1. Hyphenation

The main reason for hyphenation is increased clarity.

1.1. Attributive Adjectives

Always hyphen. The following should always be hyphenated as attributive adjectives:

1. Noun + present or past participle

   English-speaking people  U-shaped tube
   sulfate-containing aerosols  e-folding layer
   sediment-filled streams  hand-drawn graphs
   V-shaped weir

   If the noun in the combination is modified, AGU preference is no hyphen unless you are trying to match a similar combination elsewhere in the paper; then use a hyphen between the modifier and the noun and between the noun and the participle. For example, if "field-aligned" appears in the paper, you should hyphen "magnetic-field-aligned":

   magnetic-field-aligned irregularity or magnetic field aligned irregularity

   Office style considers some noun + present or past participle combinations in the predicate to be passive verb forms, so they must be hyphened to make it clear that they are performing as a unit:

   sediment-filled Fourier-transformed
   Doppler-shifted band-pass-filtered

2. Adjective + present or past participle (except compass directions)

   straight-sided vessel  coarse-textured grain
   lunar-orbiting satellite  good-sized sample

   Do not hyphen if the adjective is modified by an adverb:

   more coarse textured grain
   very fine grained

3. Verb + preposition or adverb (unless closed up or opened in dictionary (use the current Webster's Collegiate Dictionary and then Webster's Third International Dictionary and the Addendum)(see pp. 230-231 in Words Into Type 1974 edition (WIT))

   hollowed-out
   speeding-up

4. "Well," "ill," or "little" + past participle

   well-known theorem  ill-defined term
   little-known derivation

   Do not hyphen if the combination is being used as a predicate adjective or if well (ill, little) is modified by an adverb:

   very well known model
   less well defined terms

5. Preposition + noun or adjective

   near-surface reaction  behind-arc spreading
   near-normal wave mode
6. "Quasi" + adjective or adverb (Also hyphenate as a predicate adjective.)
   
   quasi-linear expression
   
   When quasi is used with a two-part adjective, quasi can stand by itself:
   
   quasi steady state system
   quasi self-consistent model
   
7. "Self" compounds (Also hyphenate as a predicate adjective. Check the dictionary for approved closed forms.)
   
   self-sustaining reaction
   
8. "Cross" compounds (Check dictionary for approved closed forms.)
   
   cross-L sweep cross-section(al) diagram
   cross-correlation function
   
9. "All" compounds (Also hyphen if the combination is being used as a predicate adjective.)
   
   all-inclusive program
   all-salt deposit
   
10. "No" compounds (Also hyphen if the combination is being used as a predicate adjective.)
    
   no-flow boundaries
   
11. Fractions
    
   two-thirds part
   
12. Temporary compounds formed by adjective + noun indicating number, dimension, or quality. These examples are not all-inclusive.
    
   Cardinal number + noun or adjective
   
   zero-base budgeting
   one-dimensional figure (k-dimensional model)
   two-fluid response
   
   Ordinal number + noun
   
   nth-order equation second-order equation
   
   Single, double, triple, multiple, half, etc., + noun
   
   single-chain reaction
   multiple-layer model
   
   High, middle, low, medium, long, short, large, small, intermediate, etc., + noun (but not upper and lower)
   (hot/cold and/or thick/thin may be hyphenated, follow usage)
   
   high-energy particles
   middle-latitude stations
   
   Follow the author for combinations such as the following (do not hyphen if adjective is modified by an adverb: very high frequency signals):
   
   low-P region
   low-Mg samples

If you have both combinations in a paper (one modified by an adverb and one not, such as "high-frequency waves" and "very high frequency waves"), do not treat them similarly (i.e., do not hyphen both or leave both open). The presence of the adverb in the second combination makes the difference. For combinations such
as the following, preference is for no hyphen unless you are trying to match a similar combination elsewhere in the paper; then use two hyphens. For example, if "high-resolution" appears in the paper, hyphen "high-vertical-resolution."

Also hyphen regular -er and -est comparatives and superlatives of these adjectives when they are used in combination with nouns:

- higher-energy particles
- lowest-latitude sample

13. Colors in combination
- bluish-green overlay
- blue-gray particle

14. Attributive adjectives formed by a noun plus one of the following or similar words:
- type
- (in)dependent
- free
- odd
- invariant
- soluble
- rich
- wide (check dictionary for solid words)
- synchronous
- specific
- only
- scale
- variable

For example,
- pH-dependent finding
- Fe-rich deposit (very Fe-rich deposit; very is modifying Fe rich, not just Fe)
- C- and N-rich deposits (but do not use C-rich and -poor deposits)
- grain-size particle

These combinations are also hyphenated if they are used as predicate adjectives.

Never hyphen. The following combinations should never be hyphenated as attributive adjectives:

1. Irregular comparatives or superlative + participles or nouns
- best known theorem
- worst liked person
- least known derivation

2. Foreign phrases
- a priori solution
- per mille basis
- in situ technique

3. Adverbs ending in -ly + adjective or participle
- slowly flowing stream
- highly complex approach

4. Chemical compounds
- ferric oxide layer
- sulfuric acid residue

5. Light or dark + colors
- light blue house
- dark red hue

6. Compounds indicating direction or placement
- north central Utah
- upper right corner
7. Adverbs ending in -ward + participle
   westward moving currents

8. Compass directions + present or past participles
   northeast trending
   south directed

9. Temporary compounds used as attributive adjectives formed by noun + noun or adjective + noun (see
   Word List at end of guide and dictionary for exceptions)
   plasma flow region
   wake surface potential

10. Permanent compounds (formed by noun + noun or adjective + noun that are used so often that they can
     be considered permanent compounds; many may be listed in the dictionary or the Word Llist)

    | solar wind          | computer programing | electric field |
    | magnetic field      | data processing     | ion cyclotron |
    | cosmic ray          | pitch angle         | steady state  |
    | soil water          | atomic oxygen       | quiet time    |
    | linear programing   | atomic nitrogen     | sporadic E    |
    | molecular oxygen    | molecular nitrogen  | V notch       |
    | $F$ region          | $\gamma$ ray        | $x$ component |
    | $P$ wave            | $x$ axis            |               |

Hyphen optional. In a given paper, follow usage to hyphenate or not hyphenate the following categories
of attributive adjectives.

1. Phrases that act as attributive modifiers
   - signal-to-noise ratio
   - month-by-month computation
   - order-of-magnitude change

   If phrases are listed in the dictionary with hyphens, the hyphens are mandatory and should be added:
   - day-to-day variation
   - one-to-one basis

2. A hyphen in past/present participle + noun combinations should be left to avoid ambiguity:
   - charged-particle fluxes or charged particle fluxes

3. Numeral + unit of measure
   - 2-cm pipe
   - 5-foot (~1.5 m) booms
   - 1-km-wide trench
   - 5-year-old record
   - 6-mm-diameter tube
   - 9-year-old pine plantation
   - 6-mile-wide highway
   - 10- to 20-km-wide area

   Note that two hyphens should be used only when the second word is a dimension (diameter, wide) or involves
   age (old), but do not hyphen 9 Ma as attributive: the 9 Ma trench. Do not hyphenate with compound units:
   15 km s$^{-1}$ velocity.

