

Instructions to Authors

Part II. Manuscript Preparation and Submission

1. Introduction

These style guidelines are intended primarily for use in writing research papers for AMS journals. With some exceptions noted in the following, however, they also apply to other AMS publications—papers for the *Bulletin*, contributions to Society books and monographs, and submissions to be included in preprint volumes. In addition, staff members are enjoined to apply the guidelines to their own writing and editing, the goal being a uniform AMS style that promotes clarity and accuracy in the Society's communications.

This guide primarily covers style issues that are specific to AMS publications. For general stylistic questions relating to proper English usage—in grammar, spelling, punctuation, capitalization, and vocabulary use—that are not covered here, AMS style follows *The Chicago Manual of Style*, 14th ed. (1993). For questions of scientific usage that are not covered explicitly in this guide, AMS editorial policy follows the *AIP Style Manual* (1990) prepared by the American Institute of Physics. The AMS authority for spelling and word definitions is *Merriam-Webster's Collegiate Dictionary*, 10th ed. (1993). For spelling and capitalization of geographical areas, the AMS uses *The Times Atlas of the*

*World, Ninth Comprehensive Edition* (1992). The AMS also uses the *Acronyms, Initialism, & Abbreviations Dictionary* (1992) as a reference.

The style guidelines provided here are generally applicable to all AMS publications, as noted. Authors are encouraged to review the "Information for Contributors" on the inside front and back covers of a recent issue of the respective journal for a quick reference on style issues related to publication in that specific journal.

## **2. Types of manuscripts**

Each AMS journal is divided into two major sections: "Articles" and "Notes and Correspondence." The *Journal of Climate* also publishes "Letters" periodically and "Seasonal Climate Summaries" quarterly, and *Monthly Weather Review* includes "Annual Summaries" of Atlantic and Pacific hurricane and tropical storm activity and "Photo of the Month." *Weather and Forecasting* has several additional departments as well: "NCEP Notes," "Forecasting Techniques," "Computer Techniques," "Forecaster's Forum," and "Photo of the Month".

Articles are full-length papers that report on new research findings in some detail. More broadly based review articles may be accepted at the discretion of the editors. It is advisable that potential authors contact the chief editor or a co-chief editor of a journal before preparing a review article or an article for one of the previously mentioned special departments; such articles are frequently

solicited from known and trusted authors, and over-the-transom submissions may be inappropriate.

Article length must be less than 7500 words of article text plus appendixes, or about 26 double-spaced pages. Occasional exceptions to this limit may be made by the chief editor of the journal, but require that the author submit a letter along with the submission, justifying the necessity of a longer paper. In any case, the decision of the chief editor on this matter is final.

Notes are much shorter research papers, occupying a few pages in a journal. There are no specific length guidelines.

The "Correspondence" section is for comments on articles or notes that have previously appeared in a journal. Correspondence generally consists of a "Comment" on an article or note, often followed by a "Reply" from the original author (see [Part I, section 4b](#)).

In addition, the *Journal of Climate* has recently instituted a "Letters" section. This section provides rapid publication of brief communications on important and timely topics of great interest to the climate research community. More information on the "Letters" section of *Journal of Climate* is available in the Editorial by David A. Randall in the August 1999 issue of the journal (page 2136).

All manuscripts must be written in the English language. Neither AMS editors nor staff have the time available to edit manuscripts that require extensive grammatical changes, as can sometimes be the case with authors from

non-English-speaking countries. While the AMS wishes to encourage the international exchange of scientific results through its journals, it requests that such authors make their own arrangements to ensure that submitted manuscripts are already in correct English. If not, their submissions may be returned unreviewed.

### **3. Components of a manuscript**

Manuscripts must be complete when submitted, and *all* pages must be typed double spaced on one side only, on paper approximately 28 cm x 22 cm (8.5" x 11"), with wide margins (about 2.5 cm on all sides). The font size used should be no smaller than 12 point, with a line spacing of no more than three lines per 2.5 cm. All pages must be numbered consecutively, starting with the title page. Tables and figures should be broken out and included at the end of the text in separate sections, as explained in [section 3a](#). Authors may incorporate figures and tables within the body of the manuscript for the reviewer copies only, but this should not be done in the copy forwarded for processing by AMS Headquarters. A sans serif font (such as Helvetica or Arial) should be avoided as there can be confusion interpreting some characters (e.g., lowercase "ell" versus the number "one") and the AMS reserves bold sans serif for matrix symbols. A common source of delay in processing a manuscript at Headquarters is that components of it are received with the text single spaced. To avoid the errors that are common when insufficient room is allowed to mark

instructions to the typesetters, authors are asked to replace single-spaced components of the manuscript with double-spaced versions.

#### a. Articles

The manuscript for an article should generally include all the components listed in the following sections in the order presented here.

##### 1) Title page

The title page should include the manuscript's title, the authors' names and affiliations, date of submittal, and corresponding author address. These items should appear on one page, in this order, separate from the remainder of the manuscript. The affiliations should be as concise as possible and will not constitute a complete mailing address, but the corresponding author address should be a complete address, *including e-mail address* (both the editor's office and the editorial staff at AMS Headquarters use e-mail extensively to expedite the publication process). The journal editor will add the manuscript receipt and acceptance dates.

##### 2) Abstract

The abstract should summarize the principal conclusions arrived at in the paper and the methods used to reach them. The abstract should be 250 words or less in length, typed double spaced, and should start on a new page immediately following the title page. The AMS tries to adhere to the ANSI/NISO Z39.14 standard for abstracts as much as possible. Therefore, unless absolutely essential, the abstract should contain no mathematical

expressions, should refrain from including citations or footnotes, and should not use the first person (see [section 4b](#)).

### 3) Text

The text should be divided into sections, each with a separate heading and numbered or lettered consecutively. Section and subsection headings should be typed on separate lines using the following format.

#### 1. Primary heading

##### *a. Secondary heading*

##### 1) TERTIARY HEADING

##### (i) *Quaternary heading*

New paragraphs should be indented. Avoid starting paragraphs flush with the left margin and separated by a blank line. This sometimes leads to ambiguity and errors in the typesetting of the paragraphs.

Underlining within the text is to be reserved solely for words to appear in italics.

