MOLECULAR PHYLOGENETICS AND EVOLUTION

TABLE OF CONTENTS

- Description p.1
- Audience p.1
- Impact Factor p.2
- Abstracting and Indexing p.2
- Editorial Board p.2
- Guide for Authors p.5

DESCRIPTION

*Molecular Phylogenetics and Evolution* is dedicated to bringing Darwin's dream within grasp - to "have fairly true genealogical trees of each great kingdom of Nature." The journal provides a forum for molecular studies that advance our understanding of *phylogeny* and *evolution*, further the development of phylogenetically more accurate *taxonomic classifications*, and ultimately bring a *unified classification* for all the ramifying lines of life. Phylogeographic studies will be considered for publication if they offer EXCEPTIONAL theoretical or empirical advances.

The journal encourages articles that are multidisciplinary, especially in areas, such as bioinformatics, computational biology, molecular biology, and organismic biology, that are of interest to the community of systematic and evolutionary biologists. In addition, presentations of new findings on or insights into evolutionary processes and mechanisms as expressed at the molecular level are welcome, as are those that deal with the methodology of reconstructing evolutionary history from molecular data (such as descriptions of new or more powerful computer algorithms for constructing phylogenetic trees from orthologous nucleotide or aminoacid sequences). A deeper understanding of the mechanisms and processes of molecular evolution should lead to more accurate models of molecular evolution, which in turn should facilitate the development of better algorithms for reconstructing evolutionary history from sequence data.

Papers based on few taxa, single molecular markers, or that use codon-based methods to test for positive Darwinian selection, but in the absence of experimental evidence that allegedly selected amino acid changes cause an adaptive phenotypic effect, will not be accepted.

**Benefits to authors**
We also provide many author benefits, such as free PDFs, a liberal copyright policy, special discounts on Elsevier publications and much more. Please click here for more information on our author services.

Please see our *Guide for Authors* for information on article submission. If you require any further information or help, please visit our *Support Center*.

AUDIENCE

Evolutionary researchers, geneticists, molecular biologists, biochemists, microbiologists, plant scientists, zoologists
IMPACT FACTOR

2017: 4.412 © Clarivate Analytics Journal Citation Reports 2018

ABSTRACTING AND INDEXING

Scopus
EMBiology

EDITORIAL BOARD

Editor-in-Chief:
E.A. Zimmer, National Museum of Natural History, PO Box 37012, Washington, District of Columbia, 20013-7012, United States

Founding Editor:
M. Goodman †

Deputy Editor:
G. Orti, GEORGE WASHINGTON UNIVERSITY, Washington, District of Columbia, United States

