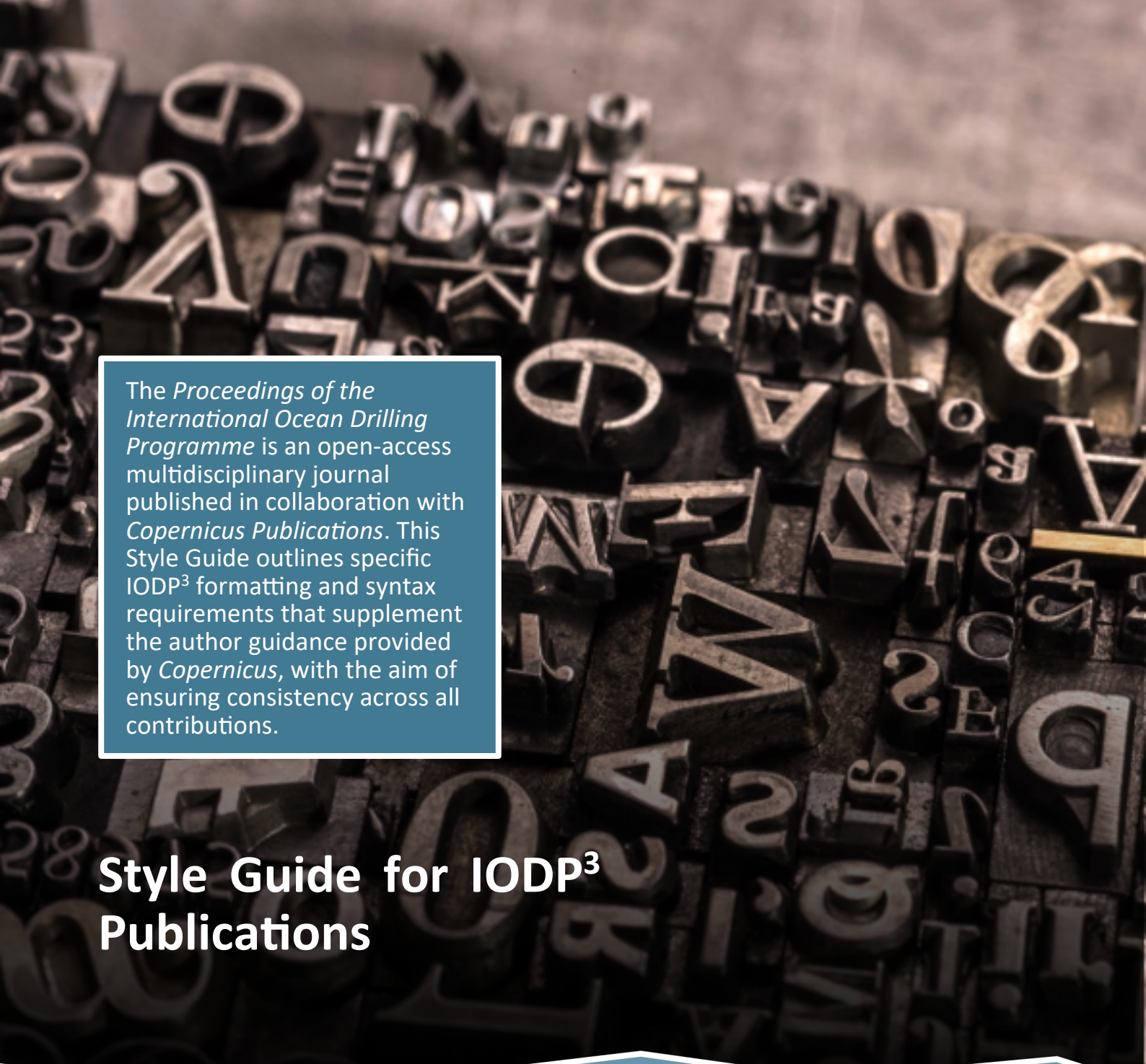

The *Proceedings of the International Ocean Drilling Programme* is an open-access multidisciplinary journal published in collaboration with *Copernicus Publications*. This Style Guide outlines specific IODP^3 formatting and syntax requirements that supplement the author guidance provided by *Copernicus*, with the aim of ensuring consistency across all contributions.

Style Guide for IODP^3 Publications

INTERNATIONAL OCEAN DRILLING PROGRAMME

Version 1.0, July 2025

Style Guide for IODP^3 Publications

1. Introduction

The *Proceedings of the International Ocean Drilling Programme* is an open-access multidisciplinary journal dedicated to publishing reports and research results for IODP[3] offshore and SPARC (Scientific Projects using Ocean Drilling Archives) expeditions.

The journal is published by *Copernicus Publications* and hence manuscripts for submission to the *Proceedings* should be prepared in accordance with the author submission guidelines available at **https://www.proceedings-iodp3.net/submission.html**. These provide key information on the preparation of manuscripts, figures and tables, and on the formatting of units, references and citations.

The purpose of this Style Guide is to provide additional information on formatting and syntax requirements that are specific to IODP[3] science that supplement the author guidance provided by Copernicus, with the aim of ensuring consistency across all contributions.

