

The A&A language guide for authors and language editors

2021 version

1. Introduction

The aim of this guide is to help you meet A&A standards when you are preparing your paper and to understand the linguistic and grammatical changes that language editors make to your paper.

This guide is not an extensive compendium of English grammar and style. It is meant to help our authors adapt to the house style of the journal and avoid common language errors. A general rule for this language guide is that consistency is key. It should be noted that language editors are not concerned with the overall structure of a paper as their role is solely to address linguistic ambiguities and errors.

There will always be variations in the English found in the journal as a whole, such as differences in spelling and sentence structure between British (UK) English and American (US) English, which we also cover in this guide. The following sections present the most important elements of A&A style and tips on how to ensure that your paper follows our guidelines.

1.1 Clarity and concision

In English, as in science, it is best to use precise phrasing for an idea. Please avoid paragraphs and sentences that are either too long or too short. Wordy constructions can often cloud the author's intended meaning, and poetic language as well as cultural references should not be used.

1.2 Voice

We recommend authors mainly use the **active** voice and declarative structure (e.g., "We study") in describing their methods and findings. While scientific writing in general may tend to use the passive voice in many cases, this often leads to wordy sentence structures. Please try to keep the subject, predicate (verb phrase), and object of each sentence in a logical sequence. This can help avoid ambiguity about which verb refers to which subject in a compound sentence.

Example:

X That such observations can lead to accurate results is demonstrated by our analysis.

✓ Our analysis demonstrates that such observations lead to accurate results.

Note: A&A avoids addressing the reader directly. For example, questions should not appear in papers and "note that" can either be deleted completely or replaced with "we note that."

Example:

X Note that the authors, after making substantial corrections, submitted the article.

✓ We note that the authors submitted the article after making substantial corrections.

2. Main guidelines for A&A style

Consistency in punctuation, capitalization, spelling, hyphenation, and abbreviation is essential in maintaining the highest standard possible in any journal. The following sections explain the general rules of the A&A house style.

2.1 Acronyms and abbreviations

All **acronyms** and **abbreviations** should be spelled out upon first appearance in the body of the text and be followed by the acronym in parentheses. Once a term and its acronym have been introduced, you should use the acronym thereafter.

Example:

✓ The High Accuracy Radial velocity Planet Searcher (HARPS) spectrograph was mounted at the ESO 3.6m telescope in La Silla in 2003.

Note 1: A sentence should not begin with an acronym or abbreviation. Adding an article before the name can sometimes work to fix this issue; otherwise, please write out the name in full.

Note 2: The abbreviations **e.g.** and **i.e.** are acceptable when used in parentheses or figure and table legends; however, they should always be expanded when they are part of the main text. The abbreviation “e.g.” in the body of the text can be replaced with “for example,” “for instance,” or “such as,” whereas in the main body of the text, “i.e.” should be replaced by “that is” or a similar phrase. When using e.g. and i.e. in parentheses, please make note that in UK convention, there is no comma (e.g. and i.e.) while in US style, there is a comma (e.g., and i.e.,) when abbreviated.

Note 3: When giving **location indicators** throughout the paper, **Sect., Fig., Eq., and Col.** should always be abbreviated and capitalized when referring to a specific item, except when they are at the beginning of a sentence in which case they should be written out (Section, Figure, Equation, and Column).

Examples: Sect. 2, Sects. 2 and 3; Fig. 1, Figs. 1-4; Eq. (1), Eqs. (1), (2); Col. 1, Cols. 1-3.

Note 4: Table is never abbreviated, although it is capitalized when followed by its designated number. When any of these words are not followed by a specific item number, they are not capitalized or abbreviated.

Example:

✓ This result can be found in the next section, where Eqs. (5) and (6) are discussed.

2.2 Capitalization

When it comes to **capitalization**, only proper nouns (Poisson, Solar Orbiter) and terms derived from proper nouns (Gaussian) are capitalized; this also applies to cardinal directions (north, south, east, west), which are in **lowercase** unless forming part of a proper noun (*Chandra* Deep Field South).

When giving the full name of a measurement, method, or other scientific terms, **do not use capitals** unless it comes from a proper noun (e.g., Poisson; Poissonian), the acronym has been formed from a combination of uppercase and lowercase letters, or the acronym is formed from other than the first letters.