1.2. Nouns
In general, new compound nouns are spelled without hyphens. Check dictionary for permanent compounds listed there. If word is not in the dictionary and is not in the "Always hyphenate" or "Close up" categories below, open up as two words.

**Never hyphenate.** The following combinations should always be open when they act as nouns in sentences:

1. Noun + gerund
   - problem solving
   - data logging
2. Fractions
   - one half
   - two thirds

**Always hyphenate.** The following combinations should always be hyphenated:

1. "Self" compounds
   - self-knowledge
2. Quasi + noun (unless open or closed in the dictionary)
   - quasi-response
   - quasiperiodic

   When quasi is used with a two-part noun, quasi can stand by itself:
   - quasi steady state
   - quasi self-help
3. Verb + preposition (unless closed up in the dictionary)
   - short-out
   - drop-off
4. Noun or adjective + "like"
   - floor-like or floorlike
   - kelyphite-like or kelyphitelike
   - but taillike (see dictionary)

Hyphen if the noun ends in "ll" or is a proper noun:

- bell-like, not bellllike
- Mars-like, not Marslike
Close up. The following combinations are always closed up:

1. "Fold" compounds

   tenfold   multifold

   Use numeral and hyphen if a hyphenated number would precede fold:

   125-fold

2. "Glow" compounds

   dayglow  nightglow  airglow

3. "Side" compounds

   dayside  duskside  frontside
   nightside  noonside  backside
   downside  topside  underside

1.3. Words Formed With Prefixes

1. The following are some common prefixes:

   pre-, post-, un-, non- re-
   intra-, extra- semi- multi-
   infra-, ultra- pseudo- micro-, macro-
   sub-, super- supra- mini-, maxi-
   pro-, anti- co- mid- (but mid-ocean)

   This is not an inclusive list. Check dictionary for other prefixes and closed up forms. Note that “over” is a prefix, but “under” is not. Also, “fore” is a prefix, but “back” is not. Up and down are not prefixes.

2. Spell all words formed with these prefixes closed unless (1) the prefix precedes a capitalized word or a numeral (mid-Cretaceous, post-1950); (2) a homograph is formed (recover versus re-cover, to cover again; remark versus re-mark, to mark again); or (3) the same vowel would be repeated (intra-aggregate, semi-infinite), except co-, de-, pre-, pro-, and re- may be set closed even when a double vowel forms (preexist); but hyphenate if triple vowel results. Check dictionary for hyphenated words (un-ionized).

3. Use an en dash if the second element is a proper noun or proper adjective consisting of more than one word (pre–World War II, post–Civil War period).

4. Use two hyphens if the second element consists of more than one word (hyphened) (non-time-homogeneous equation, non-English-speaking people).

5. If the second element contains more than one word and is a combination that we never hyphen, match the solution to the type of prefix:

   (1) Post-, pseudo-, and mid- can stand alone if necessary (i.e., can function as adjectives or adverbs); therefore use

   pseudo magnetic field
   post cosmic ray event
(2) Other prefixes are only in the dictionary as combined forms and cannot stand alone:
   In some cases the meaning will permit the prefix to be attached to the first word of the second element: nonsteady state.
   In other cases, use an en dash or rephrase: pre-solar wind or before the solar wind. Another option is to use two hyphens even though the element containing two words is not usually hyphenated (e.g., pre-main-sequence).

6. When multiple prefixes precede the same base word, the prefixes should not stand alone; e.g., use preseismic and postseismic, not pre- and postseismic. Change mid- and high-latitude (as adjectives) to midlatitude and high-latitude or middle- and high-latitude.

1.4. Words of Equal Weight

A hyphen is used to connect words of equal weight. Usually, they are connected because they have an "either-or," "from-to," or "between-and" relationship:

<table>
<thead>
<tr>
<th>wave-particle interaction</th>
<th>noon-midnight value</th>
<th>plant-soil system</th>
</tr>
</thead>
<tbody>
<tr>
<td>air-sea interface</td>
<td>north-south range</td>
<td>time-space plot</td>
</tr>
<tr>
<td>desorption-absorption</td>
<td>precipitation-dissolution</td>
<td></td>
</tr>
</tbody>
</table>
2. Commas

A comma should be used to clarify meaning. AGU uses the open punctuation style, that is, using only as much punctuation as necessary for clarity. Do not use balancing commas. Generally, commas are used around, before, and after nonrestrictive clauses and phrases. A nonrestrictive clause or phrases is one that could be omitted without changing the meaning of the sentence. Because of the technical nature of the material in AGU journals, it is sometimes difficult to be sure if a phrase or clause is nonrestrictive; follow usage in these cases. This section lists correct usage examples and house style. See WIT and Chicago Manual of Style for grammatical rules concerning comma usage.

2.1. Examples of Correct Usage

Use a comma

After the results were computed, we made a log plot of the data. (introductory adverb clause)
Using the data, we constructed a graph. (participial phrase)
To confirm the results, a second experiment was planned. (infinitive phrase)
The results being in question, the experiment was repeated. (nominative absolute)
In general, the results from the two studies are in agreement. (sentence modifier)
Initially, the current meters produced ambiguous data. (adverb ending in -ly)
After launching the satellite, scientists followed its trajectory by radar. (no strong natural break)
In the references above, the reader may find further details of the methodology used here. (could be misread)
After reweighing, the samples were subjected to further tests. (ends in verb form)
We performed the experiment at room temperature, but the results were not as good. (compound sentence)
In the cool, humid climate the plants thrived. (coordinate adjectives)
The samples were collected in a glass beaker, which had been washed, dried, and weighed. (nonrestrictive)
The data, the number of echo soundings per second, were entered into the computer. (nonrestrictive appositive)
The distance per unit time, or velocity, is important to this calculation. (nonrestrictive appositive)
While a few were sandstone, the rocks were mostly granite. (introductory subordinate clause)
Papers based on data from Pioneers 10 and 11 conclude that a magnetic field decreases, while papers based on the data from Voyagers 1 and 2 are consistent with the Parker model. (nonrestrictive clause)
At the mountaintop, where the air is thin, it is necessary to wear oxygen masks.
The altitudes above 120 km, where O₃(v) fluorescence was too weak to be observed, provided data considered irrelevant for this study.
This follows the theory of Smith and Ames [1980], who solved the full MHD equations. (nonrestrictive phrase)
We interpreted a measurement of, say, 15 dbar to indicate that the system was at equilibrium. (independent element)
The expedition was a joint effort of American, Canadian, and French scientific societies. (series)
Thus, although in the first case the temperature is lowered, it did not affect the results.
If the lava flow were emplaced in this 550-year period, it would also have been entirely submarine. (If, then)
One hundred starting models are generated using a predefined set of velocity nodes, with a fixed window of allowable depth variations between nodes.