Priority should be given to the *Copernicus Publications* submission guidelines in case of conflicts with any of the information contained herein.

2. Vessel names

Vessels refer to ships, boats, submersibles, remotely operated vehicles (ROVs), and jack-up/lift boats.

- For the vessels commonly found in IODP[3] publications:
  - First use: e.g., on board the drilling vessel *Chikyu*, …on the D/V *Chikyu*
  - Subsequent use: e.g., on board *Chikyu*
  - Noun following: The *Chikyu* operations schedule
- For ships that include "the" as part of their name (e.g. *L'Orient, La Splendide*), do not add another "the" in front of the ship name.
- Italicise the vessel name but not the classification: D/V *Chikyu*.
- Do not use all uppercase for a vessel name: "*Chikyu*" NOT "*CHIKYU.*"
- Do not use vessel nicknames in text.

3. Sample identifiers

3.1. Structure of sample identifiers

A full sample identifier for an IODP[3] sample includes the following, in order:

Expedition - Site+Hole - Core+CoreType – Section+Section Half, Piece or interval top–interval bottom cm.

Hard rock identifiers may also include Piece number and offset interval on the piece. Section half type (A = archive or W = working) is generally included in a sample identifier only if needed to highlight if analyses were done on a non-standard half.

Examples:

Sample 519-C0108A-9R-1A, 5–7 cm
Sample 519-C0109A-9R-1, 5–7 cm
Sample 524-M0156A-5R-3, Piece 2, 2–4 cm
Sample 524-M0156A-23R-2, Piece 1A
Section 521-C0121B-5H-CC
Interval 530-M0169-4H-3, 47–64 cm

- **Expedition**: official expedition number; this is a 500-series number for IODP[3].
- **Site**: numbered in the order drilled: MSP expedition site numbers are prefaced with "M", e.g., Site M0096. *Chikyu* expedition site numbers are prefaced with "C", e.g., Site C0019.
- **Hole**: each hole spudded, drilled, or cored at a site is given a new letter, starting with "A".
- **Core**: each core or half-core barrel deployment is given a number, starting with "1" at the top of the hole.
- **Core Type**: is a capitalised letter indicating the coring tool used (see **Section 3.3**)
- **Section**: each core is cut into numbered sections, starting with "1" at the top of each core.
- **Section Half**: each section is split lengthwise into two halves:
    - A: archive half (used for core description, half-core measurements, photographs, and archiving)
    - W: working half (used when samples are taken from the core for most laboratory tests)
    - WR: whole-round sample (taken from the section before core splitting; generally for pore water and microbiology).
- **Piece**: for some hard rock cores, broken but consolidated pieces of the core are numbered sequentially from the top of the core. Sub-pieces that can be fit together may be lettered and curated as Piece 1A, 1B, etc.
- **Interval** (offset from top of section): a length of material that was collected from the section; the interval top and bottom are given in centimetres measured from the top of the section.

3.2. Sample identifier usage

- In text or tables, use the full sample identifier including interval measured from the top of section or offset from top of section (for single point measurement), e.g., Sample 513-M0128A-16R-1, 15–20 cm, Sample 513-M0128A-16R-1, 100 cm.
- Images are usually taken on the archive half, but for good practice it is recommended that the identifier should be given with the section half type (A or W) since some images can be taken on a Working section half.
    - Line-scan images: use a full section identifier (e.g., Section 530-M0375A-15X-6 or 530-M0375A-15X-6A).
    - Close-up images: use the full sample identifier including interval photographed (e.g., Section 530-M0375A-15X-6, 25–105 cm).
    - Photomicrographs: use the full identifier including interval taken to make the thin section (e.g., Sample 529-C0250B-4R-2, 0–2 cm).
- Discussions of cores, sections, and samples must include Expedition, Site, and Hole (e.g., Core 525-M0051A-5R)
- Sites and holes can be referenced without an accompanying expedition number (e.g., Site M0353; Hole C0304A)
- Add "Site," "Hole," "Core," "Section," "Sample," or "interval" before an identifier in text for clarity. The first time a core, section, interval, or sample is mentioned in a paragraph, include the complete identifier. Subsequent references in the same paragraph can be shortened (e.g., Core 5H; Section 6X-2). If in the paragraph a different Site or Hole is mentioned, then the entire identifier, including expedition number, must be repeated to avoid confusion.