Note: Earth, Moon, Milky Way, Solar System, and Galaxy are **always** capitalized but only when referring to Earth's own Galaxy. Objects outside of our Galaxy should be written in lowercase.

Examples: star formation (SF), Atlantic Ocean (AO), the Galactic center (GC, when referring to our Galaxy), galactic center (GC, when referring to another galaxy), LOw Frequency ARray (LO-FAR)

2.3 Commas and listing items effectively

Use the **serial comma** (also known as the Oxford comma) between three or more items that are listed consecutively. If a conjunction is used (and, or), the third comma should come before it. The word **respectively** can be used to clarify relationships between multiple sets of data. A semicolon can be used to further distinguish several consecutive sets of items or two independent ideas that are part of a complex sentence.

General notes on **commas**:

- Commas should be used after introductory sentences of three or more words.
- Commas should be used when splitting up or moving around the individual parts of a sentence (clauses) to improve clarity, especially in the case of complex phrases or sentence structures.
- Commas are not necessary between two parallel items in a sentence.

Example:

- ✓ In this paper, the estimation of rotation, glide, and quadrupole parameters are presented in Figs. 10, 11, and 12, respectively. We set the bin size at 20 for ICRF1 and published our results in a previous paper.

2.4 Date format

The **date** format in a paper must be consistent. To avoid ambiguity between UK and US styles of dates, we ask for the month to be spelled out and cardinal endings left out.

Examples: 4 January 2004; 4 Jan 2004; January 4, 2004; Jan 4, 2004; 2004 January 4; 2004 Jan 4

2.5 Headings and titles

For **titles** and **headings**, only the first word should be capitalized unless it is a proper noun, copyrighted name, or a specific instrument. When a colon appears in the **title**, the second part of the title is treated as a subtitle and the first word should also be **capitalized**. Abbreviations in the titles or headings should be avoided unless it renders the title too long (i.e., more than three lines).

Note: A colon should only be used when joining together two related but independent ideas. For the text appearing after a **colon**, the first word is not capitalized unless it is a full sentence, a proper noun, or part of a title or section heading.

Examples of titles and headings:

- Radio afterglows of binary neutron star mergers: A population study
- NGC 346 massive star census. Nitrogen abundances for core burning B-type stars
- 5. Discussion and conclusions
- 5.1 Twisted quasar light curves

2.6 Measurements

Standard units of measurement (cm, au, kg, s, h) do not need to be introduced unless they are mentioned individually, without any specific value.

Example:

✓ We measured the distance in kilometers. Our result is 13 678 km.

Note: The **tilde** symbol (~) should only be used before measurements (~ 5 au) but not before text. Its textual equivalent is “approximately,” “on the order of” (US), or “of the order of” (UK).

2.7 Numbers

Write out **numbers** and **ordinal numbers** below 11 when they are not used as a measurement.

Example:

✓ This was the second time we attempted to carry out observations at 5 GHz using the VLBA over the course of 12 years.

2.8 Parenthesis

Use **parentheses** to provide additional information, such as acronyms, brief elaborations, and, of course, references. Please avoid lengthy or numerous parenthetical phrases. If the text in parentheses can stand alone as a sentence, the parentheses are probably not necessary. Avoid parenthesis within parentheses, except when it is part of a formula. This includes the year in a reference that is placed in parenthesis, where we also prefer no comma between the name and year but do expect the period after “et al.”: (Johnson et al. 1999). When the name is in the text, only the year is in parenthesis. Also avoid placing two sets of parentheses together.

Example:

✓ The ALLWISE catalog (Mainzer et al. 2011) was compiled after combining the data obtained during the cryogenic and post-cryogenic survey (NEOWISE) phases. These differences were noted by Tisserand (2012) and also mentioned earlier on in this paper (see Sect. 4).

2.9 Things to avoid

- Avoid **beginning a sentence** with a number, a formula, or a symbol (in addition to an abbreviation or acronym, as mentioned above). To avoid this, you can either rephrase the sentence, add an article, or (in the case of a number or acronym) spell out the number/acronym.

Example:

✓ Ten years ago, our team of researchers began studying this phenomenon.