Letters representing mathematical variables will be set as italics automatically and should not be underlined. Authors should, however, use italics for these quantities if their word processing capabilities allow. Mark a single *wavy* underline for vectors [which are set as bold roman type (e.g., **V**)] and a double *wavy* underline for matrices or tensors [which are set as bold sans serif type (e.g., **A**)], or set these items using these fonts. Mathematical terms not set as italics include uppercase Greek letters, most mathematical functions (such as  $\sin x$  and  $\ln x$ ), and most multiple-character quantities such as relative humidity

(RH), Richardson number ( $Ri$ ), and Prandtl number ( $Pr$ ). These quantities are set roman so that they will not appear to be products of variables (that is, so that the relative humidity RH is not confused with  $R$  times  $H$ ). Similarly, subscripts that are words or abbreviations (such as subscripts "model" or "obs") are normally set as roman even when the variable with the subscript is set italic. Authors who follow these conventions within their manuscript (assuming their word processing package provides for it) can expect fewer errors in their page proofs.

Citations in the text may regard standard or nonstandard references. *Standard references* are those that have been published in a refereed scientific or technical journal or a book. *Nonstandard references* are those from unrefereed publications, typically preprints, symposia, proceedings, technical reports, agency or institutional documents, or contract or grant reports. If a nonstandard reference is considered essential by an author, and there is not an equivalent standard reference, the material may be referenced. If the reviewers and editors will need to refer to as yet unpublished manuscripts to understand and evaluate the submission, the author should provide copies of each with the submission. The author should also be prepared to provide copies of nonstandard references at the request of the editor. See [section 12](#) for information on formatting citations in text and the corresponding references.

Information on style and acceptable units, symbols, formulas, and abbreviations is given in sections 4—9; information on figures and tables is given in sections 10 and 11.

#### 4) Acknowledgments

Keep acknowledgments as brief as possible. In general, acknowledge only *direct* help in writing or research. Financial support for the work done, or for an author, or for the laboratory where the work was performed, is best acknowledged here rather than as footnotes to the title or to an author's name.

#### 5) Appendixes

Material that is subordinate to the main theme of a paper, such as lengthy mathematical analysis, should normally be omitted. If inclusion is essential, however, it can be placed in an appendix. Appendixes can also be used to define symbols or other terms used in the text. If only one appendix is used, refer to it as "the appendix." If more than one appendix is used, each should be labeled consecutively with letters and referred to in text as "appendix A," "appendix B," etc. Figures, tables, equations, and footnotes that are located in an appendix are labeled according to the appendix letter (use "A" if there is only one appendix), followed by an Arabic number [Eq. (A3), Table B1, Fig. A1, etc.]. Appendixes should be given titles that are centered below the word APPENDIX (or APPENDIX A).

#### 6) References

All references referred to in the text are listed alphabetically (see [section 12](#) for more on ordering multiple references by the same author) without numbering at the end of the manuscript under the heading REFERENCES. References must be complete and in standardized form. See [section 12](#) for more complete instructions on formatting common reference types. It is especially important that references be double spaced because the reference section normally requires a considerable amount of mark up for the typesetters and single spacing does not allow room for this.

#### 7) Figure captions

Figures include graphs, illustrations, photographs, computer plots, and line drawings. Each figure should be provided with a legend or caption that makes the figure understandable without reference to the text. Each figure must be mentioned explicitly in the text and must be numbered in the order of first mention in the text.

All figure captions should be typed in double-spaced format and should be included in sequence on one or more manuscript pages, attached to the end of the text. Captions will be typeset and printed below the figure in a font that matches that of the text; therefore, captions should not be incorporated into the drawings, graphs, or other original artwork of the figures. The captions should, however, be included on the photocopies of the figures that are provided with the reviewers' copies of the manuscripts. (See [section 10](#) for more information on preparation of figures.) The typesetters may not be able to match exactly

symbols used in the figure itself, so the caption should refer to symbols or line types descriptively (such as "open triangle" or "dash-dot line") rather than using the symbols in the caption.

## 8) Tables

Each table must be numbered, provided with a legend, and mentioned specifically in the text. Each table should be typed in double-spaced format on a separate sheet of paper, with an explanatory caption typed above the table on the same page. All tables should be attached at the end of the manuscript, following the figure legends. Generally, tables will be typeset rather than photographed from the author's original copy. See [section 11](#) for more information on the proper preparation of tables. Large tables can become difficult to read when double spaced, so authors may choose to single space the tables used in the reviewers copies. For the copy forwarded to AMS Headquarters for processing, however, the tables should be double spaced to allow the substantial mark up that is typically required to prepare the tables for typesetting.

## 9) Footnotes

Footnotes should appear in standard format, double spaced, at the bottom of the manuscript page in which they are cited. Footnotes used on the title page will be set as nonnumerical symbols (\*, +, and #). Footnotes appearing in the text of the paper will be numbered consecutively throughout the text. Use of

footnotes should be held to a minimum, and potential footnote material should be incorporated in the text whenever possible.

#### b. Notes and correspondence

Notes and correspondence may not contain all the same components as articles. Thus, the author, editor, or reviewer may decide whether a note needs an abstract and whether the text needs to be divided into sections.

An abstract is desirable if the manuscript is longer than two double-spaced pages. Correspondence generally does not require an abstract.

Apart from these minor differences, however, notes and correspondence should be submitted in a format identical to that described previously for articles.

### 4. Style

#### a. Basic writing style

The need for brevity and clarity in writing has never been more acute. Johnson and Schubert (1989) pointed out over a decade ago that article length in AMS journals had nearly doubled in the preceding 20 years, and the situation has not improved. Instead of simply publishing longer articles or articles broken up into multiple parts, they argued, "A more attractive goal is conciseness in writing and presenting research results (not to the exclusion of essential details)." Authors who wish their work to be read, understood, and referenced must write in a clear, terse style. Geerts (1999) echoed these sentiments and

provided an analysis indicating that AMS journals are becoming less readable. Several suggestions leading to improved clarity are made by Geerts (1999), and authors are encouraged to read his paper, which is freely available through the [AMS Journals Online](#) site.

Manuscripts may be rejected for publication if they are considered to be poorly written. Indeed, one of the five criteria on which reviewers base their evaluations of a research paper is the clarity, conciseness, and organization an author shows in his or her presentation (see [Part I, section 4a](#)). Although editors and reviewers may offer advice on how the style and organization of a manuscript may be improved, it is not their function to rewrite manuscripts.