3.3. IODP[3] Core Type codes

- **A** = Resistivity At the Bit to log while coring (RAB-C)

- **B** = Bit sample
- **C** = Center bit recovery
- **D** = Positive Displacement Coring Motor (PDCM)
- **E** = Hyacinth Rotary Corer (HRC) recovered under in situ pressure
- **F** = Half-length Piston Corer or Short-advance Hydraulic Piston Coring System (S-HPCS)
- **G** = Ghost cores, redrilled intervals
- **H** = Advanced Piston Coring (APC) or Hydraulic Piston Coring System (HPCS)
- **K** = 8-1/2" Small Diameter Rotary Core Barrel (SD-RCB). "K" is derived from "Klein," a German word for small.
- **L** = Industry-type conventional coring system with aluminum liner
- **M** = Miscellaneous
- **N** = Navi-drill core barrel (NCB), Motor-driven Core Barrel (MDCB), or Turbine-Driven Coring System (TDCS)
- **P** = Pressure Coring System (PCS) or Pressure Core Barrel (PCB)
- **R** = Rotary Core Barrel (RCB)
- **S** = Sidewall sample
- **T** = Extended Punch Coring System (EPCS)
- **V** = Vibra-Percussive Corer (VPC)
- **W** = Wash core sample
- **X** = Extended Core Barrel (XCB) or Extended Shoe Coring System (ESCS)
- **Y** = Fugro Pressure Corer (FPC) recovered under in situ pressure
- **Z** = Diamond Coring System (DCS) or Advanced Diamond Core Barrel (ADCB)

4. Depths

The Science Team should use consistent depth terminology throughout the volume, including when referring to depth in text, tables, and figures. This should be based on the definitions provided in the **IODP³ Depth Scale Terminology** document and the scale used should be specified in offshore expedition Methods chapters or individual Data Reports in the case of SPARC expeditions.

5. Common IODP³ units

5.1. Organic geochemistry

Measurement	Unit	Abbreviation
Total organic carbon (TOC)	weight percent	wt%
Total carbon (TC), inorganic carbon (C)	weight percent	wt%
Total inorganic carbon (TIC)	weight percent	wt%
Calcium carbonate ($CaCO_3$)	weight percent	wt%
Hydrogen index	milligrams hydrocarbon per gram sediment	mg HC/g sediment
Oxygen index	milligrams CO_2 per gram sediment	mg CO_2/g sediment
Hydrocarbon gases (C_1, C_2, C_3, C_4, etc.)	parts per million by volume	ppmv
C_1/C_2 ratio	dimensionless	none

5.2. Inorganic geochemistry

Measurement	Unit	Abbreviation
Loss on ignition (LOI) in sediment/rock	weight percent	wt%
Salinity (IW)	dimensionless	none
Dissolved minor constituents in IW (Sr, Ba, Fe, Mn, Li, B, Si, Cu, Mo, Ni, V, Zn)	micromolar	µM
	parts per billion	ppb
Dissolved oxygen	micromolar	µM
	micrograms per litre	µg/L
Dissolved anions in IW (PO_4, NO_3, NH_4)	micromolar	µM
Dissolved cations/anions in IW (alkalinity, Cl, SO_4, Ca, Mg, K, Na)	millimolar	mM
Major element oxides in sediment/rock (SiO_2, TiO_2, Al_2O_3, Fe_2O_3, MnO, MgO, CaO, Na_2O, K_2O, P_2O_5)	weight percent	wt%
Trace elements in sediment/rock (Ba, Cr, Sc, Sr, V, Y, Zr, Zn, Co, Cu, Nb, Ni)	parts per million	ppm
Elemental ratios	dimensionless	none
Total N and total S in sediment/rock	weight percent	wt%
pH	dimensionless	none
Manheim squeezer pressure	megapascal	MPa
Solution concentration	molar	M
Standard deviation	same as measurement	
ICP wavelength	nanometre	nm

Note: µM = µmol/L, mM – mmol/L

5.3. Lithostratigraphy

Measurement	Unit	Abbreviation
XRD wavelength	Angstrom	Å
XRD plot *x*-axis unit	degree 2-theta	°2Θ
XRD plot *y*-axis unit	counts	counts
Mineral composition by thin section	percent, modal percent, or volume percent	%, mod%, vol%
Calcium carbonate ($CaCO_2$) by smear slide	percent	%
Grain size	phi	ϕ
Colour reflectance wavelength	nanometre	nm
Colour reflectance unit (L*, a, b)	percent	%
Brightness/Lightness	percent	%

5.4. Paleomagnetism

Measurement	Unit	Abbreviation
NRM and ARM intensity	ampere per metre	A/m
Magnetisation	ampere metre squared per kilogram	Am^2/kg
Magnetic moment	ampere per square metre	A/m^2
Applied field	tesla or millitesla	T or mT
Inclination and declination	degrees	°
Magnetic susceptibility (κ)	dimensionless	none
Coercivity (*B*)	millitesla	mT

5.5. Physical properties

Measurement	Unit	Abbreviation
Density (GRA, bulk, dry, grain) (ρ)	grams per cubic centimetre	g/cm^3
Moisture	weight percent	wt%
Temperature	degrees celsius	°C
	degrees kelvin	K
Thermal conductivity	watts per metre degree kelvin	W/(m·K)
Compressional wave (*P*-wave) velocity	metres per second	m/s
	kilometres per second	km/s
Natural gamma radiation	counts per second	counts/s
Heat flow	milliwatts per square metre	mW/m^2
Porosity (ϕ)	percent	%
	fraction	none
Vane shear strength	kilopascal	kPa
Pressure	bar	bar