- Avoid the use of **bullets or lists** in the body of the text. Bullet lists may be permitted in the conclusion as long as they are properly introduced with at least two sentences and there are a few concluding sentences after the last point of the list.
- Avoid the **contraction** of verbs. Please write out verbs in full without any contraction. Correct usage is: do not, cannot, will not, it is, it is not, etc.

- Avoid long and numerous **footnotes** where possible. For lengthy descriptions, please include as much as possible in the main body of the text.
- Avoid **italics** for indicating emphasis. If you wish to place emphasis on a word, quotation marks are recommended - single for papers written in UK style (‘) and double for papers in US style (“). Quotation marks should only be used for emphasis the first time you use the word or phrase.
- Avoid using informal language because it often creates ambiguity. For example, when making comparisons or giving examples, the word **like** should be replaced by **such as**, **for example**, or **for instance**.
- Avoid using lengthy **quotes** from other papers. When possible, it is best to summarize the point you wish to make and provide the appropriate reference.
- To avoid potential confusion, **seasons** (e.g., summer, fall/autumn, winter, spring) should be replaced with months as they are different in the Northern and Southern Hemispheres.
- Avoid using **slashes** in the body of the text because these should be reserved for equations, ratios, and specific pairings of instruments. In place of slashes, we recommend using **and**, **or**, or a **hyphen**, as appropriate.

Note: A&A uses the abbreviation S/N for **signal-to-noise ratio** to avoid confusion with supernova remnant (SNR). There is no need to write out the word “ratio” after S/N as this is already indicated by the slash.

3. General structure

Published papers follow the same basic structure, with some small variations depending on the author’s own style: **title**, **abstract**, **introduction**, **methods**, **discussion** of the observations, **results**, and, finally, the **conclusion**.

3.1 Title

The **title** should be as brief and succinct as possible. Abbreviations should be avoided unless including the full name of the object, measurement, or instrument would make the title very long (i.e., more than three lines). Only the first word should be capitalized unless there is a proper noun, copyrighted name, or a specific instrument that requires capitalization. If you are using a subtitle, it can be separated from the main title by using a period, colon, or simply by skipping to the next line. Again, only the first letter of the subtitle should be capitalized, excluding the abovementioned exceptions. The discursive phrase “on the” should be avoided as it makes the title too wordy and often redundant. Additionally, it evokes Charles Darwin’s work “On the Origin of Species,” and it thus carries implied expectations along with it. Furthermore, puns or references to popular culture should be avoided in scientific articles, and titles in particular, especially since the meaning might be lost on some readers. Lastly, the use of questions in titles is strongly discouraged.

Note: Longer titles should be formulated using the corresponding latex command. If there are two parts to the title, the second part will be displayed as a subtitle and formatted at the production stage. For a paper that is part of a series, the generic series title will serve as the main title and the subject title will be numbered and displayed as the subtitle during production.

3.2 Abstract

When writing your abstract, it is recommended that you follow the traditional abstract layout of **Context, Aims, Methods, Results, and Conclusions** even if you choose not to use the headings in your text. Citations and references are not allowed in the abstract except under special circumstances; however, they must be included in the body of the main text. The abstract should be written in complete sentences.

Example:

- ✓Aims. In this study, we investigate stars.
- ✓In this study, we aim to investigate stars.

3.3 Body of the paper

The abstract should be followed by an **introduction**, which introduces the general context of the study. The rest of the paper should be split up into individual **sections**, each with its own theme and title. Sections can be further divided into **subsections** and **sub-subsections** if necessary. Every section, subsection, and subsubsection of the paper should be indicated with a header and numbered consecutively. Only the first word of a heading should be capitalized - unless it is a proper noun.

Note: Subsections and sub-subsections are not permitted in the introduction.

Example:

- ✓1. Introduction
- ✓2. LBGs
- ✓2.1 Properties of LGBs with detected emission lines
- ✓2.2 Properties of LGBs with a 3D radiative transfer

Each **paragraph** of every section should have its own focus that is introduced in the first sentence. This first sentence should provide a smooth transition or otherwise clear connection to the preceding paragraph and the entire section. The **transition** helps the reader follow the discussion. Logical **connectors** (thus, hence, so that) can aid in providing clarity but they should not be overused. Furthermore, single-sentence paragraphs are not allowed.