Authors are advised to consult a good general style manual, such as *The Chicago Manual of Style*, 14th ed. (1993), which is used as the primary general style guide at AMS. Authors whose first language is not English should seek the help of someone well versed in the English language. Indeed, those whose first language *is* English could often benefit from critical reading of manuscripts by colleagues.

#### **b. Impersonal construction and passive voice**

Use of the first person in sentence construction should normally be avoided in the body of the manuscript. This can often be accomplished quite naturally, through the use of passive construction, when stating facts. For example, use "the rainfall rates were measured using . . ." rather than "I measured the rainfall

rates using . . . ." The use of "we" is appropriate where it politely includes the reader, such as "We have already seen . . . ."

The first person should be used when directly stating opinions of the authors so that it is clear that these opinions may not be held universally. For example, the statement "It is believed that this phenomenon is a result of . . ." implies this is a widely held belief, whereas "We believe that this phenomenon is a result of . . ." clearly refers to the beliefs of the authors.

The first person may also be appropriate when comparisons are made to the work of others or when reporting on decisions that were made. For example, ". . . our calculated values are larger than those of Smith et al. (1998) . . ." or ". . . in view of the limitations of this approach we chose to use the following . . ." The acknowledgments are also a natural place for authors to use first-person construction.

As noted in [section 3a](#), impersonal construction should be used in the abstract of a paper. This is because the abstracts are disseminated in a variety of resources, such as *MGA*, in both print and electronic databases that often consist of a mixture of author-prepared and third-party abstracts. The use of "I" or "we" can be confusing in this context, so use "the author(s)" or impersonal construction.

### c. Spelling, punctuation, and capitalization

As a primary guide, AMS uses *Merriam-Webster's Collegiate Dictionary*, 10th ed. (1993), for the correct spelling of words. A technical field such as

meteorology or oceanography often has terms not present in the dictionary, however, and dictionaries often lag behind usage as terms evolve. To handle these more technical situations, the AMS editorial staff uses the American Institute of Physics *AIP Style Manual*, 4th edition (1990), and has created a word list to give consistent spelling of technical terms. This word list is included in [appendix A](#). The editorial staff monitors author usage of terms to identify words that appear to be evolving and may make changes to the word list to reflect this (often with input from the journals' chief editors).

Oxford English spellings will be changed to the appropriate American spelling in all instances except for proper names (such as the European Centre for Medium-Range Weather Forecasts).

In general, the guidelines of *The Chicago Manual of Style*, 14th ed. (1993) are followed for determining the hyphenation of terms. [Appendix A](#) gives many examples of hyphenated terms (especially those used as modifiers) in the word list and also provides information on the hyphenation of common prefixes and suffixes.

Serial commas should be used before the conjunctions "and" or "or" in a list of three or more items. Commas are not used in numbers except when the number refers to a monetary amount (e.g., \$10,000). For numbers with more than four digits, a space is inserted where the comma would normally appear (e.g., 4000, 10 000). This also applies to decimals (e.g., 0.000 01).

The proper names of locations and phenomena are capitalized (e.g., Lake Erie, the Gulf of Mexico, the Appalachian Mountains, the Gulf Stream). Regions and regional phenomena can also be considered proper terms and treated as capitalized (e.g., Lower Michigan, the Sun Belt, the Piedmont, the Great Plains, the Denver Cyclone). Note, however, that reference to these locations or phenomena by an abbreviated form of the name is lowercase. That is, we say "the Tibetan Plateau" (capitalized) and can refer to it later as "the plateau" (lowercase), or we can discuss "the Labrador Current" and later we could refer to it as "the current." There are a very few cases in which an abbreviated form of the name of a geographic location can also be considered a proper term. The AMS recognizes, for example, "the Gulf" as a proper term referring to the Gulf of Mexico, but this abbreviated form should only be used after the full form has been used and should not be used if there is any potential for misunderstanding (i.e., if more than one gulf is referred to in the paper). Northern Hemisphere, Southern Hemisphere, Eastern Hemisphere, and Western Hemisphere are all capitalized. The Tropics is capitalized, but extratropics and subtropics are written lowercase.

## **5. Units**

Use of the International System of Units [Système Internationale (SI)] is standard in all AMS publications. Although it is the intention of the AMS to adhere as closely as possible to the standard practices associated with SI

usage, some special considerations must be given to non-SI practices that can be defended in the interest of clear communication or on the basis of universal usage within a discipline. The following interpretations and practices will be followed by the AMS.

- Although the SI base unit of temperature is the kelvin (K), the Celsius temperature is widely used in meteorology and oceanography for observational, synoptic, and climatic work. Celsius temperature is equal to the thermodynamic temperature in kelvins minus 273.15 K and is expressed in "degrees Celsius" ( $^{\circ}$  C).
- The SI-derived unit for pressure is the pascal (Pa), but the millibar (mb) is the unit of pressure often used by meteorologists by international agreement and the decibar (db) is commonly used by oceanographers. The pascal [or the appropriate decimal multiple, such as the hectopascal (1 hPa=1 mb)] is the preferred unit for AMS journals, but the millibar (mb) is acceptable so long as the international meteorological community continues to use it officially.
- Logarithmic measures and their units such as pH, dB, dBZ, and Np are acceptable.
- Authors should use the roman capital "L" as the symbol for liter because the printed lowercased "ell," which is recommended under the SI standard, is easily confused for the Arabic numeral "one." The International Committee for Weights and Measures has accepted L as an alternative symbol.
- Although the SI unit megagram (Mg) is preferable, AMS accepts the use of the term "metric ton" (t). The qualifier "metric" is necessary, however, to distinguish the unit from the British "long ton" and the U.S. "short ton." This unit has also been called the "tonne," but AMS does not use this form.
- AMS accepts the symbol "n mi" for nautical mile, although this symbol is not recognized by the International Committee on Weights and Measures.
- In situations where the use of SI units would seriously impede communication, values expressed in more familiar units may be inserted parenthetically after the SI units. Similarly, in graphs, non-SI units may be used as a secondary coordinate scale if necessary for improving the reader's understanding of the results.
- AMS accepts the symbol "kt" for the unit of speed "knot" representing nautical miles per hour, but the corresponding speed expressed in SI units (normally in  $\text{m s}^{-1}$ ) should always be indicated as well.