5.6. Microbiology

Measurement	Unit	Abbreviation
Perfluorocarbon tracer in sediment	nanograms PFT per gram sediment	ng PFT/g sediment
Seawater contamination of cores	microlitre seawater per gram sediment	µL seawater/g sediment
Radioactivity	millicurie	mCi
Radiotracer activity	bequerel or kilobequerel	Bq or kBq
Microbial growth	colony formation unit	cfu
Cell counts	cells per cubic centimetre	$cells/cm^3$

5.7. Biostratigraphy/Age models

Measurement	Unit	Abbreviation
Sedimentation rate	metres per million years	m/My
	centimetres per thousand years	cm/ky
Accumulation rate	grams per square centimetre per million years	$g/cm^2/My$
Age	millions of years old	Ma
	thousands of years old	ka
Time span (duration)	millions of years	Ma
	thousands of years	ky
Carbon stable isotope ($\delta^{13}C$)	permil	‰
Oxygen stable isotope ($\delta^{18}O$)	permil	‰

5.8. Downhole logging

Measurement	Unit	Abbreviation
Photoelectric effect	barns per electron	b/e^-
Resistivity	ohm metres	Ωm
Thermal gradient	degrees per metre	°C/m
Velocity	milliseconds per foot	ms/ft
Acceleration	milliseconds per square second	ms/s^2
Azimuth	degrees	°
Gamma radiation	American Petroleum Institute units	gAPI
	counts per second	counts/s, cps
NGR: formation thorium and uranium	parts per millions	ppm
NGR: formation poatassium	weight percent	wt%

5.9. Operations

Measurement	Unit	Abbreviation
Rate of penetration (ROP)	metres per hour	m/h
Ship speed	knots	kt
Ship distance travelled	nautical miles	nmi
Weight on bit (WOB)	kilo-pounds (conv. to pounds)	klb, lb
Time	hours Universal Time Coordinated	UTC, h
Pumping rate	gallons per minute	gal/min
PDR frequency	kilohertz	kHz
Pressure	pounds per square inch	$lb/inch^2$
Mud pumped volume	barrels	bbl
Mud weight	pounds per gallon	lb/gal

5.10. Seismic

Measurement	Unit	Abbreviation
Acoustic impedance	grams per square centimetre per second	$g/(cm^2 \cdot s)$
Two-way traveltime	seconds or milliseconds	σ ορ μσ

5.11. Mechanical properties

Measurement	Unit	Abbreviation
Stiffness modulus	kilopascal	Kpa
Strain	percent	%
Effective stress	kilopascal or megapascal	kPa or MPa
Permeability	square metres	m^2
Diffusivity	square metres per second	m^2/s
Sediment consolidation	cubic centimetres	cm^3
Applied flow rate	cubic centimetres per second	cm^3/s
Viscosity	pascal seconds	Pa·s

6. Geological strata/geological time

- According to the Geological Time Scale 2020*:
    - Neogene (Miocene, Pliocene): informal substages (early/lower, middle, late/upper) are not capitalised.
    - Quaternary (Pleistocene, Holocene): formal stages (Early/Lower, Middle, Late/Upper) are capitalised.
    - "Recent/recent" as an alternative to Holocene should not be used.
- Early, middle, and late refer to geologic time or age, e.g., Sediments were dated to the early Miocene.
- Upper, middle, and lower describe location in the stratigraphic column, e.g., Upper Pleistocene sediment contained Late Pleistocene nannofossils.
- Biozones are positional, e.g., lower Zone NN12 assemblage.
- Express geologic ages using units of giga-annum (Ga: 10^9 y), mega-annum (Ma: 10^6 y), or kilo-annum (ka: 10^3 y).
- Express duration of time in years (Gy, My, or ky), e.g., the Cretaceous lasted 80 My, from 144 to 65 Ma.

7. Chronostratigraphy

- Chronostratigraphic units encompass rocks formed within certain time spans of Earth history, regardless of composition or properties. See the most current geological **International Commission on Stratigraphy timescale**. Note that the timescale is updated several times per year.

7.1. Time/age

- "early," "middle," and "late" refer to geologic time duration (expressed as My or ky) and/or age (expressed as Ma or ka). e.g., The late Eocene hiatus lasted ~3 My; The rock shows a Late Cretaceous age of 65 Ma.
- NOTE: Pliocene does not have a middle, so use mid-Pliocene.

7.2. Stratigraphic position

- "Upper," "Middle," and "Lower" describe location in the stratigraphic column and are not applicable when discussing ages, which use "early," "middle," and "late." Biozones are defined by strata and therefore should not use early, middle, or late.
    - Correct: e.g., The unconformity is overlain by Upper Cretaceous sediment; A lower Eocene sequence comprises Lithologic Unit II. Lithologic Unit II sediments are of Late Cretaceous age.
    - NOT correct: e.g., Early Eocene Biozone NN15 is placed between Sample 15R-CC and 16R-CC. The interval is dated to the Upper Cretaceous.

8. Biostratigraphy

- Use *planktonic* rather than planktic.
- Use *benthic* rather than benthonic.
- Use *Foraminifera* (capitalised) and *Radiolaria* to represent the formal phylum names.