Example:

- ✓**Twenty-five** years ago, we published our first study of exo-planets. We recently carried out our latest observations based on the **mentioned** study, **which** proved helpful in establishing constraints on our findings.

When making **transitions**, please be sure that it is clear what the pronoun and reference word you are using refer to (latter, aforementioned, that study, those authors, that finding). If there is any **ambiguity**, repeat the noun or phrase to which you are referring.

Example:

X Smith et al. found that their measurement was not a good fit for the data, whereas Bart et al. reported that their findings were more precise than they had anticipated. This was an unexpected result for the entire scope of the project.

Possible solutions for clarifying whose findings these were and what was unexpected:

- ✓ Smith et al. found that their measurement was not a good fit for the data, whereas Bart et al. reported that their own findings were more precise than they had anticipated. This discrepancy between measurements was an unexpected result for the entire scope of the project.
- ✓ Smith et al. found that their measurement was not a good fit for the data, whereas Bart et al. reported that the findings of Smith et al. had actually been more precise than they had anticipated. This discovery was an unexpected result for the entire scope of the project.

Example:

X In this paper, we present fluxes in the CI lines of neutral carbon at the centres of some 76 galaxies with far-infrared luminosities ranging from X to Y, as obtained with the Herschel Space Observatory and ground-based facilities, along with the line fluxes of the J=7-6 transition.

Possible solutions to clarify the role of the line fluxes in the sentence:

- ✓ In this paper, we present fluxes in the CI lines of neutral carbon at the centres of some 76 galaxies with far-infrared luminosities ranging from X to Y, as obtained using the Herschel Space Observatory and ground-based facilities, along with the line fluxes of the J=7-6 transition.
- ✓ In this paper, we present fluxes in the CI lines of neutral carbon at the centres of some 76 galaxies with far-infrared luminosities ranging from X to Y, as obtained with the Herschel Space Observatory and ground-based facilities. We also present the line fluxes of the J=7-6 transition.

Base your sentence structure on English **declarative** sentences, which are made up of a subject, predicate (central verb phrase), and object of the action. Subjects and verbs should be kept as close together as possible in a sentence to avoid confusion or ambiguity. Any ambiguity in phrasing will be flagged by the LE and rephrased directly or highlighted with a note asking the author to rephrase the sentence to clarify their meaning.

Note: While it is not grammatically incorrect to start a sentence with a dependent clause in English, it should only be used sparingly (e.g., when it improves readability).

Examples:

X The authors, after revising the English, submitted their article.

✓ After revising the English, the authors submitted their article.

X Especially appealing is the study of its stellar winds.

✓ The study of its stellar winds is especially appealing.

X To understand the observed diversity of these systems, the multitude of physical mechanisms affecting low mass galaxy evolution, data on the ages, chemical abundances, spatial distribution, and kinematics of the stellar component of LG dwarf galaxies are needed.

✓ The multitude of physical mechanisms affecting low mass galaxy evolution, data on the ages, chemical abundances, spacial distribution, and kinematics of the stellar component of LG dwarf galaxies are needed to understand the observed diversity of these systems.

Authors should also avoid separating a transitive verb from its direct object. While some adverbs go before the verb (often, rarely, clearly), an adverb generally follows either the object of the verb (transitive verb) or the verb when it is intransitive.

Examples:

- X The star's image shows clearly the alignment.
- ✓ The star's image clearly shows the alignment. (transitive verb)
- ✓ The star's image shows the alignment clearly. (transitive verb)
- ✓ The number of small dwarfs increased exponentially. (intransitive verb)
- ✓ The small dwarf increased in size exponentially. (transitive verb)

The **subtle difference in meaning** between the first two solutions above is based on emphasis. In the first example, there is emphasis on it being clear that the image shows the alignment (1) and in the second, the emphasis is on the fact that the alignment is shown clearly in the image (2). Another way to say this would be: The star's image obviously shows the alignment (1) and The alignment is shown clearly in the star's image (2).

Furthermore, certain **prepositional phrases** and **idioms** cannot be separated, such as: to take (something) into consideration or to take (something) into account.

Example:

- X We take into account the results of the study.
- ✓ We take the results of the study into account.
- X We take the results of the study, which was published last year, into consideration.
- ✓ We took the results of the study that was published last year into consideration.