Associate Editors:
A. Abecasis, New University of Lisbon Education and Research Unit for International Public Health and Biostatistics, Rua da Junqueira Nº 100, 1349-008, Lisboa, Portugal
F. Burki, Department of Organismal Biology, Science For Life Laboratory, Uppsala Universitet, Norbyvägen 18D, 752 36, Uppsala, Sweden
G. S. Cabanne, Museo Argentino de Ciencias Naturales, Division of Ornithology, Av. Ángel Gallardo 470, C1405DJR, Buenos Aires, Argentina
D.M. de Vienne, Laboratory of Biometry and Evolutionary Biology, 43 bd du 11 novembre 1918, 69100, Villeurbanne, France
A. Dornburg, North Carolina Museum of Natural Sciences, 11 W. Jones Street, Raleigh, North Carolina, 27699, United States
V. L. GONZÁLEZ, National Museum of Natural History, PO Box 37012, Washington, District of Columbia, 20013-7012, United States
S.M. Ickert-Bond, University of Alaska Museum of the North, 907 Yukon Drive, Fairbanks, Alaska, 99775-6960, United States
R. Jabaily, Colorado College, Department of Organismal Biology and Ecology, 14 East Cache la Poudre St., Colorado Springs, Colorado, 80903, United States
A. Larson, Washington University in Saint Louis Department of Biology, Saint Louis, Missouri, 63130-4899, United States
L. Lohmann, University of Sao Paulo Institute of Biosciences, Rua do Matão, 277, 05508-090, SAO PAULO, Brazil
F. Lutzoni, Duke University Department of Biology, Box 90338, 130 Science Drive, Durham, North Carolina, 27708-0338, United States
C. Matthee, Stellenbosch University Department of Botany and Zoology, Private Bag X1, 7602, Stellenbosch, South Africa
J.M. Moncalvo, Royal Ontario Museum, Dept. of Natural History, 100 Queen's Park, Toronto, M5S 2C6, Ontario, Canada
P.M. O'Grady, Cornell University Department of Entomology, Geneva Nyu 14456 E 25th St, Ithaca, New York, 14853, United States
D. Paraskevis, Dept. of Hygiene and Epidemiology, National and Kapodistrian University of Athens, Mikras Asias 75 street (Goudi), 115 27, Athens, Greece
M. Perez-Losada, Innovation Hall, Computational Biology Institute, The George Washington University, 45085 University Drive, Suite 305, Ashburn, Virginia, 20147, United States
F. Raposo do Amaral, Universidade Federal de São Paulo, Diadema - SP, Brazil
A. Reyes-Prieto, Rutgers University, Dept. of Biology, Fredericton, E3B 5A3, New Brunswick, Canada
N. Saitou, National Institute of Genetics, Div. of Population Genetics, 1111 Yata, 411-0801, Mishima, Japan
B. Schierwater, TiHo Hannover: Tierärztliche Hochschule, ITZ, Ecology and Evolution, Bünteweg 17D, 30559, Hannover, Germany
A.P. Vogler, Imperial College London Department of Electrical and Electronic Engineering, Exhibition Road, SW7 2AZ, London, United Kingdom
X.-Q. Wang, Institute of Botany, State Key Laboratory of Systematic and Evolutionary Botany, Chinese Academy of Sciences (CAS), 20 Nanxincun, Xiangshan, 100093, Beijing, China
S. Wanke, TU Dresden Department of Botany, Zellescher Weg 20b, 01062, Dresden, Germany
D. Wildman, University of Illinois at Urbana-Champaign Department of Molecular and Integrative Physiology, 1206 West Gregory Drive, Urbana, Illinois, 61801-3732, United States
M. Santos, Federal University of Santa Maria, 97105-900, SANTA MARIA, Brazil