* Gradstein, F.M., Ogg, J.G., Schmitz, M.D. and Ogg, G.M. eds., 2020. *Geologic Time Scale 2020*. Elsevier.

- Use *foraminifers* or *foraminifera* informally.
- Use *radiolarians* rather than radiolaria.

9. Taxonomic usage

In *Proceedings* volumes, formal taxonomic designations are often used: Ostracoda, Foraminiferida/ Foraminifera, Radiolaria, and Bacteria. Capitalisation and construction of these designations differs depending on whether the author is speaking of the formal taxonomic group (capitalised) or speaking informally of one or several species (lowercase: ostracods, radiolarians, foraminifer[s]/foraminifera [if both are used, use foraminifera; if only foraminifer[s] is used, don't change it]).

9.1. Species nomenclature

- The full, formal species designation consists of four parts:
    - Latin genus name
    - Latin species name
    - Surname of the "author" (discoverer and/or namer)
    - Official date when the species was "published" (named)
- Genera and species names are always italicised, the name and date of the species author are not italicised; comma usage in species author and date should be standardised toward the way the list was provided:
    - *Coccolithus radiatus* Kamptner, 1955
    - *Coccolithus radiatus* Kamptner 1955
- A name in parenthesis indicates that the author described the species but referred it to a different genus:
    - *Reticulofenestra minutula* (Gartner, 1967) Haq and Berggren, 1978
    - *Actinocyclus ingens* (Baldauf) Whiting and Schrader 1985
- It is not necessary to include the complete four-part species description in text and tables, especially if there is an alphabetical species list or systematic description included. If there is no taxonomic list, it is preferable that the full four-part designation be used for the first occurrence, but this is optional.
- The author and date that often follow the Latin genus and species name do not constitute a bibliographic reference but are part of the formal nomenclature. A corresponding bibliographic entry in the reference list is required only if the author cites page, plate, or figure references.
- The genus name is always capitalised and the species name is never capitalised. This applies in text, titles, tables, indexes, etc. The words "genus" or "species" are not capitalised when used as a classification:
    - the genus *Reticulofenestra*
    - the species *abies*
- A subspecies name following the binomial species name is also italicised, e.g., *Noctilio labialis labialis*
- A genus name used as a common name is not italicised or capitalised, e.g., discoasters, reticulofenestrids.

9.2. Genus expression

- In text the genus name can be abbreviated using the first letter of the genus, italicised and followed by a period, for each mention of a genus with each particular species after the first (spell out genus on first use), or in a list where genus identification is clear. For instance:
    - A relatively pure nannofossil ooze in the top of Section 560-M0139A-1R-1 consists of very abundant *Emiliania huxleyi* (90% of the assemblage), which indicates the *E. huxleyi* acme of Gartner (1977) with an age of ~84 ka or less. The second section of the core that contained few *E. huxleyi* is assigned to the lower portion of the *E. huxleyi* Zone.
    - Several species of discoasters were found in the assemblage: *D. deflandrei, D. pentaradiatus, D. exilis, D. variabilis,* and *D. quinqueramus.*
- If both the species and the subspecies are the same, the first one can be abbreviated. e.g., *Noctilio l. labialis.*
- Some biostratigraphers prefer that a genus name at the beginning of a sentence be spelled out, whether it is the first or subsequent mention. Follow author preference if requested.
- In tabular and graphic material in which species are listed alphabetically by genus name and when the author has provided a full species list to accompany the text, the genus name may be abbreviated. Species names are not abbreviated.
- Generally, genus names should be added to range charts and biostratigraphic event tables if there is room.

9.3. Abbreviations

A variety of abbreviations are found attached to species names. These abbreviations are not italicised. Sometimes “ssp.”, “var.,” or “f.” may be inserted before a subspecies name.

Species: sp. and var.

The abbreviations “sp.” and “var.” without a following name indicate that the species or variety is unknown or unspecified. The plural “ssp.” refers to a group of species. The genus name should never be abbreviated with sp. or var., e.g., Discoaster sp.; never D. sp.

Confer: cf.

The abbreviation “cf.,” meaning “confer” or “compare,” is included after the genus name if there is doubt about the species identification (NOTE: the comparative genus name can be abbreviated), e.g., *Discoaster* cf. *D. sublodoensis, Reticulofenestra* sp. cf. *R. samodurovii, Gephyrocapsa* sp. cf. *sinuosa, Prunopyle* cf. *titan.*

Affinity: aff.

The abbreviation “aff.” after the genus name means that the species is closely related to the one given but is possibly a different species. Aff. implies less certainty than cf. Again, the second genus name can be abbreviated, e.g., *Gephyrocapsa* aff. *G. oceanica, Ceratocyrtis* sp. aff. *C. stigi.*

Other abbreviations

Other abbreviations inserted between genus and species names are not italicised and may include:

- f. (forma)
- n. sp. (new species)

- s.l. (sensu lato)
- s.s. (sensu stricto)
- subsp. (subspecies)

Examples: *Cornutella clathrata* s.s. *profunda, Distephanus speculum notabilis* f. *notabili, Reticulofenestra* spp. (<3 µm).