Units should be set in roman font with a space between each unit in a compound set (e.g.,  $\text{m s}^{-2}$  rather than  $\text{ms}^{-2}$ ). Avoid using the solidus (/) to form unit combinations; use negative exponents instead (e.g., write  $\text{m s}^{-1}$  rather than  $\text{m/s}$ ). Words and symbols for units should not be mixed; if mathematical operations are indicated, only symbols should be used. For example, one may write "joule per mole" or " $\text{J mol}^{-1}$ ," but not "joules mole<sup>-1</sup>," "joules  $\text{mol}^{-1}$ ," or " $\text{J mole}^{-1}$ ." When numerical values are included in a unit combination (as is sometimes done when representing change over a vertical layer, such as a lapse rate), care should be taken be sure the combination is clearly stated. For example, use  $^{\circ}\text{C (100 m)}^{-1}$ , not  $^{\circ}\text{C}/100 \text{ m}$ .

Number–single-unit combinations used as modifiers should be hyphenated following the *AIP Style Manual* (1990). For example, we would hyphenate 500 hPa when referring to the "500-hPa temperature."

## 6. Mathematical expressions

Since correct typographical presentation is crucial to understanding equations, authors of mathematically oriented papers should prepare their manuscripts carefully to ensure correct and efficient typesetting. Before sending the final revised manuscript to the chief editor, the author should select one clear copy (preferably the original) and on the title page print the words "Copy for the Printer." The manuscript should then be read for legibility only. If the author feels there is any chance that a symbol might be misread, such as

misinterpreting a Greek rho for a roman  $\rho$  or a Greek nu for an italic  $\nu$ , the symbol should be identified with a notation in black pencil. It is generally sufficient to mark only the first occurrence of a special symbol, and papers prepared with good scientific word processing software rarely need additional marking. Such identification of symbols is imperative if symbols or equations are handwritten, but even perfect typing or the use of scientific word processing software does not always obviate this requirement. The letter "l" (ell) and the number "1" (one) are often hard to distinguish, so the author must make certain it is clear which is intended. [This shows up most critically in equations that may contain both 1 (one) as a number and l (ell) as a wavenumber.] Papers may be returned to the author if too many symbols cannot be properly identified.

The author should be aware that photocompositors such as those employed by the AMS have the capability of handling rather complicated mathematics and maintain sets of alphabets that include such added symbols as single and double overbars, tildes, carets, dots, etc. (see [Fig. 4](#)). Authors should feel free to use these alphabets and special symbols but should make certain their manuscript clearly indicates what is desired.

There are other important factors, however, in manuscript marking by the author. These include typeface and type font, particularly with respect to the use of vectors, matrices, and tensors. As stated earlier, vectors should be identified by a single *wavy* underline, which will be set as bold roman type (e.g.,

V), and matrices and tensors should be identified by a double *wavy* underline, which will cause them to be set as bold sans serif (e.g., **A**). No other mathematical symbols should be underlined.

Every equation or set of equations, except for very short single-level equations that can be set in the text, should be displayed—that is, centered on its own separate line. Equations should be numbered consecutively, with the numbers in parentheses set flush right against the margin. Simple fractions appearing in the text, but not in displayed equations, should use a solidus and parentheses if necessary to avoid ambiguities. That is, use  $1/(a + b)$ , not  $1/a + b$ . The following order should be used: parentheses, brackets, braces, and angle brackets  $\hat{a}\{[()]\}$ . When more than four groupings are involved, the sequence should be repeated. Identify special usage of brackets (e.g.,  $\hat{a}$ ) to mean some type of average) when they first appear so that it is clear that the unusual order is intended.

The use of the exponent  $\frac{1}{2}$  is preferred to the radical sign ( $\sqrt{\quad}$ ). Also, the use of negative exponents is preferable to fractions made with a solidus—that is, write  $ax^{-1}\cos y$  rather than  $(a/x)\cos y$ . If a paper has large numbers of notations and symbols, it is recommended that the symbols be listed in an appendix to the manuscript, with short explanations for each symbol. Use "exp" for expressions involving  $e$  modified by a complicated exponent.

The following symbols should be used to represent these common mathematical phrases.

$\approx$  approximately equal to

$\propto$  proportional to

$\rightarrow$  tends to

$\sim$  asymptotically equal to

$\mathcal{O}(\ )$  on the order of

$\mathbf{A}^*$  complex conjugate of  $\mathbf{A}$

A more complete discussion of the proper use of mathematical and physical symbols and equations can be found in the *AIP Style Manual* (1990, appendix F).

## 7. Abbreviations, acronyms, and numbers

Apart from standard abbreviations, which are listed in [appendix C](#), abbreviations (including most initializations and acronyms) should be defined at their first use in the text, such as "National Climatic Data Center (NCDC)." Since the abstract is printed separate from the article in secondary sources, such as *MGA*, abbreviations should be defined in both the abstract and the first occurrence in the text. When many acronyms or initializations are used in a paper, a list of their expansions as an appendix can be an effective aid to readers. Only very well-known and established acronyms or initializations, such as NASA, CISK, or GFDL, should be used in the title of the manuscript. Numbers should be spelled out in text through nine and written as a numeral from 10 on. An exception to this is when a sentence includes numbers in the

same context that are both above and below nine, in which case the numeral form should be used throughout. For example, use "2 out of 14 cases" rather than "two out of 14 cases." Numbers should also be spelled out when they start a sentence. The ordinal numbers for second and third are represented by the "d" alone when used in numerals (e.g., 22d or 23d); and ordinals, as with cardinal numbers, are normally spelled out for values below 10th.

## **8. Date and time conventions**

Day, month, and year are written in the form "29 March 1993" in AMS publications. Do not abbreviate the names of months. The recommended time zone annotation system is universal time, abbreviated UTC, which should be used in nearly all circumstances. Time, time zone, day, month, and year are written in the form "1409 UTC 29 March 1993." The use of other time zones [for instance, EST, EDT, PST, LST (local standard time), or LT (local time)] is permissible if it significantly adds to the interpretation of the material, but should be defined on first use. Do not use Z or GMT in place of UTC.

Astronomical or military time (i.e., a 24-hour clock) is required. While no colon is used between hours and minutes, a colon is included to separate minutes from seconds (e. g., 0537:15 UTC).

The month is always spelled out completely when dates are included in regular text. In figure captions and tables, however, the month is abbreviated to its first

three letters to conserve space (e.g., "Jan" or "Mar"). Authors may want to use a similar convention in figures for consistency.