A common error in usage is related to the verb: **allow**. The correct prepositions that should be used with allow are: to allow for; to allow someone to do something; and to allow something to be done.

Examples:

- X The programme allows to analyse the data.
- ✓ The programme allows for an analysis of the data.
- ✓ The programme allows us to analyse the data.
- ✓ The programme allows for the data to be analysed.

The synonyms **enable** and **permit** can also be used to replace allow when the word is overused.

Example:

- ✓ The programme permits the analysis of the data.
- ✓ The programme enabled us to analyze the data.

3.4 Acknowledgements

In this part of your paper, you have the opportunity to thank any referees or fellow researchers who helped in editing the paper, along with acknowledging any institutions that provided you or your team with academic or financial support.

Note: The language editors no longer correct the acknowledgements as they are not considered to be part of the scientific portion of papers. Please make sure you have corrected any errors or typos.

4. UK versus US spelling and grammar

Depending on whether you are using **American** (US) or **British** (UK) style in your paper, please apply the given spelling and grammar conventions throughout. We provide some of the most common differences between these conventions below. We recommend setting your spellcheck tool to the convention you are using. Also, the most dependable dictionary for referencing US spelling is Merriam-Webster, while for UK spelling, it is the Cambridge Dictionary.

4.1 Spelling

	UK conventions	US conventions
• Nouns ending in our/or	behaviour, neighbour, favour, colour, harbour, vapour	behavior, neighbor, favor, color, harbor, vapor
Note: Contour is always spelled with an “our” ending for both US and UK styles.		
• Nouns ending in re/er	centre, metre, fibre, calibre	center, meter, fiber, caliber
Note 1: Past participles also take the re/er ending: centred (UK) and centered (US). Note 2: Parameter and diameter have the same spelling for both conventions.		
• Nouns ending in logue/log	catalogue, analogue, isotopologue	catalog, analog, isotopolog
• Nouns ending in ize/ise/yse	analyse, summarise, organise, ionise, normalise, minimise, practise	analyze, summarize, organize, ionize, normalize, minimize, practice
Note 1: The related noun endings in -ization/-isation also follow the convention: organisation, ionisation (UK) and organization, ionization (US). Note 2: Authors can opt to use the “z” spelling in UK conventions (excluding “analyse”) as long as the use is consistent throughout a paper.		
More differences in noun usage	artefact, ageing, grey, speciality, sulphur, aluminium, disc (disk is a variant)	artifact, aging, gray, specialty, sulfur, aluminum, disk
• Verbs ending in el	model-modelling-modelled; label-labelling-labelled; cancel-cancelling-cancelled	model-modeling-modeled; label-labeling-labeled; cancel-canceling-canceled
• Verbs ending in il	fulfil; fulfilling; fulfilled; fulfilment	fulfill; fulfilling; fulfilled; fulfillment
• Verbs ending in us	focus; focussing; focussed (focusing and focused are variants)	focus; focusing; focused
Other examples of differences in verb usage	to inquire, to orientate (orient is a variant)	to enquire, to orient
• Adverb	towards, outwards, forwards	toward, outward, forward

Note: In UK convention, when words ending in -wards are used in the adjective form, -ward is used (e.g., the forward movement).

4.2 More examples of differences between UK and US conventions

4.2.1 Formatting

Quotation marks: UK convention calls for the use of single quotation marks when formatting speech, titles, or when endowing a phrase with special meaning. US convention calls for double quotation marks in these instances. However, when quotation marks are used to show special meaning, they are only needed upon first appearance.

Note 1: If the special meaning is otherwise clear, or indicated by “so called” or similar, quotation marks or single quotation marks are not needed.

Note 2: When the end of a quote is just before a period or comma, in UK style the period or comma is outside of the closing quotation mark. In US style, the period or comma is placed inside of the quotation marks.

Examples:

UK: Such alternative trajectories allow orbits that are along previously inaccessible field lines to 'escape'.

US: Such alternative trajectories allow orbits that are along previously inaccessible field lines to “escape.”

US/UK: According to Bert et al., this is a so-called rare phenomenon.

4.2.2 Hyphenation

UK convention calls for the hyphenation of certain prefixes that are merged in US English. Common examples are given below. See more on hyphenation further on in this guide.