Question marks

The author may include a question mark if there is some doubt about the identification of the fossil; the position of the question mark indicates different levels of doubt. The question mark should not be separated from the genus or species name by a space and should not be italicised. Parentheses around the question mark should be removed.

- A question mark before or after the genus name indicates that the entire identification is in doubt, e.g., *Helicosphaera*? *carteri,* ?*Helicosphaera carteri, Amphistylus*? sp. A
- A question mark after the species name indicates the genus identification is certain but the species identification is not, e.g., *Reticulofenestra umbilicus*?

10. Grammar and Usage

Keep global writers/readers in mind while editing text. Pay attention to the following areas:

- Avoid using long, complicated sentences (best average is 15–20 words): split longer sentences or present a series in a bulleted list
- Preposition selection: avoid using *above* when you mean greater than or shallower than; *on* when you mean during; *under* when you mean less than or better than, etc.
- Use correct prepositions in idioms, e.g., correspond *to*; overlain *by*; different *from*; filled *with*; replaced *by*; independent *of*
- Avoid phrasal verbs, e.g., with regard to; to account for; cut down on; get out of; join up; focus on; figure out; end up
- Avoid undefined terms, e.g., this/these/those; there is.
- Avoid incorrect use/omission of articles, e.g., a/an, the
- Avoid unnecessary wordy phrases, e.g., to the north of; in the vicinity of

10.1. Verb tenses

- Operational procedures (i.e., activities that took place during the expedition) such as methods: use past tense, e.g., We preserved microbiology samples for shore analysis; A 5 mL aliquot of interstitial water was analysed for heavy metals.
- Results, observations, and statements of fact: use present tense, e.g., Ba reaches a maximum at 57.25 mbsf; Section 528-C0363A-2H-2 contains *E. huxleyi*.
- Discussion/conclusions: use present or past tense, subject to consistency throughout the section, e.g., We placed the Zone NN11/NN12 boundary in Core 52X.
- Other work or results that were performed at specific time in the past: use past tense, e.g., Howe et al. (2023) analysed samples from Site 1134.
- Actions that took place in the past or continues to the present, actions from an indefinite time in the past: use present perfect tense, e.g., Several investigators have observed the same result.

10.2. Collective nouns

- Use the singular verb to emphasise the group, e.g., For LOI, 3–5 g of sediment was weighed into a crucible; VSP testing was suspended while a pod of whales was in the area; A total of 156 m of sediment was recovered.
- Use the plural verb to emphasise the individual members of the group, e.g., Fifteen samples were analysed.
- "Data" is always used in a plural sense in IODP[3] publications, e.g., NGR data were uniformly lower than background.

10.3. Plural forms

- index, indexes
- appendix, appendices
- hiatus, hiatuses
- datum, datums (but not in the context of data, where the singular form is "datum" and the plural form is "data")

11. Capitalisation

11.1. DO capitalise

- **IODP[3] designations** when preceding a number or identifier (but not "interval"): "Expedition," "Site," Hole," "Core," "Section," "Sample," and "Piece", e.g., Expedition 545; Site C0309; Hole C0309A; Core 15R; Section 5; Piece 7A.
- Designations that precede a letter or numeral, e.g., Line XL2052; Seismic Reflector C; Lithologic Unit IV; Logging Unit 2; Anomaly M1; Marine Isotope Stage 5.
- Formally named **water masses, currents, and underwater features**, e.g., Ridge; Trough; Plateau; Basin; Abyssal Plain; Trench; Massif; Fracture Zone; Reef; Seamount.
- Formally named **geographical locations and/or features**, e.g., Equator; North Pole; Cape; Sea; Volcano; Island; Mount; Gulf.
- Northern Hemisphere and Southern Hemisphere.
- **Geochronologic/chronostratigraphic divisions** if formally defined, e.g., Cenozoic; Pliocene; Quaternary.
- Formally defined **geological periods or events**, e.g., Last Glacial Maximum; Laschamp Event; Ice Age; Last Glacial Maximum; Greenhouse Earth.
- **Lithostratigraphic unit names** if listed by the International Commission on Stratigraphy, e.g., Otaku Group; Hatteras Formation.
- Formally defined **magnetostratigraphic polarity divisions**, e.g., Chron C2n; Brunhes Chron; Jaramillo Subchron; Cretaceous Long Normal.
- **Rock-stratigraphic and time-stratigraphic unit modifiers** if formally named: lower/middle/upper or early/middle/late. For example, Cretaceous and Jurassic have these formal divisions (e.g., Early/Lower Cretaceous, Late/Upper Jurassic, Middle Jurassic).
- Formally defined **biostratigraphic divisions (zones/biozones)**, e.g., Subzone NP1a; *Paralia sulcata* Zone; *Rouxia californica* Biozone; Zone NN12.
- **Supragenus and genus names**, e.g., Subphylum (Sarcodina); Class (Actinopoda).
- "**Earth**" when used as a formal name.