Do not use comma

In the absence of clear measurements it became necessary to extrapolate values for L. (strong natural break)
The results were uncertain; hence we did not use them.
Nappes therefore appear to have common history.
We dismissed data having excessively high or low values and plotted the remaining data on a T-S grid. (compound verb)
An examination of Figure 4 indicates that the midlatitude values are relatively low for this parameter and that high-latitude values are quite divergent. (parallel dependent clause)
In the area of the stratosphere where O₃ molecules are densest, damage by aerosols was the greatest. (restrictive phrases)
It was understood that given the above constraints, agreement would be tenuous. (before or after “that”)
These migmatites remained within the field long enough to deform while they were partially molten (before a subordinate clause at end of sentence)
Virtually all the Mauna Loa lavas encountered are interpreted to be subaerially emplaced. (exception to after -ly)
2.2. AGU Style

**With parameters.** It is not necessary to set off variables in text with commas (or parentheses) if they directly follow the parameter for which they stand (follow author if usage is consistent):

The modeling equations can be closed by specifying the constitutive equations for the stress tensor $T$ of gas and solids, drag $D$, and heat transfer $Q$.

However, if a phrase separates the variable and the parameter, then retain enclosures (either commas or parentheses but be consistent within a paper):

The enthalpy ($h$), the thermal conductivity ($k$), and the volumetric heat transfer coefficient for the exchange of heat between the gas and pyroclasts ($Q$)....

**Serial comma.** Use a serial comma; that is, in a list of three or more, use comma before conjunction. In a numbered in-text list, a comma is sufficient to separate parts.

**Numerals.** Use comma only in numerals with five or more digits, including pages in reference list, except in tables (add comma to four-digit numerals if in column with five- or more digit numerals): 50,000, but use 5000 to 34,000 years in text.

**Jr. and III.** Do not use commas around or before Jr., Sr., or III except in reference list for first author in inverted order: House, J. H., Jr., and ....

2.3. **Comma Usage at Beginning of Sentence** (this list is not inclusive)

<table>
<thead>
<tr>
<th>Always Use a Comma</th>
<th>Optional</th>
<th>(Almost) Never Use a Comma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Again</td>
<td>In part</td>
<td>For this reason</td>
</tr>
<tr>
<td>Also</td>
<td>In particular</td>
<td>In turn</td>
</tr>
<tr>
<td>At the same time</td>
<td>In practice</td>
<td>Next</td>
</tr>
<tr>
<td>For example</td>
<td>In total</td>
<td>Then</td>
</tr>
<tr>
<td>Furthermore</td>
<td>Instead</td>
<td>In this case</td>
</tr>
<tr>
<td>However</td>
<td>Moreover</td>
<td>In this study</td>
</tr>
<tr>
<td>In addition</td>
<td>Nevertheless</td>
<td>In this paper</td>
</tr>
<tr>
<td>In any event</td>
<td>Nonetheless</td>
<td>Thereafter</td>
</tr>
<tr>
<td>In contrast</td>
<td>Of course</td>
<td>At this point</td>
</tr>
<tr>
<td>Indeed</td>
<td>On the other hand</td>
<td></td>
</tr>
<tr>
<td>In essence</td>
<td>Rather</td>
<td></td>
</tr>
<tr>
<td>In general</td>
<td>So far</td>
<td></td>
</tr>
<tr>
<td>In fact</td>
<td>That is</td>
<td></td>
</tr>
<tr>
<td>In other words</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.4. Some Parts of Speech and Common Examples

1. Parts of speech (note that some words can function in more than one way) (not inclusive)

<table>
<thead>
<tr>
<th>Prepositions</th>
<th>Compound Prepositions</th>
<th>Coordinating Conjunctions</th>
</tr>
</thead>
<tbody>
<tr>
<td>about</td>
<td>off</td>
<td>according to</td>
</tr>
<tr>
<td>above</td>
<td>on</td>
<td>apart from</td>
</tr>
<tr>
<td>across</td>
<td>onto</td>
<td>owing to</td>
</tr>
<tr>
<td>after</td>
<td>out</td>
<td>as to</td>
</tr>
<tr>
<td>against</td>
<td>outside</td>
<td>owing to</td>
</tr>
<tr>
<td>along</td>
<td>over</td>
<td>as to</td>
</tr>
<tr>
<td>amid</td>
<td>past</td>
<td>because of</td>
</tr>
<tr>
<td>among</td>
<td>regarding</td>
<td>instead of</td>
</tr>
<tr>
<td>at</td>
<td>respecting</td>
<td>out of</td>
</tr>
<tr>
<td>before</td>
<td>since</td>
<td></td>
</tr>
<tr>
<td>behind</td>
<td>through</td>
<td></td>
</tr>
<tr>
<td>below</td>
<td>throughout</td>
<td></td>
</tr>
<tr>
<td>beneath</td>
<td>till</td>
<td>-ly</td>
</tr>
<tr>
<td>beside</td>
<td>to</td>
<td>hence</td>
</tr>
<tr>
<td>between</td>
<td>toward</td>
<td>thus</td>
</tr>
<tr>
<td>beyond</td>
<td>under</td>
<td>therefore</td>
</tr>
<tr>
<td>by</td>
<td>underneath</td>
<td>so</td>
</tr>
<tr>
<td>concerning</td>
<td>until</td>
<td>yet</td>
</tr>
<tr>
<td>during</td>
<td>up</td>
<td>accordingly</td>
</tr>
<tr>
<td>except</td>
<td>upon</td>
<td>consequently</td>
</tr>
<tr>
<td>excepting</td>
<td>with</td>
<td>consequently</td>
</tr>
<tr>
<td>for</td>
<td>within</td>
<td>as</td>
</tr>
<tr>
<td>in</td>
<td>without</td>
<td>then</td>
</tr>
<tr>
<td>inside</td>
<td></td>
<td></td>
</tr>
<tr>
<td>into</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Strong natural breaks (do not use comma after introductory prepositional phrase followed by a natural break unless ending in a verb form)

- indefinite articles: a, an
- definite article: the
- demonstrative or definitive adjectives or pronouns: this, that, these, those
- indefinite adjectives: each, both, either, such, some, many
- distributive pronouns: each, every, everyone, either, neither
- indefinite pronouns: both, any, few, many, none, one, some, such, several, most
- personal pronouns and their declined forms: I, he, she, it, we, you, they, my, mine, his, her, your, yours, their, theirs, ours, our, his, hers
3. Additional Grammar/Punctuation Rules

3.1. Adjectival/Adverbial Phrases

1. The following are adjectival (adjective + preposition), which can only modify a noun.

**Due to:** Since due to is an adjective, it needs a noun or pronoun to modify. To assure this functioning, the safest place for due to is after a form of the verb to be because there it always serves as an adjective: "The cancellation was due to bad weather" (due modifies the noun cancellation). "My failure to pay promptly was due to an oversight" (due modifies failure). The most dangerous placement of due to is at the head of a sentence. In "Due to rain" or in "Due to the lateness of the hour" or in "Due to a cold I was unable to attend," due to is treated as an adverbial phrase. This is a misuse. A test to determine whether due to is being used correctly is to replace it with “caused by” or “attributed to,” which is what due to means. If the replacements make sense, due to is correctly used, as it is in "The explosion was due to [caused by or attributed to] carelessness."