Examples:

UK: non-zero, north-east, multi-component, multi-wavelength

US: nonzero, northeast, multicomponent, multiwavelength

5. Punctuation and style concerns regarding equations, figures, tables, and footnotes

Equations

Punctuate all equations in the body of the text with a comma or period where necessary according to their function in the sentence. If the equation ends a sentence, then it should be followed by a period (full stop). Please include a numbered reference with each equation and use that reference when discussing the equation in the body of the paper.

Figure and table legends

The first sentence of a figure caption or legend should be a descriptive title in telegraphic style, which omits the articles (the, a, an). The description that follows should concisely label and explain figures and parts of figures without going into too much detail. Additional details can be provided in the main text without duplicating the information provided in the captions.

Footnotes

Please make any footnotes as brief and succinct as possible.

6. Verb tenses

You are likely to find yourself shifting between tenses in your paper depending on what aspect of your findings you are discussing. In general, A&A style uses the present tense to describe general facts, findings, truths, methods, and results from papers published within the last ten years. We use the past tense to describe the specific steps of the method used in your study or another study by a different author or group of authors. Here are some tips on when to use the past tense and when to use the present.

6.1 Present simple and past simple

Use the **present simple** for:

- statements of fact and general truths
- general findings from other authors, particularly recent ones (from the last ten years)
- general methods used in the field (not the specific steps you used in your study)
- general descriptions of your results and findings, including any discussions or conclusions
- descriptions of tables and figures included in the paper

Time markers for the present include: now, usually, often, currently, at present, in this paper, etc. The context will also indicate the tense that is appropriate for each part of your paper. The introduction, for example, tends to offer the reader a **general** background for the current study so it is typically written in the present tense.

Examples:

- ✓ In the usual reduction procedure, the data are measured and flux-calibrated.
- ✓ Herschel images allow us to detect new YSOs.
- ✓ In this paper, we find that the emission could be fully non-thermal at 5 GHz.

Use the **past simple** for:

- specific steps you took as part of your method for your study (not general methods)
- specific steps taken as part of a method by other authors and scientists (not general methods)
- specific methods taken by other authors as well as their findings from studies in the distant past (e.g., more than ten years ago)

The past tense is frequently used in the body of the paper where you describe the **specific** actions you took in your study to achieve your final results, such as: we took, we carried out, we measured, we calibrated, we used, we observed, we calculated, we deduced, we assumed, we concluded.

Examples:

- ✓ In our study, we measured and flux-calibrated the data.
- ✓ We detected 16 YSOs based on the Herschel images.
- ✓ Using this method, we found that the emission was fully non-thermal at 5 GHz.

When describing your findings in the present tense, make sure that you also use the **present** for **recent** or **current** (within the last ten years) findings from other authors. Using the past tense when referring to the work of other authors could suggest that their findings are incorrect or out of date. Their specific methods, however, should remain in the past tense.

6.2 Present perfect and past perfect

These tenses are used to describe actions that occur over an extended period of time or at an unspecified point in time. They are generally **not particularly useful** in scientific writing.

Examples:

- ✓ Astronomers have used many different methods to study the Milky Way.
- ✓ The authors had already published their paper by the time we finished ours.

There is also the **present perfect continuous tense**, which is used to describe an action that began in the past, continues in the present, and may continue into the future. Again, this tense is **rarely** necessary when writing a scientific paper.

Example:

- ✓ The researchers' results have been useful in providing a background for our own study.

Note: This tense can be used with phrases that serve as indicators of time, such as “in the past few years, in recent years, over the past few years” to extend the action through a period of time.

Example:

- ✓ In recent years, several Seifert 2 galaxies have been discovered.

6.3 Present continuous and past continuous

These tenses are not recommended as there is **seldom** any need for the present or past continuous **unless** you are describing an ongoing action in the context of a simple action.

Examples:

- ✓ We conducted our study as night was falling.
- ✓ It was proving difficult to calibrate the instrument due to environmental effects.

6.4 Future

In certain instances, you may use the future tense to describe upcoming studies or new equipment.

Examples:

- ✓ Crab pulsar rotation periods will be further examined in a forthcoming paper.
- ✓ The JWST will provide greatly improved resolution and sensitivity.