For year ranges, do not include the century in the second year unless a transition of centuries is spanned (e.g., "1988–92" but "1887–1932"). A solidus is appropriate for indicating the calendar year transition for a period less than two full years, and the century of the second year should be omitted unless the century changes (e.g., "the 1988/89 winter," "the 1974/75 experiment period," but "1899/1900 winter").

## **9. Latitude and longitude**

Latitude and longitude pairs should be expressed in that order, for example, 41EN, 136EW. For locations on the globe at the equator, the Greenwich meridian, or 180E longitude, omit the hemisphere letter (e.g., 0E, 154EE; 33ES, 0E; or 57EN, 180E).

## **10. Figures**

Figures allow the reader to see both the actual data and the relationship between different sets of data. Figures should be prepared to emphasize points made in the paper and should not merely illustrate tabular material in graphical form. Well-prepared figures, properly reproduced, attract the reader's attention to a more easily understood source of information. A checklist and

summary of important information for the preparation of figures appears in [Fig.](#)

[5.](#)

There are basically two kinds of figures: line drawings and continuous-tone photographs. Instructions are given in the following sections for the preparation of each in both hardcopy or electronic form. Unacceptable figures are one of the major causes of delay in the publication of a manuscript.

#### [a. General instructions](#)

Figures should be carefully designed with attention to the fact that they normally appear in the journals in one of three widths: a single-column width of 7.9 cm (3.125"), a double-column width of 16.5-cm (6.5"), or a medium width between these two. A figure whose maximum dimension is 22.9 cm (9") may be placed broadside on the page (as long as it does not exceed the 16.5 cm page width). Broadside orientation is inconvenient for readers, especially in the online presentation, so the technical editors will use broadside orientation only when it is absolutely necessary.

Each figure should be carefully identified in a location that does not interfere with the reproduction of the figure, preferably on the back, with a figure number and the author's name. If identification is written on the back of a photograph, write lightly with a blue pencil. Please be sure to indicate which panel(s) of a multipanel figure are represented on each piece (for example, one sheet may contain Figs. 3a–c while a second piece may contain Figs. 3d–f). Also indicate

figure orientation on the back if there could be any question as to which is top or bottom.

Attempt to prepare related figures as a group. That is, if a series of sequential maps of the development of a storm are included, they could be offered as Figs. 1a, 1b, and 1c, all aligned vertically in a column and each designed to fit within the 7.9-cm width, or as side-by-side panels using the full page width.

The lowercase identifying letters (a, b, c, etc.) for each panel should appear in an upper corner (usually left) just above or just inside the panel. Do not place an identification letter so far outside the figure panel that the figure must be reduced additionally just so that the panel letter will fit inside the column or page.

Authors should place the identification letters on figure panels, but this will also be done as part of the typesetting process at the discretion of the technical editor. Never place the figure number within the figure itself. Do not include a border around a figure panel unless it is necessary.

#### **b. Line drawings and figures created using computer graphics**

Illustrators who prepare line drawings should model their work on well-designed figures published in recent issues of one of the AMS journals.

Line drawings can be either manually drafted or computer generated. They should be made with India ink or printed on a laser printer with a minimum of 300-dots-per-inch (dpi) resolution and should be made on a material that provides maximum black–white contrast with sharp edges and sufficient line

thickness to withstand reduction. Glossy photographic prints of final drawings are preferred if they are of high quality, with sharp, even lines and lettering. Any blurring in a photograph will be further exaggerated in the printed form. Low quality prints will be rejected, and commercial plain paper photocopies are often unacceptable substitutes for original drawings. Photocopies, however, can normally be used in the extra copies of papers required for review. In such cases, the editors will retain the glossy or original laser prints until a decision has been reached on publication of the paper.

Symbols and letters should be drawn so that the smallest will be at least 1.5 mm tall after reduction (though lettering can often be as small as 1 mm after reduction and still be very legible). A drawing that is 16 cm wide may be reduced to half its original size to fit in one column of a journal; in this case, the smallest symbols and letters should be at least 3 mm high in the original.

Authors must design figures and tables so that they are legible within these limits. [Figure 6](#) shows a drawing that, after reduction, has lettering that is too small for ease of reading and understanding. [Figure 7](#) shows an example of a graph with clear lettering and an appropriate legend within the figure.

Lettering should be simple in style, without serifs and with open areas that stay open with reduction (for instance, the open area of the number "6"). Freehand lettering is never acceptable. Most figures are currently computer generated and output on laser printers or with a plotter, but mechanical lettering, such as Leroy, provides simple and legible lettering, as do dry transfer letter sets, and

machines such as Kroytype can also provide acceptable lettering. Keep in mind that scalar variables in text will be set italic and vectors will be set bold regular font. Following this same convention in any labels that may occur in figures will improve the correspondence between the figure and the text. Authors should try to avoid great disparities in the thickness of lines and in the size of symbols and letters. This has become a common problem with the advent of computer plotting routines that allow a wide variety of letter fonts and sizes to be used in the same figure. Major disparities are awkward in themselves and are not eliminated by photographic reduction in the printing process. Thus, thin lines may be broken or lost upon reduction. The thinnest line that can be reproduced consistently well after reduction is one 0.5 pt thick (approximately 0.017 cm or about 0.007"), so authors should routinely set their graphics programs to create lines at least twice this thick. Open or half-closed symbols tend to close up or become indistinct on reduction, so they should be drawn slightly larger than comparable symbols that are closed. Letters used for subscripts and superscripts should be approximately 75% of the size of the principal lettering.

Do not use open symbols with dots in them since they may appear to be filled symbols after printing. To ensure legibility after reduction, give decimal points a diameter about 1.5 times the thickness of the lines in the lettering.

Graphs should be self-explanatory, their purpose being evident without reference to the text. One should indicate clearly what is being plotted, on both

the vertical and horizontal axes. The figure caption should provide sufficient information for the reader to understand what the figure is intended to show. Coordinate rulings should be limited in number to those necessary to guide the eye in making a reading to the desired degree of approximation. Ticks to indicate coordinate values may be placed on all four sides of the graph to increase readability and are recommended. Place numbers and letters so that they may be easily read from either the bottom or the right-hand side of the graph.

Relevant nongraphic material, such as keys to the symbols in the graphs, may be included in the graph itself if it fits without too much crowding (see [Fig. 7](#)).

