the article, to create extracts, abstracts and other revised versions, adaptations or derivative works of or from an article (such as a translation), to include in a collective work (such as an anthology), to text and data mine the article, as long as they credit the author(s), do not represent the author as endorsing their adaptation of the article, do not modify the article in such a way as to damage the author's honor or reputation, and license their new adaptations or creations under identical terms (CC BY-NC-SA).
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.

To provide open access, this journal has a publication fee which needs to be met by the authors or their research funders for each article published open access.
Your publication choice will have no effect on the peer review process or acceptance of submitted articles.

In 2014 there is a 25% discount off of the open access publication fee for members of the International Association for Mathematical Geosciences. Prices are listed below.

Full Price International Association for Mathematical Geosciences.* $3,000 $2,250

*To be eligible for the society member discount the corresponding author must be a member of the International Association for Mathematical Geosciences.. To claim the discount the author can verify their membership at article submission stage via EES. Elsevier reserves the right to remove or refuse the discount. Discounts are exclusive of each other and will not be accrued.

Learn more about Elsevier's pricing policy: http://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 WebShop (http://webshop.elsevier.com/languageediting/) or visit our customer support site (http://support.elsevier.com) for more information.

Submission
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 source files to a single PDF file of the article, which is used in the peer-review process. Please note that even though manuscript source files are converted to PDF files at submission for the review process, these source files are needed for further processing after acceptance. All correspondence, including notification of the Editor's decision and requests for revision, takes place by e-mail removing the need for a paper trail.

Submit your article
Please submit your article via http://ees.elsevier.com/cageo.

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 & 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 wordprocessor 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 lay-out 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 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.

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.

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: http://www.elsevier.com/guidepublication). 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* (http://www.ctan.org/tex-archive/macros/latex/contrib/elsarticle) to prepare your manuscript and BibTeX (http://www.bibtex.org) to generate your bibliography.
For detailed submission instructions, templates and other information on LaTeX, see http://www.elsevier.com/latex.

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 detail to allow the work to be reproduced. Methods already published should be indicated by a reference: only relevant modifications should 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.

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.* Where the family name may be ambiguous (e.g., a double name), please indicate this clearly. 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. **Ensure that phone numbers (with country and area code) are provided in addition to the e-mail address and the complete postal address. Contact details must be 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.

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. See http://www.elsevier.com/graphicalabstracts for examples.

Authors can make use of Elsevier's Illustration and Enhancement service to ensure the best presentation of their images and in accordance with all technical requirements: Illustration Service.

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 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). See http://www.elsevier.com/highlights for examples.

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.).

Nomenclature and Units

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

Math formulae

Present simple formulae in the line of 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 EES. Therefore, these should be supplied in one of the following ways:
1. As a .pdf file
2. 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 wordprocessors build footnotes into the text, and this feature may be used. Should this not be the case, indicate the position of footnotes in the text and present the footnotes themselves separately at the end of the article. Do not include footnotes in the Reference list.

Table footnotes
Indicate each footnote in a table with a superscript lowercase letter.

Artwork

Electronic artwork
General points
• Make sure you use uniform lettering and sizing of your original artwork.
• Preferred fonts: Arial (or Helvetica), Times New Roman (or Times), Symbol, Courier.
• Number the illustrations according to their sequence in the text.
• Use a logical naming convention for your artwork files.
• Indicate per figure if it is a single, 1.5 or 2-column fitting image.
• For Word submissions only, you may still provide figures and their captions, and tables within a single file at the revision stage.
• Please note that individual figure files larger than 10 MB must be provided in separate source files.
A detailed guide on electronic artwork is available on our website:
http://www.elsevier.com/artworkinstructions.
You are urged to visit this site; some excerpts from the detailed information are given here.
Formats
Regardless of the application used, 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 the font or save the text as 'graphics'.
TIFF (or JPG): Color or grayscale photographs (halftones): always use a minimum of 300 dpi.
TIFF (or JPG): Bitmapped line drawings: use a minimum of 1000 dpi.
TIFF (or JPG): Combinations bitmapped line/half-tone (color or grayscale): a minimum of 500 dpi is required.
Please do not:
• Supply files that are optimized for screen use (e.g., GIF, BMP, PICT, WPG); the resolution is too low.
• 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 on the Web (e.g., ScienceDirect and other sites) regardless of whether or not these illustrations are reproduced in color in the printed version. **For color reproduction in print, you will receive information regarding the costs from Elsevier after receipt of your accepted article**. Please indicate your preference for color: in print or on the Web only. For further information on the preparation of electronic artwork, please see http://www.elsevier.com/artworkinstructions.