Editorial Board:
R. Adkins, LEBONHEUR CHILDRENS MEDICAL CENTER, Children’s Foundation Research Ctr, Memphis, Tennessee, 38103, United States
R.J. Baker, Texas Tech University Department of Biological Sciences, Lubbock, Texas, 79409-3131, United States
M. L. Borbee, The University of British Columbia Department of Botany, 6270 University Boulevard, Vancouver, V6T 1Z4, British Columbia, Canada
F. T. Burbank, College of Staten Island Department of Biology, 2800 Victory Blvd., Staten Island, New York, 10314, United States
G. Caccone, Yale Institute for Biospheric Studies, 21 Sachem St, New Haven, Connecticut, 06520-8105, United States
J. L. Cracraft, American Museum of Natural History, Dept. of Ornithology, Central Park West at 79th Street, New York, New York, 10024, United States
M. P. Cummings, University of Maryland at College Park Center for Bioinformatics and Computational Biology, Biomolecular Sciences Bldg, #296, College Park, Maryland, 20740, United States
P. Deininger, Tulane University, Tulane Cancer Center, 1430 Tulane Avenue, New Orleans, Louisiana, LA 70112-2699, United States
R. DeSalle, American Museum of Natural History, Dept. of Entomology, Central Park West at 79th Street, New York, New York, NY 11024, United States
J. J. Doyle, Cornell University Liberty Hyde Bailey Hortorium, 408 Mann Library Building, Ithaca, New York, 14853, United States
D. H. A. Fitch, New York University Department of Biology, 100 Washington Sq E, New York, New York, 10003-6688, United States
J. R. Garey, University of South Florida Department of Cell Biology Microbiology and Molecular Biology, 4202 East Fowler Ave ISA2015, Tampa, Florida, 33620-5150, United States
B. S. Gaut, University of California Irvine Department of Ecology and Evolutionary Biology, 321 Steinhaus Hall, Irvine, California, 92697-2525, United States
M. George, College of Medicine, Dept. of Biochemistry and Molecular Biology, Howard University, 520 W Street, N.W., Washington, District of Columbia, DC 20059, United States
M. T. Ghiselin, California Academy of Sciences, Dept. of Invertebrate Pathology and Zoology, Center for the History and Philosophy of Science, San Francisco, California, CA 94118-9961, United States
G. Giribet, Harvard University Department of Organismic and Evolutionary Biology, 16 Divinity Ave., Cambridge, Massachusetts, 02138, United States
X. Gu, Iowa State University College of Agriculture and Life Sciences, 322 Science II, Ames, Iowa, 50011, United States
S. Hackett, Field Museum of Natural History, Dept. of Zoology / Bird Div., 1400 South Lake Shore Drive, Chicago, Illinois, IL 60605, United States
M. Hasegawa, Institute of Statistical Mathematics, 4-6-7 Minamiazabu, 106-8569, Minato-Ku, Japan
D. Hewett-Emmett, University of Texas School of Public Health, 5323 Harry Hines Blvd VB 112, Houston, Texas, TX 75309-9128, United States
D. S. Hibbett, Clark University Department of Biology, 950 Main Street, Worcester, Massachusetts, 01610-1400, United States
D. Hillis, University of Texas at Austin School of Biological Sciences, Section of Integrative Biology, Austin, Texas, 78712-0128, United States
R. L. Honeycutt, Pepperdine University Natural Science Division, 24255 Pacific Coast Highway, Malibu, California, 90263, United States
D. M. Irwin, University of Toronto Department of Laboratory Medicine and Pathobiology, 100 College Street, Toronto, M5S 1A8, Ontario, Canada
R. A. Jenner, Natural History Museum Zoology Department, Cromwell Road, SW7 5BD, London, United Kingdom
W. Jetz, Yale University Department of Ecology and Evolutionary Biology, 165 Prospect Street, New Haven, Connecticut, 06520-8106, United States
M. D. Kane, National Science Foundation Division of Molecular and Cellular Biosciences, 4201 Wilson Blvd, Arlington, Virginia, 22203-1859, United States
B. F. Koop, Centre for Biomedical Research, Dept. of Biology, University of Victoria, PO Box 3020 STN CSC, Victoria, V8W 3N5, British Columbia, Canada
F. Lang, University of Montreal Department of Biochemistry and Molecular Medicine, C.P. 6128, Succ. Centre-ville, Montreal, H3C 3J7, Quebec, Canada
D. T. J. Littlewood, Natural History Museum Zoology Department, Cromwell Road, SW7 5BD, London, United Kingdom
D. P. Mindell, California Academy of Sciences, San Francisco, California, 94118-4503, United States
N. A. Moran, University of Texas at Austin Section of Integrative Biology, 2506 Speedway, A5000, Austin, Texas, 78712, United States
G. J. Nelson, University of Melbourne School of BioSciences, University Of Melbourne, VIC 3010, Australia
N. Okada, Tokyo Institute of Technology, Graduate School of Bioscience and Biotechnology, 4259 Nagatsutacho, Midori-ku, 226-8501, Yokohama, Japan
S. Pääbo, Max Planck Institute (MPI) for Evolutionary Biology, Inselstrasse 22, D-04103, Leipzig, Germany
R.D.M. Page, University of Glasgow Institute of Biodiversity Animal Health and Comparative Medicine, Graham Kerr Building, G12 8QQ, Glasgow, United Kingdom
J.D. Palmer, Indiana University, Dept. of Biochemistry, Bloomington, Indiana, IN 47405, United States
C. Porter, Xavier University of Louisiana, Dept. of Biology, 1 Drexel Drive, New Orleans, Louisiana, LA 70125, United States
J.R. Powell, Yale University Department of Ecology and Evolutionary Biology, 165 Prospect Street, New Haven, Connecticut, 06520-8106, United States
C. Saccone, Università degli Studi di Bari Aldo Moro, Dipart. di Biochimica e Biologia Molecolare, Via E. Orabona 4, I-70126, Bari, Italy
D. Sankoff, Université de Montréal, Centre de Recherche dues Transports, Station Centre-Ville' Po Box 6128 - PO Box 6128 SU, Montréal, H3C 3J7, Canada
M.L. Sogin, Marine Biological Laboratory, 7 MBL Street, Woods Hole, Massachusetts, 02543-1015, United States
C. Stepien, University of Toledo, Lake Erie Center, 6200 Bayshore Rd., Toledo, Ohio, OH 43618, United States
C.-B. Stewart, University at Albany Department of Biological Sciences, 1400 Washington Avenue, Albany, New York, 12222-0100, United States
A. Templeton, Washington University in Saint Louis Department of Biology, Saint Louis, Missouri, 63130-4899, United States
M. Whiting, Brigham Young University, Dept. of Zoology, Provo, Utah, UT 84602, United States
C.-I. Wu, University of Chicago Department of Ecology and Evolution, 1101 East 57th Street, Chicago, Illinois, 60637-1503, United States
A.D. Yoder, Duke University Department of Biology, Box 90338, 130 Science Drive, Durham, North Carolina, 27708-0338, United States
GUIDE FOR AUTHORS

