IODP Shipboard Writing Guide

March 2009

General guidelines

- Use American spelling (first entry in Merriam Webster's *Collegiate Dictionary*).
- For general grammar rules (compound modifiers, capitalization, punctuation, etc.) consult *The Chicago Manual of Style* (15th edition).
- For geographic terms, follow Merriam Webster's *Geographical Dictionary* (3rd edition).
- For frequently used geological descriptors and terms, consult the *Glossary of Geology* (5th edition).

Acronyms

- Define at first use in volume text acronyms that are used more than once in the volume. Consult definitions and capitalization in the "IODP Dictionary." [Note: Acronyms defined in the Abstract must be redefined in the main body of each chapter.]
- Define in each table note acronyms that are used in the table headers or body.
- Define in each figure caption acronyms that are used in the figure.

Capitalization

Capitalize the following:

- "Leg," "Site," Hole," "Core," "Section," and "Sample" (but not "interval") when preceding a number or identifier.
- "Expedition" when it is an official part of the expedition name (e.g., Wilkes Land Expedition), but not when it is a generic term (e.g., FY09 expeditions) or referring to more than one expedition (e.g., Equatorial Pacific and Wilkes Land expeditions).
- Designations that precede a letter or numeral (Anomaly M-O, seismic Line 2, Reflection C, lithologic Unit IV).
- Names of water masses, for example:

Antarctic Bottom Water	Antarctic Circumpolar Current	Antarctic Convergence	Caribbean Sea
Gulf of Mexico	Gulf Stream	Intermediate Water	Kuroshio Current
North Atlantic Deep Water	Polar Front	Southern Ocean	Subantarctic Mode Water

- Formally named underwater features (consult *Gazetteer of Undersea Features*), for example:

Abyssal Plain	Bank(s)	Basin	Borderland	Caldera	Canyon
Cap	Channel	Cone	Deep	Drift	Discordance
Escarpment	Fan	Fracture Zone	Gap	Gateway	Guyot
Hill(s)	Hole	Knoll	Levee	Mountains	Nose
Passage	Peak	Plain	Plateau	Promontory	Province
Reef(s)	Ridge	Rise	Saddle	Seachannel	Seamount
Shoal(s)	Sill	Spur	Strait	Tablemont	Terrace
Trench	Trough	Valley	Volcano		

- Formally named geographic locations and/or features (consult *Webster's Geographic Dictionary*), for example:

Cape	Desert	Equator	Falls
Great Divide	Island	Lake	Mount
Northern Hemisphere	Peak	Peninsula	Point
Southern Hemisphere	North Pole	Mountains	

- Formal geologic divisions:

Cenozoic	Mesozoic	Paleozoic	Jurassic
Cretaceous	Paleogene	Neogene	Paleocene
Eocene	Oligocene	Miocene	Pliocene
Pleistocene	Holocene	Quaternary	

- Formal magnetostratigraphic divisions:

Chron C2n	Subchron C2n.1	Gauss Chron	Matuyama Chron
Olduvai Subchron	Brunhes Chron	Jaramillo Subchron	Subchron C4Ar.2n
Kaena Subchron	Cobb Mountain Event	Subchron C3n.3n	Mammoth Subchron
Cochiti Subchron	Gilbert Chron	Subchron M-2r	Reunion Subchron

- Geological/historical periods or events:

		Younger/Dryas Event	marine isotope Stage 5
Paleocene/Eocene Thermal Maximum		Laschamp Event	Heinrich Event

- Formally defined geological features and geologic/geographic names:

Otaku Group	Puriri Formation	Marshall Paraconformity	Hatteras Formation
Murphy Member	Wildwood Member	Bishop Conglomerate	