His failure was due to insufficient study.

**Compared to** (or compared with): Use compared to for unlike objects: Shall I compare thee to a summer's day. Use compared with for like objects: Shall I compare thee with my ex-husband.

2. The following are adverbial (adv + prep), which can modify a verb, an adjective, or another adverb: Owing to (because of, on account of), in comparison to, in relation to

He failed owing to [because of] insufficient study.
This paper was short in comparison to the previous one.
Height in relation to depth was the important factor.

**Based on** “Based on” phrases should only modify nouns not verbs. Change to “on the basis of” at beginning of sentences and if modifying a verb, e.g., “the results based on Smith’s theory...” but not “Based on Smith’s theory, we found”

3.2. Comprise Versus Compose

1. Whole (subject) comprises parts (object) (must be active verb): The book comprises five chapters.
2. Parts (subject) compose (make up) a whole (object):

   These chapters compose this book.
   This book is composed of three chapters.

Never use comprised of; change to composed of.

3.3. Singular Versus Plural With Certain Nouns

1. Number: “A” takes plural verb: A significant number of points are in large disagreement with (2) and (3).
   "The" takes singular verb: From Table 3 it is apparent that the number of points over which averages are taken varies considerably between data divisions.

2. Set and group (collective nouns) should take singular verb unless the individuals of the group are to be emphasized. Authors often have either one intention or the other, so it is best to follow the author's usage unless it is found to be totally incorrect.
A set of points, such that $N$ and $X$ are both ... are defined as feasible designs for satisfying the information demand of the $n$th parameter.

Furthermore, the set of nonzero Lagrange multipliers represents the set of trade-off ratios between the principal objective and each of the constraining objectives.

3. "Data" must take the plural verb; however, "geodetic datum" is singular, and "geodetic datums" is plural.

4. "Series" can take singular verb if individuals in series are not emphasized:

   A series of models have been constructed that approximate the measured horizontal disturbance at the Earth's surface derived by Langel [1973].

   The series that we used helps to identify the position of the vector.

5. “The” percentage always takes a singular verb. “A” percentage can take either a plural or singular verb depending on object of preposition: A substantial percentage of these individuals are quite sure that they have made the best decision.

6. Percent can take either plural or singular verb depending on object of preposition: Roughly 8% of all proton velocities were contoured./About 9% of the field was rejected.

7. Total takes a singular verb:

   A total of 98 field stations was established with an elevation range from 4400 to 9000 m.

8. Chain takes a singular verb: The changes in neutral composition trigger a complex chain of events, which affects not only the distributions but also the emission rates.

9. Proportion can take either plural or singular verb depending on object of preposition: A relatively larger proportion of bound $H_2$ molecules emerge and flow from the hotter dayside to the cooler nightside.

10. Sequence takes a singular verb: The following sequence of boundary conditions is therefore obtained for the free surface geometry.

11. Part  (determine singular or plural sense)

   Part of the results of the simple model are compared with magnetic field mappings of Imp and Mariner 5.

   The part that we used was not properly verified.

12. Fraction  (determine singular or plural sense)

   A large fraction of the reports available are clustered over the continent.

   A fraction will be chosen that is indicative of the actual cost per person.
3.4. Other Rules

1. Retain subjunctive mood, but do not change the verb to the subjunctive: e.g., It is required that the glass container be airtight. (See WIT (3rd ed., pp. 342-343) for a discussion of the subjunctive mood.)

2. Punctuation before i.e. (comma versus semicolon) varies depending on what function the material following i.e. plays in the sentence. If it is a noun or a phrase, a comma should be used. If it is an independent clause, a semicolon is necessary and change i.e. to "that is."

We have used only data in which the difference is larger than 30%; that is, we have used only data...
We have used only data in which the difference is larger than 30%, i.e., only those over 20.3.

The first example is an independent clause, and the second is a noun (the direct object).

3. So that of purpose versus so that of result: So that of purpose (i.e., in order to) is not preceded by a comma ("that" may be understood): Andy put on his sun glasses so that he could see.

So that of result (i.e., as a result) is preceded by a comma ("that" may be understood): John stepped in the wet cement, so he ruined his new shoes.

4. Do not use colons after forms of the verb "to be," after prepositions, or to separate a verb from its object. Colons may be used after forms of "to follow." If you want to retain the colon for any of the above cases, insert "as follows" or "in the following" or "for the following." Capitalize word after colon for independent clauses.

5. AGU style is to avoid em dashes. They should be changed to either commas or parentheses if there are two or to a colon if there is one.

6. AGU style does not use understood verbs.

   Change the following from “The group of incompatible elements that form ore deposits are related to S-type granites and the more compatible to I-type granites.” to “The group of incompatible elements that form ore deposits are related to S-type granites, and the more compatible are related to I-type granites.” (Repeat verb and add a comma.)

   Also watch for understood verb forms such as infinitives in a series. Change “The electronic data from the abstract will be used to create databases, new alerting services, and to develop products for scientists” either to “The electronic data from the abstract will be used to create databases, to create new alerting services, and to develop products for scientists” or to “The electronic data from the abstract will be used to create databases and new alerting services and to develop products for scientists”.

   After equations a list variables and their definitions may be given in paragraph format. If “is” or “denotes” is used for the first and last but left out for the in-between ones, add the verb for all or rephrase to delete all.

   For example,
   $$x = \frac{(ba + c)}{[(d - 1) + m]}$$

   where $x$ is the random variable, $b$ the balloon, $a$ the area, $c$ the content, $d$ the distance, and $m$ is the mean.

   Change to “where $x$ is the random variable, $b$ is the balloon, $a$ is the area, $c$ is the content, $d$ is the distance, and $m$ is the mean.” Or reword to delete all verbs: “where the variables are defined as follows: $x$, random variable; $b$, balloon; $a$, area; $c$, content; $d$, distance; and $m$, mean.” (These can also be changed to in-text notations lists if more than three variables are listed.)
4. Spelling

Any variant spelling listed in the dictionary may be used as long as it is consistent throughout the paper. If spelling is not consistent, make it consistent by making all occurrences of the word conform to the spelling used most often. Either spelling in the pairs that follow is acceptable according to the dictionary:

4.1. Alternate Spellings

Acceptable

<table>
<thead>
<tr>
<th>Acceptable</th>
<th>Acceptable</th>
</tr>
</thead>
<tbody>
<tr>
<td>aesthetic/esthetic</td>
<td>anaerobic/anaerobic</td>
</tr>
<tr>
<td>alignment/alinement</td>
<td>appendices/appendices</td>
</tr>
<tr>
<td>analog/anologue</td>
<td>indexes/indices</td>
</tr>
<tr>
<td>supersede/supercede</td>
<td>for scientific/mathematical</td>
</tr>
<tr>
<td>subtract/substract</td>
<td>cators, dictionary, index 8)</td>
</tr>
<tr>
<td>spatial/spacial</td>
<td>grey/grey</td>
</tr>
<tr>
<td>coterminous/conterminous</td>
<td>terrain/terrane (see dictionary; different meanings)</td>
</tr>
</tbody>
</table>