Otherwise, such material should be in the caption. Take care to preserve standard forms for symbols and abbreviations, particularly of units. Symbols of SI units should be lettered as lowercase or capital letters as specified by the SI standard, and variables or vectors used in the figure should be set in italic or bold nonitalic font, respectively, following the style that will be used in the text.

Shading in figures in the form of screens or halftones (i.e., gray shades made up of small dot patterns) can sometimes reproduce poorly as a result of the scanning process used at press. Very small dots may not be picked up, ink bleed may cause nearly black areas to become black, and aliasing between the original's dot resolution and that of the scanner can result in moire patterns in the final printed image. These difficulties can be avoided by using a "screen" or "mesh" size no finer (after reduction) than 70 lines per cm (175 lines per

inch) and by using "fill" densities that are not less than 10% or greater than 70%. Computer-generated figures using screens or halftones should be printed on a laser printer with at least 600 (dpi) resolution (or the screens should be set coarser than indicated here). Please submit the original figure generated by the computer printer and not a photocopy of it to ensure the best possible reproduction.

Diagonal or cross-hatch lines for shading often reproduce best. High quality commercial products that produce uniform cross-hatching through dry transfer are readily available. [Figure 8](#) shows an example where both screening and cross-hatching were used effectively.

### c. Continuous-tone photographs

Continuous-tone photographs are standard color or black-and-white prints, such as one gets back from the photo lab; they are characterized by virtually continuous variation in color or shades of gray. This continuous variation is impossible to reproduce in the printing process; photographs are printed instead using halftone reproduction. In this process, the photograph is converted to a pattern of dots through a scanning process. The quality of the reproduction depends on the scanning resolution and the type of paper used for printing. A technical editor may choose to print a section of the journal issue on coated (glossy) paper in order to improve the print quality of halftone photographs in that section of the journal.

Ultimately, the quality of reproduction depends on the quality of the original photograph submitted. Photographs should be clear and crisp, with details sharply in focus. They should be submitted on glossy paper. Since contrast is often lost in reproduction, the original photograph should have somewhat more contrast than is desired in the printed photograph.

Continuous-tone photographs submitted with superimposed screens, thin lines, or very small lettering, are very difficult to process and may not reproduce well.

The interaction between the dot pattern on a superimposed screen and the halftone pattern created during the scan can yield moire patterns. The halftone process also blurs somewhat the edges of superimposed lines or lettering, and this is much more noticeable in the final printed reproduction if the lines were thin or the lettering small. Thus, lettering used to identify components directly on a photograph should be large and bold so that it will withstand both reduction and the halftone process. Lettering should contrast with the background—that is, black lettering should be put on a light background, and white lettering on a dark background.

Photographs of standard apparatus in a laboratory are not instructive and should not be submitted. A good line drawing of the apparatus, amply and clearly labeled, is almost always more informative than a photograph.

#### d. Color illustrations

The journals and *Bulletin* regularly publish color photographs and illustrations.

Authors should be aware that color illustrations are considerably more

expensive to reproduce than black-and-white illustrations. Although black-and-white photos can be included in a manuscript with no additional page charges, the high cost of processing and printing color images requires a substantial increase in the page charges passed on to authors. Author charges for color illustrations are made by the "piece" rather than by the page or figure, which reflects the structure of the costs incurred by AMS. A piece is defined as a figure if it is all one photographic print or piece of paper or any loose portion of a figure, such as a figure panel submitted separately from other panels of the figure. Remakes of black and white figures not necessitated by press error cost \$22 each; for color figures the charge for a remake is \$154.

Authors may want to plan their color figures in ways that reduce the number of pieces, such as having multiple-panel figures laid out and shot as a single photographic print. Care should be taken, however, to ensure that a multiple-panel figure of this type will accommodate layout on a single page.

Multiple panel figures that must span two facing pages must be submitted as at least two pieces to allow this layout. In addition, authors should not submit more than one numbered figure on a single piece, even if the figures are consecutive in number. This is because the page layout may require the figures to appear on separate pages, and even if they appear together each figure must have a caption added to it.

In general, all figures should be submitted at the size they will appear and on glossy prints rather than color slides. The best reproduction of color figures is

often a result of the author submitting figures as electronic files (if they were originally generated in electronic form) on either diskette or via FTP (see [section 10e](#)).

The current author charges for color, which are assessed in addition to the regular page charges for the article, are \$700 for the first piece, \$500 for the second piece, and \$200 for each additional piece. The higher charges for the first two pieces incorporate the costs associated with the press setup for color. The press costs for additional color production in the same article are small, and the charge per piece after the third piece reflects mostly the color separation charges for that piece.

Articles published in the *Bulletin* are subject to the same charges for color except that the first piece charge is \$1100, reflecting the higher press setup charges incurred by the AMS for *Bulletin* printing. Color covers for the *Bulletin* are more expensive to produce and have a charge of \$2050 to authors supplying the color cover. (Contact the *Bulletin* technical editor for more information on supplying cover illustrations.)

Figures that contain just one or two colors in addition to black and white do not offer savings in processing or printing compared to full color figures. Author charges for these figures are, therefore, the same as those for full color figures.

Because of the high cost, authors may wish to seek alternatives to color where possible. It should be noted that while the inability of an author's institution to

honor page charges will not prevent publication of a paper, an attempt is made to secure a commitment to the page charges prior to processing color illustrations. If page charges cannot be honored, the technical editor of the journal will work with the author to find a suitable way to present the illustrated material in a black-and-white format.

#### e. [Electronic submission of figures](#)

It is now possible for the AMS to take advantage, in many cases, of the electronic files used by authors to create computer-generated figures directly in the composition process. Using these files can often lead to a higher quality of reproduction in the journals and represents an efficient use of the electronic medium. The following serve as guidelines for electronic submission of figures. Authors should feel free to contact the technical editors at AMS Headquarters if they have questions. The following general guidelines apply in addition to those in [Fig. 5](#).

- Authors should not, in general, submit the electronic files containing their figures with their submission. Instead they should indicate in their letter to the editor or in a note on the press copy of the manuscript that the figures are available as electronic files. The technical editor will contact the author by e-mail with instructions on providing the electronic files via FTP transfer to press at the appropriate time.
- Authors should submit their files in electronic form only if their figures were created that way to begin with—that is, authors should not submit scanned

images of hardcopy figures because the AMS typesetters can, in general, process those hardcopy figures in ways that optimize their reproduction in the printed journal. Also, figures created with vector graphics should be submitted as files with the vector information rather than as bitmapped image files.