Please note: Because of technical complications that can arise by converting color figures to 'gray scale' (for the printed version should you not opt for color in print) please submit in addition usable black and white versions of all the color illustrations.

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

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
Number tables consecutively in accordance with their appearance in the text. Place footnotes to tables below the table body and indicate them with superscript lowercase letters. Avoid vertical rules. Be sparing in the use of tables and ensure that the data presented in tables do not duplicate results described elsewhere in the article.

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; *Threee 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. doi: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:

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 Universität München, 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.

Exact citations of the work of others must be provided in quotes with the author(s) properly credited and sourced.

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.

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
This journal has standard templates available in key reference management packages EndNote (http://www.endnote.com/support/enstyles.asp) and Reference Manager (http://refman.com/support/rmstyles.asp). Using plug-ins to wordprocessing packages, authors only need to select the appropriate journal template when preparing their article and the list of references and citations to these will be formatted according to the journal style which is described below.

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 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:
1. *Single author:* the author's name (without initials, unless there is ambiguity) and the year of publication;
2. *Two authors:* both authors' names and the year of publication;
3. *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.

Video data
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 files in one of our recommended file formats with a preferred maximum size of 50 MB. Video and animation files supplied will be published online in the electronic version of your article in Elsevier Web products, including ScienceDirect: http://www.sciencedirect.com. 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 at http://www.elsevier.com/artworkinstructions. 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.

AudioSlides

The journal encourages authors to create an AudioSlides presentation with their published article. AudioSlides are brief, webinar-style presentations that are shown next to the online article on ScienceDirect. This gives authors the opportunity to summarize their research in their own words and to help readers understand what the paper is about. More information and examples are available at http://www.elsevier.com/audioslides. Authors of this journal will automatically receive an invitation e-mail to create an AudioSlides presentation after acceptance of their paper.

Supplementary data

Elsevier accepts electronic supplementary material to support and enhance your scientific research. Supplementary files offer the author additional possibilities to publish supporting applications, high-resolution images, background datasets, sound clips and more. Supplementary files supplied will be published online alongside the electronic version of your article in Elsevier Web products, including ScienceDirect: http://www.sciencedirect.com. In order to ensure that your submitted material is directly usable, please provide the data in one of our recommended file formats. Authors should submit the material in electronic format together with the article and supply a concise and descriptive caption for each file. For more detailed instructions please visit our artwork instruction pages at http://www.elsevier.com/artworkinstructions.

Data deposit and linking

Elsevier encourages authors to deposit raw data sets underpinning their research publication in data repositories, and to enable interlinking of articles and data. Please visit http://www.elsevier.com/databaselinking for more information on depositing and linking your data with a supported data repository.

Google Maps and KML files

KML (Keyhole Markup Language) files (optional): You can enrich your online articles by providing KML or KMZ files which will be visualized using Google maps. The KML or KMZ files can be uploaded in our online submission system. KML is an XML schema for expressing geographic annotation and visualization within Internet-based Earth browsers. Elsevier will generate Google Maps from the submitted KML files and include these in the article when published online. Submitted KML files will also be available for downloading from your online article on ScienceDirect. For more information see http://www.elsevier.com/googlemaps.

Interactive plots

This journal encourages you to include data and quantitative results as interactive plots with your publication. To make use of this feature, please include your data as a CSV (comma-separated values) file when you submit your manuscript. Please refer to http://www.elsevier.com/interactiveplots for further details and formatting instructions.