Not acceptable (but do not fix figures)

1. Double final consonants before endings (inflections); use the shorter form in text if both forms are given in the dictionary:

   equaled                      | not equalled (but controlling) |
   focuses, biases             | not focusses, biasses          |
   focused, biased             | not focussed, biassed          |
   pluses                      | not plusses                  |
   modeling                    | not modelling                |

2. Suffixes "-ment" and "-able"; use the shorter form in text if both forms are given in the dictionary:

   judgment                    | not judgement                |
   acknowledgment             | not acknowledgement          |
   sizable                     | not sizeable (but noticeable) |

3. American versus British spellings; use the American rather than the British spelling in text:

   behavior, favor, color      | not behaviour, favour, colour |
   advertise                   | not advertize                |
   meter, center               | not metre, centre            |
   inflection                  | not inflexion                |
   analyze                     | not analyse                  |
   draft                       | not draught                  |

4.2. Commonly Used Proper Names (unusual spellings or accented letters)

If accents are consistently not used, do not add them.

Alfvén
Avé Lallemant (author)
Bénard (associated with cells or convection)
Bouguer (gravity anomaly)
Chappuis (band)
Debye (theory, constants) (in combination w/Scherrer)
Eötvös
Grüneisen (parameter - gamma)
Kirchhoff
Kolmogorov-Smirnov (goodness of fit test)
Lagrange (constant)
Lamé (constant)
Laplace
Le Pichon (author: first initial X (Xavier)
Milankovitch

Mohorovičić (Moho, no accents with "discontinuity")
Murnaghan (as in Birch-Murnaghan equation)
Néel
Poisson (ratio, sigma)
Rayleigh (wave, number)
Savonius (rotor)
Toksööz
Larmor
Brunt-Väisälä
von Kármán
Clapeyron
Boltzmann
Crank-Nicolson (no “h”)
4.3. Countries

1. Former Soviet Union Countries

The following is a list of spellings used by Webster's and the State Department for the Baltic States and the Republics which were formerly part of the Soviet Union. Change to these spellings.

<table>
<thead>
<tr>
<th>Name</th>
<th>Adjective</th>
<th>Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Armenia (Hayastan, use Armenia)</td>
<td>Armenian</td>
<td>Yerevan</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>Azerbaijani</td>
<td>Baku</td>
</tr>
<tr>
<td>Belarus</td>
<td>Belarus</td>
<td>Minsk</td>
</tr>
<tr>
<td>Estonia</td>
<td>Estonian</td>
<td>Tallinn</td>
</tr>
<tr>
<td>Georgia</td>
<td>Georgian</td>
<td>Tbilisi</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>Kazak</td>
<td>Almaty</td>
</tr>
<tr>
<td>Kyrgyzstan</td>
<td>Kyrgyz</td>
<td>Bishkek (formerly Frunze)</td>
</tr>
<tr>
<td>Latvia</td>
<td>Latvian</td>
<td>Riga</td>
</tr>
<tr>
<td>Lithuania</td>
<td>Lithuanian</td>
<td>Vilnius</td>
</tr>
<tr>
<td>Moldova</td>
<td>Moldovan</td>
<td>Chisinau (formerly Kishinev)</td>
</tr>
<tr>
<td>Russia</td>
<td>Russian</td>
<td>Moscow</td>
</tr>
<tr>
<td>Tajikistan</td>
<td>Tajik</td>
<td>Dushanbe</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>Turkmen</td>
<td>Ashgabad</td>
</tr>
<tr>
<td>Ukraine</td>
<td>Ukrainian</td>
<td>Kyyiv (Kiev)</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>Uzbek</td>
<td>Tashkent</td>
</tr>
</tbody>
</table>

2. Prefectures of Japan With Their Capitals

<table>
<thead>
<tr>
<th>Prefecture</th>
<th>Capital</th>
<th>Prefecture</th>
<th>Capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aichi</td>
<td>Nagoya</td>
<td>Miyazaki</td>
<td>Miyazaki</td>
</tr>
<tr>
<td>Akita</td>
<td>Akita</td>
<td>Nagano</td>
<td>Nagano</td>
</tr>
<tr>
<td>Aomori</td>
<td>Aomori</td>
<td>Nagasaki</td>
<td>Nagasaki</td>
</tr>
<tr>
<td>Chiba</td>
<td>Chiba</td>
<td>Nara</td>
<td>Nara</td>
</tr>
<tr>
<td>Ehime</td>
<td>Matsuyama</td>
<td>Niigata</td>
<td>Niigata</td>
</tr>
<tr>
<td>Fukui</td>
<td>Fukui</td>
<td>Oita</td>
<td>Oita</td>
</tr>
<tr>
<td>Fukuoka</td>
<td>Fukuoka</td>
<td>Okayama</td>
<td>Okayama</td>
</tr>
<tr>
<td>Fukushima</td>
<td>Fukushima</td>
<td>Okinawa</td>
<td>Naha</td>
</tr>
<tr>
<td>Gifu</td>
<td>Gifu</td>
<td>Osaka</td>
<td>Osaka</td>
</tr>
<tr>
<td>Gumma</td>
<td>Maebashi</td>
<td>Saga</td>
<td>Saga</td>
</tr>
<tr>
<td>Hiroshima</td>
<td>Hiroshima</td>
<td>Saitama</td>
<td>Urawa</td>
</tr>
<tr>
<td>Hokkaidō</td>
<td>Sapporo</td>
<td>Shiga</td>
<td>Ötsu</td>
</tr>
<tr>
<td>Hyōgo</td>
<td>Kōbe</td>
<td>Shimane</td>
<td>Matsue</td>
</tr>
<tr>
<td>Ibaraki</td>
<td>Mito</td>
<td>Shizuoka</td>
<td>Utsunomiya</td>
</tr>
<tr>
<td>Ishikawa</td>
<td>Kanazawa</td>
<td>Tochigi</td>
<td></td>
</tr>
<tr>
<td>Iwate</td>
<td>Morioka</td>
<td>Tokushima</td>
<td>Tokushima</td>
</tr>
<tr>
<td>Kagawa</td>
<td>Takamatsu</td>
<td>Tōkyō</td>
<td>Tōkyō</td>
</tr>
<tr>
<td>Kagoshima</td>
<td>Kagoshima</td>
<td>Tottori</td>
<td>Tottori</td>
</tr>
<tr>
<td>Kanagawa</td>
<td>Yokohama</td>
<td>Toyama</td>
<td>Toyama</td>
</tr>
<tr>
<td>Köchū</td>
<td>Köchi</td>
<td>Wakayama</td>
<td>Wakayama</td>
</tr>
<tr>
<td>Kumamoto</td>
<td>Kumamoto</td>
<td>Yamagata</td>
<td>Yamagata</td>
</tr>
<tr>
<td>Kyōto</td>
<td>Kyōto</td>
<td>Yamaguchi</td>
<td>Yamaguchi</td>
</tr>
<tr>
<td>Mie</td>
<td>Tsu</td>
<td>Yamanashi</td>
<td>Köfu</td>
</tr>
<tr>
<td>Miyagi</td>
<td>Sendai</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5. Capitalization

Because AGU is interdisciplinary, the capitalization scheme of each discipline within the geophysics community cannot be followed. The exception would be a group of papers appearing in a special section (or companion papers). A decision should be made on how to treat certain words, based on office style, or perhaps an editor's preference, and capitalize/lowercase consistently in all papers in the SI. (See Words Into Type (WIT) for treatment of questions not considered here.)