- "Lower," "middle," and "upper" ("early," "middle," and "late") when indicating a formally defined rock-stratigraphic, time-stratigraphic, or time unit. According to the 2007 International Commission on Stratigraphy, this includes Lower/Early, Middle, and Upper/Late Jurassic and Lower/Early and Upper/Late Cretaceous only.
- Supragenus names (phylum, class, subclass, order, family) and genus names *but not* species names: *Paralia sulcata*.
- Formally defined zones named for genus/species: *Paralia sulcata* Zone, Zone NN12
- Common nouns when an essential part of a proper name: Pacific Basin or Atlantic Ocean *but* Atlantic, Pacific, and Indian oceans.
- "Earth" when used as a formal name but not when preceded by "the": on Earth *but* on the earth.
- A proper noun preceded by a hyphenated prefix: mid-Cretaceous.
- The first word of each element of a list, regardless of punctuation.
- Figure, Table, Plate, and Equation when followed by a number or letter.
- Official titles of persons even when used without personal names: Co-Chief Scientist, Staff Scientist, Expedition Project Manager, Curator, Marine Laboratory Specialist, Core Technician.

Do NOT capitalize the following:

- Structural features, even when preceded by a proper name:

anticline	arc	continental shelf	fault
forearc	island arc	nappe	plate
pipe	syncline	aquifer	

- Subdivisions of series/epochs or subdivisions of units of lower rank: middle Eocene.
- Genus names used as common nouns: discoasters, heterohelids.
- Proper names used as measurement units: faraday, newton, pascal, tesla, watt.
- Informal terms in stratigraphic unit names and intrusives (per North American Stratigraphic Code):

assemblage	bed	facies	interval
layer	sequence	unit	strata
deposit	dike	sill	pluton

Preferred spelling and usage

- Use open compounds from "**Appendix B**" to avoid unnecessary hyphenation of unambiguous science and engineering terms used in the IODP *Proceedings*.
- Follow "**Appendix C**" for IODP depth scale terminology.
- Avoid using circa (ca.) when possible. If necesary, use only in a temporal sense (i.e., with dates or ages).

Stratigraphic terms

Follow the American and International stratigraphic codes, which draw a clear theoretical distinction between time (geochronologic) terms and position (chronostratigraphic) terms.

- Early, middle, and late refer to geologic time and/or age: late Eocene eruptive phase, sediments of Early Cretaceous age.
- Upper, middle, and lower describe locations of the sediments: Upper Cretaceous sediments, lower Eocene sequence.

- In discussions of fossils and organisms:
  → To describe the age of sediments: the occurrence of *Globorotalia tosaensis* dates the sequence to early Miocene (~15 Ma).
  → To describe the location of fossils in the stratigraphic column: *Pulleniatina obliquiloculata* is common in the lower Miocene assemblage.
  → Nannofossil zones occur in space: lower Zone NN15.

Units, numbers, and symbols

General unit conventions

- Use singular forms with units: lb not lbs, kg not kgs.
- Place a period after a unit only at the end of a sentence.
- Do not hyphenate units that are part of a compound modifier: a 5 mm wide vein.
- Leave a space between a numeral and a letter unit: 16 km.
- Close up the space between a numeral and a symbol unit: 34.5%, 36°C, –3.2‰, 2σ, 0.2°2θ.
- Do not repeat letter units in ranges: 10–15 mm *but* do repeat symbol units: 10%–15%.
- Repeat letter units when describing dimensions: 5 cm × 6 cm.
- Spell out the unit "inch" to avoid confusion with the word "in."
- Use SI (metric) units whenever possible (see **"Appendix D"** for additional IODP units).

General number conventions

- Start decimal fractions with a zero: 0.78 m.
- Follow a decimal with a zero only to represent precision: 27°C and 27.0°C are not interchangeable.
- Express numerical ranges in one of the following formats:
  → From…to: ranges from 140 to 150 mm,
  → Between…and: ranges between 140 and 150 mm,
  → En dash: a range of 140–150 mm, or
  → Unit change: 15 mm to 5 m.
- Retain all parts of the numbers in ranges in scientific notation: 9.2×10^{-3} to 12.6×10^{-3}.