Once in a while, you might find yourself needing to alternate between tenses when discussing things that happened at various points in time.

Example:

- ✓ The Hubble deep field consists of 300 images that were taken in 1995. Such a large store of data had never been available before then.

7. General hyphenation guide

Hyphens are what make the difference between a man-eating alligator and a man eating alligator.

Generally, the Chicago Manual of Style recommends that you should hyphenate compound phrases to avoid misdirecting the reader. When in doubt, they say, look it up in the dictionary. The goal of hyphens is to improve clarity on the relationships between words in a compound phrase. If there is a possibility the reader may be confused, it is best to use the hyphen and apply it consistently to a given phrase throughout the paper.

Examples of how hyphens can change the meaning of a phrase:

- ✓ All inclusive classrooms are to be commended. (all classrooms that are inclusive)
- ✓ All-inclusive classrooms are to be commended. (classrooms that are all-inclusive)
- ✓ He submitted nine page reports that morning. (nine reports of one page)
- ✓ He submitted nine-page reports that morning. (more than one report of nine pages)

When there is no possibility of ambiguity, there is no reason to use the hyphen unless it is **standard usage**, such as well-known, ill-humoured, long-term. Words that might be **misread** because the merged form already exists and has a distinct meaning should also gain a hyphen, such as re-form (form anew instead of reform) or re-pair (pair again instead of repair).

If the result is **awkward**, it is best to reword a sentence with too many hyphens.

Example:

- ✓ The study covered a wide age-distance-metallicity-density parameter space.
- ✓ The study covered a wide parameter space of ages, distances, metallicities, and densities.

Note: Two-word phrases with an adverb ending in **ly** are **not** hyphenated.

Examples: highly paid person, rapidly rotating planet.

Note: Compounds that use comparatives and superlatives with a participle (verb) have no hyphen.

Examples:

- fast-rotating galaxy; faster rotating galaxy; fastest rotating galaxy.
- far-reaching findings; farther reaching findings; farthest reaching findings.

However, with **compounds** that use comparatives and superlatives with a noun, there is a hyphen:

Examples:

- high-mass star; higher-mass star (but: even higher mass star); highest-mass star.
- high-resolution screen; higher-resolution screen; highest-resolution screen.
- A high-mass star typically burns hydrogen faster than its lower-mass counterpart.

Hyphens in word-forming prefixes

Both UK and US conventions use merged and hyphenated word forms. The US spelling tends to merge common prefixes (e.g., multi, over, non) in compound nouns or adjectives, whereas the UK spelling is more likely to hyphenate.

Examples:

X We used a **non relational** database.

✓ We used a **nonrelational** database (US convention)

✓ We used a **non-relational** database (UK convention)

General note: The Chicago Manual of Style reports that with frequent use, both open and hyphenated compounds tend to become closed (as in the case of on-line to online; broad-band or broad band to broadband) and that is either reflected in the dictionary or should be expected to be reflected in an upcoming edition. This is why you may see some discrepancy among spelling and hyphenation among various papers written by scientists from all over the world.

Here are some more points on when and how to use hyphens from the American Psychological Association: <https://apastyle.apa.org/learn/faqs/when-use-hyphen>

8. Common editing issues

Here is a list of the common errors that A&A language editors tend to see in papers.

8.1 Nouns

Data uses the plural form of the verb, however **data set** and **data point** take the singular

Examples:

✓ We extrapolated the data and found that they were incorrect.

✓ We reported that our data set was insufficient and we needed to obtain further data points.

While **statistics** is plural in form, the verb form can be either plural, when referring to a collection of data, or singular, when referring to the discipline. However, a **set of statistics** always uses the singular form of the verb.

Examples:

✓ The statistics show that many of the observations were impacted by noise.

✓ This set of statistics was undermined by the results of the latest study.

✓ Statistics is concerned with compiling, organizing, analyzing, and interpreting data.

Dynamics uses the singular form of the verb.

Example: The dynamics of the system was described by a quantum master equation.

Galaxy cluster refers to a cluster of galaxies (the “ies” from “galaxies” is dropped in this case).

Example: This galaxy cluster contains hundreds of thousands of stars.

8.2 Verbs

Account

Usage: to account for; to take into account

Examples: We account for this discrepancy in our calculations.