5.1. Geographical Terms

1. The following may be either capitalized or lowercased except as indicated under point 2 below. If usage in a paper is inconsistent, lowercase underwater or geological features (anticline, arc, bank, basin, butte, channel, crater (e.g., on Earth, the Moon, or Mars), fault, fold, formation, geyser, glacier, mount, plate, plateau, ridge, rill, strait, syncline, trench, trough, volcano) unless they are part of the legally recognized name of the feature in question; this can be verified by checking Webster's Geographical Dictionary or an atlas. Terms such as convergence, divergence, currents, swells, water masses, and jets (air currents) have varying degrees of importance to different types of authors (biologists, chemists, geologists).

2. The following is AGU style for commonly occurring geographical terms. This is not an inclusive list. Check atlas for recognized geographic features. Note that generic terms such as lake, mountain, river, or valley are capitalized when used with a proper name no matter how they are listed in an atlas or gazetteer, except if “the/a river” precedes the proper name: the river Elbe. Also, Hudson River valley. Lowercase plurals of geographic features, e.g., Atlantic and Pacific oceans, even if they are capitalized when singular.

Africa, North, East, West, but central
Alps, Southern, Eastern, and Western, but northern and central; also Southern Alps for New Zealand
Andes, sub-Andes, central Andes, inter-Andean
Arctic Ocean
Asia, Southeast, central, southeastern
Atlantic Ocean, North, South, but northern, southern, central
Caspian Sea (not divided, east, west, north, south)
China, south
Coastal Plain (U.S.)
Earth (as planet rather than substance), but earthward and terrestrial
East Africa
East Antarctica
East Antarctic Ice Sheet
East China Sea
east coast, but West Coast
eastern Mediterranean Sea
east Greenland
East Siberian Sea
equator, equatorial
Europe, central, eastern, and western (capitalize Eastern and Western Europe only in political sense, rare)
Faeroe Islands (or Fàroe)
Gobi desert
the Himalayas (or the Himalaya), Outer, Greater, Lesser, but central, middle, lower
Iceland-Greenland-Norwegian Seas (order may vary)
Indo-Pacific
island of Hawaii (or Hawai‘i) (follow au for accent except when referring to the state of Hawaii, no accent)
Jupiter, Jovian, Jovicentric, Jovicraphic
Mars, Martian
Mediterranean Sea
Mediterranean, western/eastern, but Arctic mediterranean seas (mediterranean in this case is generic in meaning, i.e., land-locked or mostly land-locked, here referring to several seas within the Arctic as a group)
Middle East (or Mideast)
Midwest
Mojave Desert
the Moon, but lunar
Negev (desert, if used, is lowercased)
New York City (but follow author for adding “City”)
Nordic seas
Northern Hemisphere (Earth only)
North Pole (Earth’s only)
North Sea
open ocean
Pacific Northwest (but northwest Pacific)
Pacific Ocean, North, South, but northern, southern
Pan-African
Pan-American
plate (follow author within paper for capitalization):
African, Antarctic, Arabian, Australian, Caribbean, Cocos, Eurasian, Farallon, Indian, Juan de Fuca, Nazca, North American, Pacific, Philippine, Scotia
Sahara (desert, if used, is lowercased)
Sea of Japan (preferred, or Japan Sea)
solar system
Southern Hemisphere (Earth only)
south China
South China Sea
Southeast Asia, but southeastern Asia
Southern Ocean
South Indian Ocean
South Pole (and South Pole Station) (Earth’s only)
South Shetland Islands
the Southwest (only when referring to southwestern United States)
sub-Sahara, subalpine, sub-Andean
the Sun, but sunward and solar
Takla Makan, use Taklimakan
3. Use the following for both nouns and adjectives: Arctic and Antarctic (however, arctic may be lowercase in papers that do not use Antarctic; follow author). Use subarctic and subantarctic as adjectives, but sub-Arctic and sub-Antarctic as nouns. Note that Antarctica is the continent and Antarctic is the region.

4. Use state of Washington, but use Washington State.

5.2. Text Capitalization

1. In level 1-4 heads, capitalize all words of more than three letters.

2. Capitalize adjectives derived from proper names: Kelvin, Martian, Lambertian, Stokes.

3. In text, capitalize Figure 2 and Table 1 but lowercase model 1, section 1, and equation (2) (and related examples). However, follow usage for capitalization of Ocean Drilling Program's (formerly Deep Sea Drilling Project) Hole, Site, Leg when used with number, e.g., Site 43, Hole 128, Leg 26.

4. Protected trademarks are capitalized (Teflon, Plexiglas, Pyrex, Freon, etc.). When a trademark is used, do not capitalize the common noun portion (Pyrex beaker). See WIT, 3rd ed., p. 172 for now unprotected former trademarks (use lowercase).

5. Lowercase law, such as Snell's law.

6. Lowercase is preferred for experiments, watersheds, instruments, models, and the like, but follow usage for well-known experiments. The general rule for instruments is to lowercase them when they are generic terms (i.e., there are several of such instruments). If unique, capitalize (usually on satellites).

7. Follow usage for rock names. Both capital and lowercase may be used for the same rock within a paper, as they have different connotations. For example, Westerly Granite is a granite with a specific chemical composition, whereas Westerly granite is a more generic term. Also, follow author for Groups and Members.

8. Explosions are initial cap only, e.g., Cowboy, Salmon, Sterling.

9. Capitalize Hurricane/Typhoon when used with a specific name: Hurricane Andrew, Typhoon June.
5.3. Stratigraphic Divisions

Capitalize the attributive adjective (e.g., early, lower) only if it appears here as an officially recognized subdivision; otherwise, use lowercase: late Cenozoic, early Paleozoic, early Pleistocene, Late Jurassic, Upper Permian. See p. 949 of *Webster’s Third International Dictionary* for spelling of smaller units.