INTRODUCTION
Molecular Phylogenetics and Evolution is dedicated to bringing Darwin's dream within grasp - to "have fairly true genealogical trees of each great kingdom of Nature." The journal provides a forum for molecular studies that advance our understanding of phylogeny and evolution, further the development of phylogenetically more accurate taxonomic classifications, and ultimately bring a unified classification for all the ramifying lines of life. Phylogeographic studies will be considered for publication if they offer EXCEPTIONAL theoretical or empirical advances.

The journal encourages articles that are multidisciplinary, especially in areas, such as bioinformatics, computational biology, molecular biology, and organismic biology, that are of interest to the community of systematic and evolutionary biologists. In addition, presentations of new findings on or insights into evolutionary processes and mechanisms as expressed at the molecular level are welcome, as are those that deal with the methodology of reconstructing evolutionary history from molecular data (such as descriptions of new or more powerful computer algorithms for constructing phylogenetic trees from orthologous nucleotide or aminoacid sequences). A deeper understanding of the mechanisms and processes of molecular evolution should lead to more accurate models of molecular evolution, which in turn should facilitate the development of better algorithms for reconstructing evolutionary history from sequence data.

Papers based on few taxa, single molecular markers, or that use codon-based methods to test for positive Darwinian selection, but in the absence of experimental evidence that allegedly selected amino acid changes cause an adaptive phenotypic effect, will not be accepted.

In addition to regular articles, Review papers are also accepted. Review papers do not necessarily contain new data; rather, they are a status report of a specific field within molecular phylogenetics. There are no page limits to regular articles or Review papers.

Authors should relate molecular phylogeny to a broader audience by linking taxonomic group/names to common names so papers will have more general appeal.

Short communications of approximately 3000 words are also accepted. These papers should contain no more than two figures, two tables, and thirty references. A short abstract of fewer than 200 words is acceptable.

Letters to the editor should consist of about 1000 words and contain no tables, no figures, and no new data. Manuscripts should be prepared according to the following style rules. Deviation from these rules causes publication delays.