Equations

- Equations do not need to be numbered unless the equation is refered to in text. In that case, number all equations in that chapter.
- Example equation:
  A measure of resistivity (R_0) is then obtained through the relationship

$$R_0 = V/(I \times \mathrm{C}), \qquad (3)$$

  where V is the voltage, I is the current, and C is an empirically derived "cell constant.

The above example could also be expressed as follows:

A measure of resistivity (R_0) is then obtained through the relationship

$$R_0 = V/(I \times \mathrm{C}), \qquad (3)$$

where

V = voltage,
I = current, and
C = cell constant, an empirically derived function.

Lists

Lists can be part of a sentence or paragraph (run-in list) or set off from the text (vertical list). Short, simple lists are best presented run-in with text, particularly if the introduction and list items form a complete, grammatically correct sentence. If the list needs to be prominent or is long or contains more than several elements that are phrases, a vertical list may be more appropriate. Additionally, if each item of the list consists of one or more complete sentences, set in a vertical list.

Parallel construction

Whether a list is run-in or vertical, enumerated or not, each item must be parallel in grammatical construction.

Example:

Vertical list that is NOT parallel in construction:

In order to enhance the downhole log processing capability on the ship, we recommend the following, in order of importance:

1. Develop software to perform core-log integration,
2. Provide software to create synthetic seismograms, and
3. Issues of depth references and nomenclature must be resolved.

To correct this list to parallel construction, word as follows:

In order to enhance the downhole log processing capability on the ship, we recommend the following, in order of importance:

1. Develop software to perform core-log integration,
2. Provide software to create synthetic seismograms, and
3. Resolve issues of depth references and nomenclature.

Run-in lists

If a run-in list is enumerated with numbers or letters, enclose the number or letter for each list element in parentheses. Punctuate a run-in list like a sentence, using a colon to introduce the list only if the introductory clause is independent. Separate three or more list items with commas unless any one of the items requires internal punctuation, in which case use semicolons to separate list items.

Vertical lists

Set vertical lists off from text sections. Numbered lists imply chronology or importance and, for this reason, should be used when the list elements need to show rank, order, or procedure. If there is no particular order to list elements, use a bulleted list.

- Vertical lists can be introduced by a phrase or a complete sentence.
- If the introduction is a complete sentence, follow it with a colon; if the introduction is a phrase, there is no introductory punctuation for the list.
- If the list elements are phrases that complete a sentence begun in the introduction, divide by commas or semicolons; a period follows the last element.
- If list elements are complete sentences, follow each element with a period.
- Begin each element in all vertical lists with an uppercase letter.
- A list of short bullets (i.e., 1 to 2 words each bulleted item) requires no punctuation for each element.

List examples

Bulleted list

Drilling a short series of shallow holes into First Ridge would allow us to address several questions:

- What is the importance of *along-strike* vs. *across-strike* fluid flow in basement?

- What is the origin and significance of shallow seismic anomalies associated with areas of seafloor seepage?
- What is the extent and nature of subseafloor microbiological activity within shallow basement, and how does it relate to the upward seepage of basement fluids?

Numbered list

For a better understanding of the applied lithologic terminology, we give three examples:

1. An unconsolidated sediment containing 80% nannofossils, 13% silty clay, and 2% volcanic glass shards is termed "mud-bearing nannofossil ooze" (with minor volcanic glass shards;
2. A sediment containing 60% silty clay, 30% nannofossils, and 10% diatoms is termed "diatom-bearing nannofossil mud;" and
3. A friable sediment consisting of 50% nannofossils, 30% diatoms, and 20% foraminifers is referred to as a "foraminifer-bearing diatom nannofossil chalk."

Alpha list

The core was composed of

a. Mixed biogenic components (7%–78%),
b. Siliciclastic components (5%–34%), and
c. Volcaniclastic components (0%–9%).