Submission checklist

The following list will be useful during the final checking of an article prior to sending it to the journal for review. Please consult this Guide for Authors for further details of any item.
Ensure that the following items are present:
One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address
• Telephone
All necessary files have been uploaded, and contain:
• Keywords
• All figure captions
• All tables (including title, description, footnotes)
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 Web)
• Color figures are clearly marked as being intended for color reproduction on the Web (free of charge) and in print, or to be reproduced in color on the Web (free of charge) and in black-and-white in print
• If only color on the Web is required, black-and-white versions of the figures are also supplied for printing purposes
For any further information please visit our customer support site at http://support.elsevier.com.

Computer Code

Computer code, including test data and user manuals, can be uploaded to the Elsevier submission site as separate files. If your computer code consists of many files (>10), please contact Elsevier Author Support (authorsupport@elsevier.com) for instructions on uploading these files. Alternatively, authors may contact the Editor-in-Chief for additional information on submitting program code.

Please send all computer code on CD/DVD (no floppy disks) to:

Computers & Geosciences
C/o Dr. Eric Grunsky
Geological Survey of Canada
601 Booth St.
Ottawa, ON K1A 0E8
CANADA

Upon acceptance of the manuscript program code files will be compressed (zip file) and placed on the IAMG server (http://www.iamg.org) for public access.

Computer code should provide the following information:

1. 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.
2. A **user manual or instruction guide** that provides information on how to use the program.
3. The **source code** for any programs that have been written.
4. **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.
5. **Output files** should also be provided that will allow a user to check if a compiled program is working properly.
6. **Executable program code is not encouraged** because of difficulty in transmitting .exe files past Virus scanners and the limited life of executable code.
7. All files should be **compressed into .zip or .gz format**, which will then be placed on the Computers& Geosciences FTP site for download once the manuscript has been accepted and published.

AFTER ACCEPTANCE

Availability of accepted article
This journal makes articles available online as soon as possible after acceptance. This concerns the accepted article (both in HTML and PDF format), which has not yet been copyedited, typeset or proofread. 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.

Use of the Digital Object Identifier

The Digital Object Identifier (DOI) may be used to cite and link to electronic documents. The DOI consists of a unique alpha-numeric character string which is assigned to a document by the publisher upon the initial electronic publication. The assigned DOI never changes. Therefore, it is an ideal medium for citing a document, particularly 'Articles in press' because they have not yet received their full bibliographic information. Example of a correctly given DOI (in URL format; here an article in the journal *Physics Letters B*):
http://dx.doi.org/10.1016/j.physletb.2010.09.059
When you use a DOI to create links to documents on the web, the DOIs are guaranteed never to change.

Online proof correction

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, at no cost, will be provided with a personalized link providing 50 days free access to the final published version of the article on ScienceDirect. This link can also be used for sharing via email and social networks. 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 WebShop (http://webshop.elsevier.com/myarticleservices/offprints). Authors requiring printed copies of multiple articles may use Elsevier WebShop's 'Create Your Own Book' service to collate multiple articles within a single cover (http://webshop.elsevier.com/myarticleservices/booklets).

Contact addresses

Inquiries on manuscripts can be addressed to: candg@iamg.org, marked for the attention of the Editor.

Program code on CD/DVDs that cannot be uploaded during manuscript submission on the Elsevier Editorial System should be sent to:
Eric Grunsky
Geological Survey of Canada
601 Booth St
Ottawa
Ontario
Canada
K1A 0E8.
E-mail: egrunsky@iamg.org
Telephone: +1 613 992 7258

IAMG BUSINESS OFFICE
Business related to the International Association for Mathematical Geology (IAMG), such as membership and subscriptions to any of the three journals sponsored by the Association (Computers & Geosciences, Mathematical Geology and Natural Resources Research), should be sent to:

IAMG Office
5868 Westheimer Road #537
Houston
TX
USA
77057

Phone: +1 832 380 8833 (messages)
E-mail: support@iamgmembers.org

AUTHOR INQUIRIES

You can track your submitted article at http://help.elsevier.com/app/answers/detail/a_id/89/p/8045/. You can track your accepted article at http://www.elsevier.com/trackarticle. You are also welcome to contact Customer Support via http://support.elsevier.com.