<table>
<thead>
<tr>
<th>Era</th>
<th>Period</th>
<th>Epoch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cenozoic</td>
<td>Quaternary</td>
<td>Recent (Holocene)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pleistocene</td>
</tr>
<tr>
<td></td>
<td>Tertiary</td>
<td>Neogene[Neocene]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Miocene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Oligocene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Eocene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paleogene</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Paleocene</td>
</tr>
<tr>
<td>70 m.y. ago (70 Ma)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mesozoic</td>
<td>Cretaceous</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td></td>
<td>Jurassic</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td>160 m.y. ago (160 Ma)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paleozoic 230 m.y.</td>
<td>Permian</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td>ago</td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td></td>
<td>Pennsylvanian</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td>Carboniferous</td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td>Systems</td>
<td>Lower (Early)</td>
</tr>
<tr>
<td></td>
<td>Devonian</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td>390 m.y. ago</td>
<td>Silurian</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td></td>
<td>Ordovician</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td>500 m.y. ago</td>
<td>Cambrian</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
<tr>
<td>Precambrian</td>
<td>Proterozoic</td>
<td>Upper (Late)</td>
</tr>
<tr>
<td>620-2300 m.y. ago</td>
<td></td>
<td>Middle (Middle)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lower (Early)</td>
</tr>
</tbody>
</table>
6. Numbers

6.1. Cardinal Numbers/Arabic Numerals

Use numerals

1. For 10 or higher; write out under 10, except as indicated below.
2. With units of measure (abbreviate units if possible).
3. To make numbers under 10 consistent with larger numbers in a series:
   
   We used data from 6 experiments in the first graph and from 12 to 14 experiments in the second and third graphs, respectively.

4. With divisions (part, paragraph, section, rule, model): model 1, section 2, log 1, case 1 (do not change from roman to arabic if roman numerals are used in figures or if from a non-AGU source).

5. When implying an arithmetical manipulation: a factor of 7, 4 orders of magnitude, magnification of 50 (50X, use capital "ex" closed up to number), 5 times the height; use either 2 or two standard deviations (follow usage but be consistent).

Write out

1. For one through nine except as indicated above.
2. At the beginning of sentences, a head, or a title (if followed by a unit of measure, spell it out too: Ten kilometers...; or rephrase so that the number (and its unit of measure) does not begin the sentence, head, or title). If necessary to write out, hyphenate (both as noun and adjective) cardinal and ordinal numbers if compound: e.g., twenty-one, twenty-first. However, one hundred is not hyphenated (see number table in the dictionary).

6.2. Ordinal Numbers

Spell out ordinal numbers (first, second, third, etc.) unless hyphenated (e.g., twenty-first, use 21st) in text. If nonhyphenated form used in conjunction with hyphenated, use numbers for all: 21st, 50th, 92nd. Use the numeral and suffix form (1st, 2nd, 3rd, etc.) in references (e.g., 1st ed.). Use nth, (n - 1)th, etc. (i.e., “th” is on line and not italic.

6.3. Miscellaneous Style for Numbers

1. Give full ranges for pages or years; for example, change 801-6 to 801-806 and change 1979-80 to 1979-1980.
2. Mixed forms are permissible for very large numbers: 5 million; 2.3 billion or use $5 \times 10^6$; $2.3 \times 10^9$.
3. Insert a zero before the decimal point in a numeral less than unity; 0.002, not .002. However, do not add a zero after decimal point (e.g., 20.), but do retain decimal; adding a zero would change the degree of precision of the measurement.
4. Do not use roman numerals in names of artificial satellites, rockets, etc.: Explorer 8, Vanguard 3, Surveyor 1, OGO 3.
5. Do not use roman numerals for figure numbers or table numbers: Figure 5 and Table 2.
6. Spell out a number that directly precedes or follows a numeral: ten 2-m strips; 136 two-hour lectures (see WIT, p. 127)
7. Miscellaneous Style Rules

1. For direct questions it is okay to capitalize the question: The question is raised, How reliable are the results?

2. Do not begin sentences with lowercase Roman or Greek letters or numerals. Enclosures are ok, e.g., [, ⟨, (, as are capital Greek letters, e.g., Δ, Φ.

3. Latin phrases are not italicized except genus and species names. Use a priori, a posteriori, in situ, ad hoc, ab initio, but translate sensu (in the sense of), sensu strictu (in a strict sense), inter alia (among other things), and nota bene or N.B. (note that). This is not a complete list.

4. Italicics (or boldface or all capitals) are not used for emphasis or definition (double quotes may be used for definition; see below).

5. Use double quotes, not single quotes. If used frequently, delete after first use around a specific word or phrase in both abstract and text.

6. Periods and commas go inside closing quotes; semicolons and colons go outside.

7. AGU date format. Never use, e.g., 1/3/80, 010380, or 1-3-80. Use 1 March 1980 (not the 1st of March):

   1–3 March 1980,  
   between 1 and 3 March 1980, we observed...  
   1 March to 1 April (not 1 March–1 April)  
   March 1980 to August 1981  
   March–April 1991

En dashes should only be used between like things: 1–12 March 1983; but change 1 March–10 April to 1 March to 10 April.


9. Do not use the word “number” (or no. or #) if it can be avoided without affecting meaning. However, for sand or grit it is permissible to use #: #5 sand and #3 grit. Another permissible use is for Mg #. In most usages, number can be eliminated, e.g., for run no. 5, run 5 is quite sufficient. Use, e.g., model 1, run 5, experiment 3, well 5, sample 2568D9, borehole 356, Site/Hole 835. Sometimes context may indicate a substitute for “number,” e.g., for “Three earthquakes occurred in the 1980s, #385, #886, and #589,” the term “event” can be substituted for #: “Three earthquakes occurred in the 1980s, events 385, 886, and 589.”

10. It is permissible to use “(?)” after stratigraphic division (closed up).

11. Use “the notation section.”

12. When an author cross-references numbered observations, trends, etc., parentheses are not used (i.e., "observation 1," not "observation (1)"). Parentheses are reserved for equations and reactions.

13. Delete “s” in -ward words: toward, northward, etc.

14. In text, spell out fractions. Use "two thirds of the people" (noun form) and "two-thirds the width of the table" (attributive adjective).
15. Always use degree sign with N, S, E, W: 24°N not 24N.

16. Write out N, S, E, and W when used alone (N-S, E-W okay). Okay to use NNW, etc. (don't change to N-NW; see the dictionary), e.g., air masses from the east, SE, and NW; also 20°E okay.

17. "Not only" must be followed by "but [also]" (the “also” is optional):

Correct: The day is not only long but also very hot.

Incorrect: The day is not only long, but also it is very hot.

Note that the "but also" may be interrupted. Use comma only if independent clause. Be sure “also,” if used, is placed correctly, i.e., parallel construction.

18. Use "between...and": between 5 and 10 days but not between 5-10 days.

Use "from...to": from 5 to 10 days, not from 5-10 days.

19. "Respectively" (surrounded by commas) should be as close to the end of the statement as possible:

\[ H \text{ and } D \text{ are the height and depth, respectively, of the trench.} \]

Not

\[ H \text{ and } D, \text{ respectively, are the height and depth of the trench.} \]

20. Further versus farther: Use farther when indicating a physical direction or movement:

The point is farther from \( x \) than it is from \( y \).

Use further otherwise:

Further research should explain this discrepancy.

21. Don’t use contractions.

22. Use of “a” versus “an” before abbreviations: follow usage before an abbreviation that would take an “an” if pronounced as the abbreviation, e.g., FFT, but would take an “a” if full form used, e.g., fast.

23. Use “of the order of” for mathematical usages indicating, e.g., order, rank, category. Use “on the order of” only to mean “approximately” or “similar to.”