- **Common nouns when part of a proper name** or list of names, e.g., Atlantic, Pacific and Indian Oceans; Bengal Fan; Columbia River.
- **Each component of a compound word in titles or headings** (if first word), e.g., Core-Log-Seismic integration; X-Ray laboratory.
- **Proper noun preceded by a hyphenated prefix**, e.g., mid-Cretaceous, pre-Albian, sub-Arctic, trans-Atlantic.
- **First word of all bulleted or numbered list elements** in vertical lists, regardless of punctuation.
- **Official titles of persons and teams, with or without personal names**. e.g., Co-Chief Scientist; Operations Superintendent; Expedition Project Manager; Marine Laboratory Specialist; Expedition Science Team; Sample Allocation Committee.

11.2. Do NOT capitalise

- **Structural features and informal stratigraphic terminology**, even preceded by a proper name (plate, arc, shelf, margin, fault, drift, subduction zone, hotspot), e.g. Pacific plate, Mariana arc, Cascadia margin.
- **Informal subdivisions of series/epochs or subdivisions of units of lower rank** (early/middle/late or upper/middle/lower or extra modifiers) unless formally defined as a division by the International Commission on Stratigraphy, e.g., early Oligocene; mid-Pliocene.
- **Species and subspecies names**; e.g., *Pseudomiocenica oceanica*.
- **English derivatives from Latin taxonomic names**, e.g., discoasters, heterohelids, ostracods.
- Proper names used as measurement units, e.g., faraday, newton, pascal, tesla, watt.
- **Names of chemical ions, elements, and compounds when spelled out**, e.g., barium, carbon, carbon dioxide, sulphate.
- **Laws/theories**, e.g., Archie's relation, Boyle's law.

12. Hyphenation

The decision whether to spell a compound term as open (two words), hyphenate, or close up as a single word is determined by its grammatical function and position in a sentence.

- Chemical elemental and molecular names are open, e.g. Fe oxide; Mg carbonate
- Element + noun is closed, e.g., K-feldspar; Mg-Ti system
- Colours are hyphenated as equal terms; don't hyphenate modifiers (e.g., greenish), e.g., red-brown oxidation; the clay was yellow-green; the ooze was reddish brown; dark bluish grey ooze.
- Foreign phrases are open (no italics) unless hyphenated in original language. e.g., in situ measurement; en echelon pattern.
- Phrases used as adjectives are hyphenated, e.g., point-to-point comparison; signal-to-noise ratio; two-way-travel time.
- Number + abbreviation is open, e.g., 33 m length; 5 km deep water
- Noun + enumerator/number is always open, e.g., mesh size of 63 μm

DO NOT hyphenate these prefixes:

- *over*: overriding
- *under*: underthrust
- *co*: coexist
- *multi*: multichambered
- *bio*: biozone
- *paleo*: paleomagnetism
- *micro*: microfossil
- *macro*: macroscopic
- *high*: highstand
- *down*: downhole

DO hyphenate these prefixes:

- *re*: re-examine
- *pre*: pre-expedition
- *post*: post-cruise
- *semi*: semi-opaque
- *non*: non-magnetic
- *mid*: mid-slope
- *along*: along-slope

13. Additional Syntax Rules for Numbers, Units, Formulae and Symbols

13.1. Numbers

- Words or numerals:
  - Generally spell out single digit numbers in the text and use numerals for numbers ≥ 10.
  - A numeral is, however, acceptable to specify a number of objects, e.g., We analysed 5 samples.
  - If several numbers occur within a paragraph or series of paragraphs, maintain consistency in the *immediate context* between numerals and spelled out numbers.
- Ordinals: Letters in ordinals should not appear as superscripts, e.g., use: 15th, not 15^{th}
- Decimal numbers:
  - Start decimal fractions with a zero, e.g., 0.78 m
  - Follow a decimal with a zero only to represent precision, e.g., 27°C and 27.0°C are not interchangeable.
- Time of day:
  - Use the 24 h system, i.e., 00:00–23:59 h.
  - If required, seconds or fractions of seconds may be added, e.g., 09:27:08 h, 09:27:08.8 h
- Time duration units with numerals:
  - Abbreviate seconds (s), minutes (min), hours (h), and years (y), e.g., 45 s, 10 min, 2 h
  - Spell out days, weeks, and months, e.g. 5 days, 6 months
- Large numbers:
  - Omit commas from numbers, e.g. use 1785 and 96728, not 1,785 and 96,728
  - Retain all parts of the numbers in ranges of very large numbers, e.g., 26 million to 35 million
- Numerical ranges. Note the following representations are all equivalent and acceptable:
  - From...to: e.g., varies from 140 to 150 mm; MS ranges from 5×10^{-5} to 220×10^{-5} SI
  - Between...and: e.g., are between 140 and 150 mm
  - En-dash (do not use en-dash if either number is negative): e.g., 140–150 mm
- Scientific notation:
  - Retain all parts of the numbers in ranges in scientific notation, e.g., 9.2×10^{-3} to 12.6×10^{-3}
  - Tables/figures may use scientific E notation for exponential numbers, e.g., 1.98E−02, 6.83E+02
  - NOTE: scientific notation (E) differs from the exponential function (e): e.g., $1.67e^{3.98}$.