We take this discrepancy into account when checking our results.

Agree

Usage: to agree with; to be in agreement with

Examples: Our results agree with the findings published in the literature.
Our data are in agreement with the findings of a previous study.

Aim

Usage: to aim to; to be aimed at

Examples: In this study, we aim to show the consistency and stability of the Nuker models.
This study is aimed at demonstrating the significance of the inner density slope within the model.

Allow

Usage: to allow for; to allow something/someone to do something

Examples: This assumption allows for a precise calculation.
These innovative telescopes allow us to make more precise observations.

Correct

Usage: to correct for

Example: We used this method to **correct for** the skewed measurement in our calculations.

Distinguish; differentiate

Usage: to distinguish from; differentiate from

Example: We used the color red to distinguish our results from those of the previous study.

8.3 Pronouns and relative pronouns

et al.

This expression refers to a team with more than one author and uses the plural form of the verb. When making reference to authors, referees, or other individuals, confusion about pronouns can be avoided by using the neutral **they** form in references and acknowledgements.

Example:

✓El Mellah et al. (2019b) suggest that this mechanism is chiefly responsible for the formation of ultra-luminous X-ray sources (ULXs). We thank the referee for their comments.

That; which

These are relative pronouns that have a similar meaning but which are used differently in a sentence. A&A style leans towards the use of **that** when providing essential and defining information about a subject because it is a more direct expression of the relationship between the subject and the description.

Examples:

- An effective gating mechanism that hampers the accretion of the transferred material seems to be at work in these systems, which has a negative impact on X-ray luminosity.
- The galaxy that contains approximately one trillion stars also has satellite galaxies. (i.e., there is more than one galaxy and the fact it has one trillion stars is the defining element.)
- The galaxy, which contains approximately one trillion stars, also has satellite galaxies. (i.e., there is at least one galaxy and the additional information about the one trillion stars is nonessential.)

Note: There should not be a comma before **that** (unless it is preceded by another, separate clause in a complex sentence) but **which** can be used with or without a comma, depending on the structure and complexity of a sentence.

8.4 Expressions of size, number, and scope

None

Example: None of the parameters were met.

One of

Example: She is one of the best astronomers in the world.

Many; a number of

Examples: There have been many papers written on the subject. A number of researchers have studied this topic. There were a number of researchers taking part in the study.

Majority; minority (implies more or less than 50% of something)

The majority of researchers rely on this funding to carry out their work.

Fraction (implies a small portion)

Only a fraction of our results were in agreement with the hypothesis.

9. Measurements and their descriptions

English uses adjectives like **high** or **low** and **greater** or **lesser** as adjectives to express the **volume**, **size**, or **quantity** of a measurement. The following chart of descriptive words in scientific papers can help in finding the standard adjective to fit common types of measurements.

high or low	abundance, absorption, accuracy, adiabaticity, background, brightness, contrast, degree, density, energy, extinction, fraction, frequency, latitude, level, luminosity, mass, metallicity, number, obliquity, percentage, precision, pressure, probability, proportion, quality, rate, redshift, resolution, shear, speed, temperature, value, velocity.
big/large or small	amplitude, broadening, diffusivity, momentum, opacity, proper motions, radius, uncertainties
high/low or large/small	dispersion, frequency, magnitude, number statistics
wide/broad or narrow	range, spread, variety
steep or shallow	gradient, slope
long or short	burst, length, period, time, timescale

strong or weak	acceleration, anisotropy, argument, asymmetry, constraint, contrast, current, dependence, effect, evidence, magnetic field, flow, gradient, instability, pulse, relevance, shear, turbulence, velocity field
tight or loose	relationship, constraint, correlation note: strong and weak can also be used in these instances

10. Suggested resources for more tips on language editing in the sciences

- CHEMISTRY: *The ACS Style Guide: A Manual for Authors and Editors*, Second Edition, edited by Janet S. Dodd.
- BIOLOGY, the biology department at Columbia University: *Writing a scientific research article* [<http://www.columbia.edu/cu/biology/ug/research/paper.html>]
- NASA – Langley Research Laboratories guide for authors presenting reports by Mary McCaskill [<http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19900017394.pdf>]
- The latest edition of *The Chicago Manual of Style*, Chicago University Press.