24. Change firstly, secondly, thirdly, etc. to first, second, third, etc.
8. Word List

The following is a list of words commonly occurring in AGU papers and their treatment (hyphenation, spelling, capitalization, etc.) according to AGU style. This is meant as a quick reference (versus researching meaning and consulting dictionaries, atlases, source books, etc.). Note that (n, adj) should be assumed if not otherwise indicated. If (adj) given, assume open as noun and verb.

| Word/Phrase | Definition
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Digisonde (instrument, cap)
dipmeter
dip slip (n) dip-slip (adj)
Doppler radar
double couple (n)
  double-couple (adj)
downdip
downgoing (adj)
downleg
downrange
downscale
downwelling
drawdown (n, adj),
  draw down (v)
drill hole
drop-off (n, adj), drop off (v)
dropout
dropsonde, dropwinsonde
dry land (n, adj) dry-land (adj)
or dryland (adj) (see Web)
earth-atmosphere (adj)
easting (see Web 10)
echolocation
echo sounder
electric field
e-mail
end-member
end point vs. endpoint
  (see Web 10)
en echelon (adj, adv)(not italic)
equal-area (adj)
exceedance (n)
falloff (n) fall off (v)
far-field (adj)
far-reaching (adj)
farside
  (however, ✓ meaning)
fast spreading (adj)
fault plane
fault slip
fault-trench (adj)
fault zone
fiber optic (n),
  fiber-optic (adj)
field of view (n)
  (follow au as adj)
fine structure (adj)
finite difference
finite element
fission track
flare-up
floodplain
flowchart
flow field
flow line
flowmeter
flow path
flow rate
fluxgate
flyby
foot points
footwall
forearc
foredeep
free air (n) free-air (adj)
free fall (n) free-fall (adj, v)
freeze-up
F region
frequency domain
freshwater (adj) (also as noun meaning lake)
  F test
  γ ray
gasdynamics
gage, change to gauge
Geodimeter (trademark)
  (hyphenate as Geo-dim-eter)
Geodolite (trademark)
goodness of fit (n)
gradient drift
gravel bed
gravity-capillary wave
gray body
gray scale
great circle
grid point
groundmass
ground track
groundwater
ground wave
gyro- (closeup, prefix)
gyrofrequency
  gyroperiod
  gyroradius
  half-cell
  half-length
  half-life
  half plane
  half-space
  halfway (adj, adv)
  half width (n) half-width (adj)
  H alpha, use H α
  hanging wall
  head-on (adj, adv)
  headwall
  headwater
  head wave
  heat flow
  heavy-duty
  hillslope
  hot spot
  hourglass
  ice core
  ice raft (n, adj), ice-raft (v)
  ice sheet
  ice stream
  in-between (n, adj)
    in between (adv, prep)
  in-depth (adj)
infill (v)
in-flight
inflow
in-house
in-phase (adj) (inphase, adj, electrical only)
in-place (adj)
inshore
in situ (not italic)
intermediate-depth (adj)
intra-aggregate
Invar (trademark)
ion cyclotron
island arc
jet stream
Kapton (protected trademark)
knickpoint
kriging
lab frame
lag gravel
landfill
landform
landmass
land use (adj)
lateral
leapfrog (n, adj, v)
least cost
least squares
(not "square")
left-lateral (adj)
light-duty
linear programming
line of sight (n)
(follow au for adj)
line source
log conductivity
log likelihood
log linear
log-log
lognormal
log-periodic (antenna)(adj)
log transmissivity
long-lived
longwave vs. long wave (n)
longwave vs. long-wave (adj)
(follow au)
loss cone
low-pass (adj)
lunisolar
magnetic field
main shock
main stem
mainstream
makeup (n, adj) make up (v)
man-made
mass balance
mass transfer
Matlab (trademark)
mean square
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meltwater
midlatitude
mid-ocean
midpoint
molecular nitrogen
molecular oxygen
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moveout (n, adj), move out (v)
mudflow
mudstone
multi-instrument
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narrowband (adj)
near-field (adj)
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the Net
Netherlands (no "The" per
research 1/26/93)
nighttime
non-ice (adj)
nonsteady state
northing (see Web 10)
now casting (v)
null-space
ongoing
outward-bound (adj)
aven-dry (adj) oven-dry (v)
ozonesonde
paddy land
passband
pastureland
path length
path line
path loss
payback (n, adj) pay back (v)
peatland
pickup (n, adj), pick up (v)
piecewise
piggyback
pileup
pitch angle
pitch-up
plane-parallel
plane wave
planform
plan view
plasmapause
plasma sheet
plasmasphere
playback (n, adj) play back (v)
Plexiglas (trademark)
pore fluid
pore pressure
pore size
pore water
power law
present-day (adj)
pull-apart
pulse width
P wave
quasiperiodic
quick flow
quiet time
radio astronomy
radio decay
radio echo
radiolocation
radio physics
radio source
radio wave
rainband
raindrop
rainfall-runoff
rain flag
rain forest
rain gauge
rain splash
rainwater
rare earth
ray path
readout (n, adj) read out (v)
real time (n) real-time (adj)
real-world (adj)
red beds
reefalc (adj) (don't use reef)
resource management
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ridgletop
right-hand (adj)
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<td>tie line (or tie-line for phone</td>
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<td>(follow au for adj)</td>
<td>tiltmeter</td>
</tr>
<tr>
<td>state space (adj)</td>
<td>time-consuming (adj)</td>
</tr>
<tr>
<td>steady state</td>
<td>time delay</td>
</tr>
<tr>
<td>stemflow</td>
<td>time domain</td>
</tr>
<tr>
<td>step-by-step (adj)</td>
<td>time-lapse photography</td>
</tr>
<tr>
<td>step over</td>
<td>time period</td>
</tr>
</tbody>
</table>
timescale
time series
time step
topsoil
Tovex
trace element
track line
trade-off (n, adj)
  trade off (v)
trade winds
travel time
tree line
tree ring
trimline
turnoff (n) turn off (v)
turn-on (n) turn on (v)
tweeks (JGR-A)
Umkehr (return reversal effect)
under way (adv)
  underway (adj)
un-ionized
upcrossing
updip
upgoing
upleg
upscale (n, adj, v)
up-to-date
V notch
velocity-depth (adj)
velocity space
vice versa
volcanos (or volcanoes)
wall rock
wastewater
water mass
water rights
watershed
water table
wave band
wave field
waveform
wave front
wave function
wave group
waveguide
wavelength

wave mode
wave number
wave packet
wave path
wave power
waveshape
wave speed
wave train
wave vector
weighted-residual
well-being
well bore
wellhead
wellhole (n) well-hole (adj)
well-known (adj)
well known (otherwise)
well water
whistler mode
whole rock
wide-angle
wideband (adj)
wide-ranging
wind-borne (adj)
wind field
wind forcing (adj)
wind speed
wind stress
wind-wave tank (only)
wire line
World Wide Web (the Web)
worst-case (adj)
X ray (n), X-ray (adj)
x, y, z (axis coordinates)
yearlong (adj)
year-round (adj)
zeros or zeroes (spelling)