Plain list

The total abundance of all calcareous nannofossils for each sample was estimated as follows:

V = very abundant (>20,000 specimens for 500 fields of view).
A = abundant (2,001–20,000 specimens for 500 fields of view).
C = common (51–2,000 specimens for 500 fields of view).
F = few (11–50 specimens for 500 fields of view).
R = rare (1–10 specimens for 500 fields of view [~3 traverses]).
B = barren (none).

Complex list

Terms that describe lithification vary depending upon the dominant composition:

1. Sediment derived predominantly from calcareous pelagic organisms (e.g., calcareous nannofossils and foraminifers)
   a. Chalk: can be scratched easily by a fingernail.
   b. Ooze: can be deformed with a finger.
   c. Limestone: cannot be scratched easily.
2. Sediment derived predominantly from siliceous microfossils (diatoms, radiolarians, and siliceous sponge spicules)
3. Ooze: can be deformed with a finger.
   a. Radiolarite/spiculite/diatomite: cannot be easily deformed manually, and
   b. Porcellanite: is less hard and compact than chert.
   c. Chert: is very hard, with glassy luster.
4. Sediment composed of sand-sized volcaniclastic grains
   a. Ash: can be deformed easily with a finger.
   b. Tuff: is more consolidated than ash.
   c. Lapilli: is coarse grained.

Species lists

Species lists or systematic paleontology descriptions are generally not included in the main body of text but are treated as an appendix. Species lists included in text should be moved into an appendix at initial edit. See **"Appendix E"** for more information.

Citations

Citing in-volume text

Links can be made to any level of heading in any chapter in the volume. For example:

- (see **"Composite Depths"**)
- (see **"Magnetostratigraphy"** in "Paleomagnetism")
- (see **"Hard Rock Cores"** in "Magnetostratigraphy" in the "Methods" chapter)
- The methods used during Expedition 301 are detailed in the **"Methods"** chapter.
- Site 1088 is located on Agulhas Ridge (Figs. **F1, F5,** in the "Expedition 301 Summary" chapter).
- XRD data are compiled in separate tables in the "Lithostratigraphy" sections of each chapter.

Citing prime data

Each *Proceedings* volume contains prime data in the "Core descriptions" section.

- If prime data for a particular site is referenced from text, the link will open the first page of the specific prime data type for that site: The characteristics of the sediments are defined on the basis of smear slide analyses (see **"Site U1301 smear slides"** in "Core descriptions"). This link opens the combined PDF file to the first page of smear slide data.
- If a particular site is not identified in a text callout, the link will open the contents page index: The core description forms, or "barrel sheets" (see **"Core descriptions"**), summarize the data obtained during a visual inspection of the core. This link opens to the Core Descriptions section of the volume Table of Contents.

Citing supplementary material

Each volume includes a supplementary material section that may contain data tables, figures, raw data, description logs, and so on. Contents of the supplementary material section are cited from text as follows: Data tables are given as supplementary material (see C0001_DS.XLS in folder VELOCITY in **"Supplementary material"**). See **"Supplementary material"** for more information.

Citing unpublished papers and personal communication

- Do not include unpublished papers or personal communications in the reference list.
- Unpublished data citations should be listed in text as follows: "...using the procedure described by Wheat et al. (unpubl. data)." If more information about the unpublished citation exists (link to URL, data of unpublished report), include this information in the parens to help the reader find the information if needed.
- Personal communication citations should be listed in text as follows: "...using the procedure described by G. Wheat (pers. comm., 2007)."

Citing software and databases

- Do not include cited software or databases in the reference list.
- If available, include the URL in text where the software or database is cited (e.g., "…Petschick's MacDiff version 4 (**www.ccp14.ac.uk/ccp/ccp14/ftp-mirror/krumm/Software/macintosh/macdiff/MacDiff.html**)."