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:

One author has been designated as the corresponding author with contact details:
• E-mail address
• Full postal address

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)

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 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 competing interests include employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, and grants or other funding. Authors must disclose any interests in two places: 1. A summary declaration of interest statement in the title page file (if double-blind) or the manuscript file (if single-blind). If there are no interests to declare then please state this: 'Declarations of interest: none'. This summary statement will be ultimately published if the article is accepted. 2. Detailed disclosures as part of a separate Declaration of Interest form, which forms part of the journal's official records. It is important for potential interests to be declared in both places and that the information matches. 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. Articles should make no assumptions about the beliefs or commitments of any reader, should contain nothing which might imply that one individual is superior to another on the grounds of race, sex, culture or any other characteristic, and should use inclusive language throughout. Authors should ensure that writing is free from bias, for instance by using 'he or she', 'his/her' instead of 'he' or 'his', and by making use of job titles that are free of stereotyping (e.g. 'chairperson' instead of 'chairman' and 'flight attendant' instead of 'stewardess').

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.

Funding body agreements and policies
Elsevier has established a number of agreements with funding bodies which allow authors to comply with their funder's open access policies. Some funding bodies will reimburse the author for the gold open access publication fee. Details of existing agreements are available online.

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

Subscription
• Articles are made available to subscribers as well as developing countries and patient groups through our universal access programs.
• No open access publication fee payable by authors.
• The Author is entitled to post the accepted manuscript in their institution’s repository and make this public after an embargo period (known as green Open Access). The published journal article cannot be shared publicly, for example on ResearchGate or Academia.edu, to ensure the sustainability of peer-reviewed research in journal publications. The embargo period for this journal can be found below.

Gold open access
• Articles are freely available to both subscribers and the wider public with permitted reuse.
• A gold open access publication fee is payable by authors or on their behalf, e.g. by their research funder or institution.
Regardless of how you choose to publish your article, the journal will apply the same peer review criteria and acceptance standards.

For gold open access articles, permitted third party (re)use is defined by the following Creative Commons user licenses:

**Creative Commons Attribution (CC BY)**

Lets others distribute and copy the article, create extracts, abstracts, and other revised versions, adaptations or derivative works of or from an article (such as a translation), include in a collective work (such as an anthology), 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-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 gold open access publication fee for this journal is **USD 4050**, excluding taxes. Learn more about Elsevier's pricing policy: [https://www.elsevier.com/openaccesspricing](https://www.elsevier.com/openaccesspricing).

**Green open access**

Authors can share their research in a variety of different ways and Elsevier has a number of green open access options available. We recommend authors see our open access page for further information. Authors can also self-archive their manuscripts immediately and enable public access from their institution's repository after an embargo period. This is the version that has been accepted for publication and which typically includes author-incorporated changes suggested during submission, peer review and in editor-author communications. Embargo period: For subscription articles, an appropriate amount of time is needed for journals to deliver value to subscribing customers before an article becomes freely available to the public. This is the embargo period and it begins from the date the article is formally published online in its final and fully citable form. [Find out more.](#)

This journal has an embargo period of 12 months.

**Elsevier Researcher Academy**

Researcher Academy is a free e-learning platform designed to support early and mid-career researchers throughout their research journey. The "Learn" environment at Researcher Academy offers several interactive modules, webinars, downloadable guides and resources to guide you through the process of writing for research and going through peer review. Feel free to use these free resources to improve your submission and navigate the publication process with ease.

**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.

**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.

**Additional information**

**Preparation of supplementary material**

Supplementary files offer the author additional possibilities to publish supporting applications, movies, animation sequences, high-resolution images, background datasets, sound clips, and more. Supplementary files supplied will be published online alongside the electronic version of the article in Elsevier Web products, including ScienceDirect: [http://www.sciencedirect.com](http://www.sciencedirect.com). To ensure that submitted material is directly usable, please provide data in one of our recommended file formats. 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 [https://www.elsevier.com/artworkinstructions](https://www.elsevier.com/artworkinstructions).
PREPARATION

Peer review
This journal operates a single blind 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. More information on types of peer review.