- Authors should always supply high quality originals of all their figures, including those being submitted electronically, so that the hard copy can be used if the electronic files prove to be unusable. The electronic versions must match the hard copy in each dimension because the hard copy is used by the technical editor to set the size of the space on the page reserved for the figure.
- As with all figures, authors should take care to consider the final size and layout of the figure. Most figures will be reproduced at either column width (7.9 cm, 3.125 in.) or double-column width (16.5 cm, 6.5 in.). The electronic file should contain the figure at a size as close to final reproduction size as possible. All text, including axis labels, contour labels, and symbols, should be sized so that it will be easily readable at the final reproduction size, and authors should avoid use of text of very different size within the same figure.
- Authors should make sure that the electronic representation of the figure is closely cropped both vertically and horizontally. That is, the electronic representation should contain as little white space around the figure as possible.
- Each figure should be saved as a separate file with a logical name that will help the typesetter identify the correct file for each figure.

- When submitting electronic color images, indicate the color file format used and include a four-color proof of sufficiently high quality to serve as an original if necessary.
- Uncompressed files are desirable; however, when necessary, the following compression software can be used to save the images onto transportable media: Stuffit or Stuffit Delux, PKZip, Aladdan, DiskDoubler, or a self-extracting archive. Indicate the compression program used and its version number with the submission.
- If the graphics software used allows compression at the time of output as an encapsulated PostScript (EPS) file, this option should not be used. Instead, output the file without compression and then, if necessary, use a separate compression routine on this file.

A variety of formats can be accepted. Line art should be submitted in encapsulated PostScript (EPS), in either vector or bitmapped form, or TIFF, with bitmapped figures having 300–600 dpi resolution at the size the figure will be printed. Additionally, AMS can accept the actual application files from the program used to create the figure if it was created in a Macintosh or Windows environment with Adobe Photoshop, Adobe Illustrator, or Aldus Freehand. Black-and-white halftones should be submitted in EPS or TIFF. Color figures should be submitted in CMYK EPS or CMYK TIFF. RGB EPS and RGB TIFF do *not* reproduce well and will not be accepted. Note that PostScript files, such as those generated by the National Center for Atmospheric Research graphics

translator, that are not encapsulated PostScript are not acceptable. PostScript files can often be imported into another graphics utility, such as Adobe Photoshop, and resaved as an EPS file, which can then be submitted to AMS. While AMS prefers to have electronic figures transferred to press via FTP, figure files can be submitted on any form of DOS diskette, Mac diskette (3.5" low or high density), SyQuest (44 or 88 MB), Bernoulli 90 MB, 8-mm Exabyte UNIX-format tar (2.3 or 5 GB), Q150 cartridges (UNIX tar), or Canon Magneto-Optical (600 MB). If figures are submitted on physical media, indicate the platform and operating system used to create the files and media. Be sure that the media matches the operating system and platform used to create the file. (For example, do not submit a figure file originally generated with Windows software on a cartridge written with a UNIX machine.)

The preferred means of obtaining electronic figures from an author is via FTP transfer. If authors have electronic versions of their figures available for FTP transfer, they should indicate this in the letter accompanying their revised manuscript. They should *not* FTP the figures to AMS at the time of their submission unless they are submitting the entire manuscript electronically as discussed in [section 14](#). A technical editor will contact the author via e-mail to arrange for the FTP transfer of the figures directly to press at the appropriate time in the production process. In some cases, a technical editor may contact an author to see if a figure is available electronically, even when the author has not indicated it to be, in order to obtain the best possible reproduction.

## 11. Tables

Tables are a commonly used method of presenting information in AMS journals. Their arrangement and conciseness greatly aid in the understanding and transfer of information to the reader. Tables can be judiciously arranged to minimize use of space, a subject of concern to editors, authors, and readers. Each table should be typed in double-spaced format on a separate sheet of paper. While tables can be embedded in text for the copies for reviewers, they should *not* be embedded in text in the copy forwarded to AMS Headquarters for processing. Such embedded tables can lead to errors in the typesetting of the manuscript. Tables are to be numbered consecutively using arabic numerals in the order they are mentioned in the text. No table will be accepted unless it is mentioned in the text. All units of measure in tables should be SI units (see [section 5](#)—for limited exceptions).

The general style of tables for the AMS journals is shown in Tables 1, 2, and 3. Tables that can fit into one journal column are a particularly efficient use of space (see [Table 1](#)), but wider tables can be set for the full-page width (see [Table 2](#)). If abbreviated column headings are used to allow a table with several data columns to fit in one journal column, provide definitions of the abbreviations as part of the column, such as in [Table 3](#), so that readers need not search through the text for definitions.

Note that Tables 1 and 2 are nearly self-explanatory because of well-chosen column headings and sufficient text in the table heading. Notice also that the

units for all entries are clearly indicated. [Table 2](#) shows the proper use of footnotes within tables, with the footnote indicated by a sequence of superscript asterisks. If there are more than two footnotes, lowercase superscript letters should be used instead of asterisks.

Each table should have a caption that is positioned at the top of the table.

Captions should be brief but sufficient to make the table contents clear.

Column headings should be clear and concise. Capitalize the first word of a heading but use lowercase letters for all other words except proper terms. Use horizontal lines in tables only to separate headers from the body of the table, as shown in Tables 1–3, and not between each line of the table. Do not use vertical lines but instead use appropriate spacing. A blank line can be used to separate blocks of data within a table that the author wishes to group together.

## **12. Citations and references**

### **a. General guidelines**

Much of the costs incurred during the corrections made to the page proofs are associated with updating the references (and often the citations in text to them).

In some cases, this cannot be avoided since additional information on recently published articles may not have been available at the time the author completed the revisions to the manuscript. In many cases, however, the author has supplied incomplete references or has not included references that were cited in text and this information needs to be requested of the author on the

page proofs. If authors take care to ensure that their references are complete at the time the revised manuscript is sent to the editors both time and money can be saved during composition.