- "approximately" and "~" are both acceptable.

13.2. Units

- Spell out a unit of measurement without a numeral, even in scientific contexts, e.g.:
  - "Microbial processes in sediment occur at rates of sub-nanomolar cubic centimetres per day", not "…rates of sub-nM cm^3/day"
  - "Major element oxides are expressed in weight percent", not "…in wt%".
- Use singular forms, e.g., use lb not lbs; use kg not kgs
- Place a period after a unit only at the end of a sentence.
- Hyphenate units that are part of a compound modifier, e.g., a 5-mm wide vein
- Leave a space between a numeral and a letter unit, e.g., 16 km; 6500 K; 3–4 cm; 36 °C; 17 Å
- Do not repeat letter units in ranges, e.g., 10–15 mm
- Do repeat letter units when describing dimensions, e.g., 5 cm × 6 cm
- Use SI (metric) units whenever possible; however, do not convert drilling operations sizes originally specified in inches to metric, e.g., for drilling bits, pipe, collars, and tools.
- Spell out the unit "inch" to avoid confusion with the word "in." Where appropriate, use the plural "inches."
- Clarify hybrid mixes of metric and US units, e.g., "150,000 lb overpull", not "150 klb overpull'.
- Use molarity (M) rather than normality (N) to express concentrations of acids:
  - For acids with a single "H", M and N are equivalent, e.g., 6 N HNO_3 = 6 M HNO_3.
  - For acids with multiple "H", ask LLP/query author for molarity, i.e., 9 N H_2SO_4 ≠ 9 M H_2SO_4.
- See **Section 5** for a detailed list of IODP[3] units that are in common use.

13.3. Dates

- Follow the format X Month Year, e.g., 12 August 2025, 14 and 15 August 2025, 2 September–4 November 2025, 12 December 2025–14 January 2026

13.4. Equations, operands, and chemical formulas

- Operational signs should be surrounded by single spaces when they are preceded and followed by non-operational terms (exception: forward slash [/] for division does not have spaces surrounding it), e.g.:
  - $x = y + z$
  - $x = y/z$
  - $R_0 = R_t \times [1 + 0.025 \times (T - 20)]$
  - maximum > 38.2 mM
- When an operational sign is not preceded by a non-operational term, do not put a space between it and the term it modifies, e.g., an error of ±3; contains <5 m of sediment
- Group mathematical elements from outside in using {}, [], and (), e.g., $z = \{k[(a + b) - y(c + d)]\}/e$
- Use parentheses to enclose variables to which a function (ln, log, tan, cos, sin) will be applied, e.g., $\rho = \ln(I_0/I)/(\mu d)$.
- Equations do not need to be numbered unless the author refers to an equation in the text. In that case, number all equations in that document.
- Use italic type for single-letter variables unless they are subscript/superscript,

  e.g., VR = V_{pw}/V_{solid}; M_s = s[(M_w − M_d)/(1 − s)]; TOCDIFF = TC – IC

- Break equations across line breaks in the following preferred order:
    - before the equals sign;
    - before a plus or minus sign not enclosed in parentheses, brackets, or braces; or
    - between parentheses or brackets for multiplication of two parts; place multiplication symbol on second line.
- If more than three variables/constants are defined, set definitions as a vertical list, and set other equations with two or more definitions in the same document in the same way.
- To indicate the number of items in a test population, use
    - *N* if all values in the dataset were used; or
    - *n* if a subset of values was used (e.g.,outliers were removed)

13.5. Complex chemical formulas

- Numerals can occur at the beginning or within a chemical name, set off with hyphens [note that there is no space after commas between numbers in a chemical name], e.g., 5,7-dihydroxy-3-(4-hydroxyphenl)-4H-1-benzopyran-4-one.
- *Italic* type on element symbols denotes attachment to an atom, e.g., *O*,*O*,*S*-triethyl phosphorodithioate.
- Non-italic type is used on element symbols in type or reaction used as a noun or adjective, e.g., S-methylisation.
- *Italic* type is used for capital H that denotes added hydrogen, e.g., 2*H*-pyran-3(4*H*)-thione.
- Greek letters (not spelled out) denote stereochemistry, e.g., 5α, 10α, 15α, 20α-tetraphenylporphyrin.
- *Italic* type indicates positional, stereochemical, configurational, or structural prefixes, e.g., *cis*-diamminedichloroplatinum
- *Italic* type within square brackets is used in compound names, e.g., dibenzo[*a*,*h*]anthracene

13.6. Symbols

- Do not begin a sentence with a stand-alone symbol (e.g., δ). A sentence can be started with a symbol connected to a word (e.g., β-Endorphins). In this case, capitalise the first letter of the word to which the symbol is connected.
- Ampersand (&) is acceptable in company names. Otherwise, replace with “and” in text, tables, and taxonomic text.