Use of word processing software
It is important that the file be saved in the native format of the word processor used. The text should be in single-column format. Keep the layout of the text as simple as possible. Most formatting codes will be removed and replaced on processing the article. In particular, do not use the word processor's options to justify text or to hyphenate words. However, do use bold face, italics, subscripts, superscripts etc. When preparing tables, if you are using a table grid, use only one grid for each individual table and not a grid for each row. If no grid is used, use tabs, not spaces, to align columns. The electronic text should be prepared in a way very similar to that of conventional manuscripts (see also the Guide to Publishing with Elsevier). Note that source files of figures, tables and text graphics will be required whether or not you embed your figures in the text. 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.

Article structure
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.

Glossary
Please supply, as a separate list, the definitions of field-specific terms used in your article.

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 lowercase 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.

**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.

**Graphical abstract**

A graphical abstract is mandatory for this journal. It should summarize the contents of the article in a concise, pictorial form designed to capture the attention of a wide readership online. Authors must provide images that clearly represent the work described in the article. 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 also 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).

**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.

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/halftone (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. **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 online only. Further information on the preparation of electronic artwork.

Illustration services
Elsevier's WebShop offers Illustration Services to authors preparing to submit a manuscript but concerned about the quality of the images accompanying their article. Elsevier's expert illustrators can produce scientific, technical and medical-style images, as well as a full range of charts, tables and graphs. Image 'polishing' is also available, where our illustrators take your image(s) and improve them to a professional standard. Please visit the website to find out more.

Figure captions
Ensure that each illustration has a caption. Supply captions separately, not attached to the figure. 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.

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.

References
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.

Reference links
Increased discoverability of research and high quality peer review are ensured by online links to the sources cited. In order to allow us to create links to abstracting and indexing services, such as Scopus, CrossRef and PubMed, please ensure that data provided in the references are correct. Please note that incorrect surnames, journal/book titles, publication year and pagination may prevent link creation. When copying references, please be careful as they may already contain errors. Use of the DOI is highly encouraged.

A DOI is guaranteed never to change, so you can use it as a permanent link to any electronic article. An example of a citation using DOI for an article not yet in an issue is: VanDecar J.C., Russo R.M., James D.E., Ambeh W.B., Franke M. (2003). Aseismic continuation of the Lesser Antilles slab beneath northeastern Venezuela. Journal of Geophysical Research, https://doi.org/10.1029/2001JB000884. Please note the format of such citations should be in the same style as all other references in the paper.

Web references
As a minimum, the full URL should be given and the date when the reference was last accessed. Any further information, if known (DOI, author names, dates, reference to a source publication, etc.), should also be given. Web references can be listed separately (e.g., after the reference list) under a different heading if desired, or can be included in the reference list.

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.

Users of Mendeley Desktop can easily install the reference style for this journal by clicking the following link:

When preparing your manuscript, you will then be able to select this style using the Mendeley plug-ins for Microsoft Word or LibreOffice.

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:

Reference style

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 can be listed either first alphabetically, then chronologically, or vice versa.

Examples: 'as demonstrated (Allan, 2000a, 2000b, 1999; Allan and Jones, 1999).... Or, as demonstrated (Jones, 1999; Allan, 2000)… Kramer et al. (2010) 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:
Reference to a journal publication:
Reference to a journal publication with an article number:
Reference to a book:
Reference to a chapter in an edited book:
Reference to a website:
Reference to a dataset:

Journal abbreviations source

Journal names should be abbreviated according to the List of Title Word Abbreviations.
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 encourages 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. If you are sharing data in one of these ways, you are encouraged 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.

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 500 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.

Data statement
To foster transparency, we encourage you to state the availability of your data in your submission. This may be a requirement of your funding body or institution. If your data is unavailable to access or unsuitable to post, you will have the opportunity to indicate why during the submission process, for example by stating that the research data is confidential. The statement will appear with your published article on ScienceDirect. For more information, visit the Data Statement page.

AFTER ACCEPTANCE

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 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 Webshop. 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