The AMS editorial staff puts a great deal of emphasis on getting the references correct for several reasons. First and foremost, the references are intended to lead readers to other relevant work and if they are not complete or in error, readers may be unable to find the material being cited. Also, the reference section is used for citation reports, which have become increasingly important as a measure of the impact of an author's work. Incorrect references do not allow the citation services to correctly index citations. Finally, in the online version of the journals, the information contained in the references can often be automatically parsed to create embedded links to the abstract and full text of the article being cited. This can only be done if the reference information is complete and correct.

#### **b. Citations in text**

Citations to standard references in text should consist of the name of the author and the year of publication—for example, Smith (1990) or (Smith 1990). If there are three or more authors, state the first author's surname, followed by "et al." and the year of publication—for example, Smith et al. (1990) or (Smith et al. 1990). When there are two or more papers by the same author or authors in the same year, distinguishing letters (a, b, c, etc.) should be added to the year in both the citation in text and the reference listing—for example, Smith

(1990a). For multiple citations by one author, separate years by commas—for example, Smith (1989, 1990) or (Smith 1989, 1990). Separate multiple citations by different authors within the same parentheses by semicolons—for example, (Smith 1990; Jones 1991) or (Smith 1989, 1990; Jones 1991).

When a citation in text needs to refer to a specific section or chapter, this should be included after the year, preceded by a comma—for example, Smith (1996, chapter 7), Smith (1997, section 3.22), or (Smith 1977, section 3.22).

Do not include the chapter in the citation if that chapter is explicitly identified in the reference itself (as in the case of a chapter of a multiply authored monograph). If a specific page or page range needs to be cited, this should also follow the year, preceded by a comma—for example, Smith (1996, 235–237). If a single page is cited, insert a "p." before the number—for example, Smith (1996, p. 125).

Nonstandard references should be used only if they are essential to support the author's arguments or to give proper credits. When required, the same form of text citation is used. References to personal communications should appear only in the text and should include initials and year—for example, D. E. Smith (1982, personal communication) or (D. E. Smith 1982, personal communication). It is sometimes necessary to make reference to information that is located on the Internet. Internet files do not, however, have the permanence of traditional publications and are therefore generally considered nonstandard references. Reference to files, information servers, or World Wide

Web sites should be made parenthetically, and should contain the complete Uniform Resource Locator (URL) for the document or server.

Manuscripts that have been submitted to a journal but not yet accepted for publication cannot be included in the reference listing and must be cited in text in a manner similar to personal communication—for example, Smith (1998, manuscript submitted to *Mon. Wea. Rev.*). Manuscripts that have been accepted and are currently in the process of being published can be cited as regular references and should be listed in the reference section with "in press" replacing the normal page range information. In both the case of submitted manuscripts and articles in press, authors will be asked to provide an update on the status of the reference with their page proofs. Submitted manuscripts that have been accepted by that time will be converted to "in press" references, while those that had been in press can often have their complete publication information included. Note that "conditional acceptance" from an editor does not qualify for a manuscript being listed as "in press." A manuscript is truly "in press" only when it has been accepted in final form and forwarded from the editor to the publisher for processing (such as when an editor forwards an AMS journal manuscript to AMS Headquarters).

### c. Reference format

The AMS reference style for typical journal citations follows the general form Author(s), publication year: Article title. *Journal name*, volume, page range. and for a book it follows the form

Author(s), publication year: *Book Title*. Publisher, total pages.

There are, however, many variations on these basic formats to account for the many types of publications that can be referenced. A complete guide to reference formats is provided in the [AMS Guidelines for Preparing References](#).

Authors are requested to follow this format to the best of their ability to reduce the level of markup required and to expedite the processing of manuscripts.

Journal titles in references are abbreviated following standard abbreviations.

[Appendix B](#) provides a list of commonly cited journals and the form of abbreviation for their title that should be used in the reference. A more complete listing of journal abbreviations is available in the *Chemical Abstract Service Source Index 1907–1994 Cumulative* (1994), which serves as the standard reference for AMS publications for any journal not listed in [appendix B](#). Standard abbreviations for other terms frequently part of references are given in [Table 4](#).

Non-English-language article titles in the reference list must be followed by the translated title in parentheses. Alternatively, only the translated title can be given, but this must be followed by a statement in parentheses giving the language in which the article was published—for example, "(in Russian)."

Foreign language journal names in Russian must be given in transliterated form.

Section letters, where appropriate, are to be included with the volume—for example, *Philos. Trans. Roy. Soc. London*, **A200**. Issue numbers should be included only if omitting them would lead to a possible ambiguity.

References should be ordered alphabetically by the last name of the first author. When there is more than one reference by the *same* first author, use the following sequence to order them: all singly authored papers first, arranged chronologically by year of publication; followed by papers authored by that first author with only one coauthor, chronologically by year; followed by papers authored by that first author with two or more coauthors, chronologically by year.

For references with more than eight authors, list only the first author by name followed by "and Coauthors" (e.g., "Smith, J., and Coauthors, 1998: Title of article ..."). Note that it has been confirmed with the Institute for Scientific Information that all coauthors on a paper listed in this manner in an AMS journal receive proper citation credit for the reference.

### **13. Submitting manuscripts to AMS**

When an author has decided which journal is most appropriate for the publication of his or her manuscript (see Part I, section 3), the following materials should be submitted electronically (see section 14). The material will be checked to see if the requirements described in Fig. 2 are met, and qualifying manuscripts will be forwarded to the relevant chief editor to begin

the peer-review process. During 2005, AMS is making a transition between having this qualifying step done in the field and having it done at AMS Headquarters. Thus, if the author cannot submit electronically, then hard copies of the material either should be sent directly to AMS Headquarters for the Bulletin, JCLI, WAF, and MWR or should be sent to the chief editor of the journal for JPO, JAM, JHM, JAS, and JTECH. This division will be updated as necessary during 2005. The addresses can be found on the inside cover of a recent issue of the journal. If an author does not have access to a recent issue of the journal, the proper address can be found by contacting the AMS [45 Beacon Street, Boston, MA 02108-3693; telephone (617) 227-2425; fax (617) 742-8718; e-mail: [amspubs@ametsoc.org](mailto:amspubs@ametsoc.org)]. These addresses are also available on the AMS Web site. At this time, with the exception of the journals mentioned above, do not send manuscripts directly to AMS Headquarters.

· Cover letter. The letter should include the title of the manuscript; authors' names; name, address, e-mail address, and telephone and fax numbers of one author (usually the lead author) to whom future correspondence should be addressed; and the section of the journal (Artic

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