Reference lists

It is the author's responsibility to provide complete, accurate reference information. All works explicitly referenced in the chapter (e.g., cited in text, taxonomic lists, tables, plates, figures, appendixes, or caption material) must be included in a reference list, with the following exceptions:

- Software or databases,

- Personal communications
- Unpublished data
- Manuscripts in preparation
- Chapters within the same volume

Publication year

- "Submitted" is used if the article has not yet been accepted for publication. This also applies if the article as "in review." Include information for the journal to which the manuscript is submitted in the reference list.
- "In press" is used if the article has been accepted but the publication has not yet been released, including chapters in *Proceedings* volumes. In press applies even if the abstract is available online through CrossRef. Include information for the journal at which the manuscript is in press in the reference list.
- For references with identical authorship and year, add the letters a, b, etc. to distinguish (e.g., Smith and Jones, 1990a; 1990b), using the title of the work to determine the alphabetical order.
- For references with multiple authors and the same first author and year (e.g., Smith, Jones, and Brown, 1990, and Smith, Jones, and Green, 1990), the letter designation is determined by alphabetization of the authors. In this case, Brown comes before Green alphabetically so Smith, Jones, and Brown would be Smith et al., 1990a.

Digital object identifiers

When available, include the Digital Object Identifier (DOI) at the end of the reference. The DOI will be linked when the chapter is published.

Uniform resource locator

If a reference is available online but it does not have an assigned DOI, add the uniform resource locator (URL) after the reference.

Examples

See **"Appendix F"** for examples of IODP reference formats.

Table formatting guidelines

- Format similar tables in each site chapter in the same style (e.g., wording of captions and footnotes, how headers are stacked, wording in headers, spacing between columns, wording in notes, etc.).
- Common table inconsistencies include the following:
  - → Datum event tables: genus names spelled out vs. genus names abbreviated, use of terms like "first appearance" vs. "first occurrence," column headers "datum" vs. "event."
  - → Interstitial water chemistry tables: chemical symbol vs. spelled out chemical names, use or not of valence charges, units in each cell vs. spanned.
  - → Standardize abbreviations throughout the volume: e.g., NA = not applicable or not analyzed (not N/A). [Note: If NA is used for not applicable in one table, you may want to use NM = not measured instead of using NA = not analyzed in other tables.]
  - → Define dashes in cells and blank cells in table note.
- If numerals in a column extend varying places past the decimal point, include precision instructions for the editors.
- Check that all headers have units, where appropriate, and that units are in agreement with style preferences.
- In column headings, use the singular instead of the plural: Age (Ma) vs. Ages (Ma) or Unit vs. Units.
- When the table body (not units in headers) contains abbreviations, define them in the table note.
- When using symbol designations to reference note information, use this order: asterisk (*), dagger (†), double dagger (‡), double asterisk (**).

- Explanatory material should be kept to a minimum in table captions; move explanatory material to the table notes.
- Standardize caption wording across sites in brief form:
  → **Table T1.** Coring summary, Hole U1320A.
  → **Table T3.** Lithostratigraphic units, Hole U1320A.
  → **Table T4.** Relative abundances of planktonic foraminifers, Hole U1320A.
  → **Table T8.** Magnetostratigraphic tie points, Site U1320.
  → **Table T9.** Pore water chemistry, Hole U1320A.
  → **Table T11.** Headspace gas analysis, Hole U1320A.
  → **Table T15.** T2P Deployment 3, Hole U1320A.
- If a less common acronym will be used only in the table caption, spell it out. If it is a common acronym used throughout the volume, you can use the acronym.

Range charts

- Alphabetize genus names.
- Spell out all genus and species names.
- Check definitions used in table notes against the Methods chapter or site chapters.

Splice tie point tables

Use the terms "tie to" and "append to" instead of "tie" and "append."

Figure formatting guidelines

- Check each figure for axis labels and units, symbols, text, placement of data points, and legend or key.
- Add A, B, C parts to the figure if the caption contains parts or if individual figure parts are cited in text. Conversely, add figure parts to the caption if shown on the figure but not in the caption.
- Provide a key or definitions in the caption for every figure that contains symbols or patterns.
- Core numbers should be accompanied by a core letter.
- Add "U" before IODP hole and site numbers.
- Complete/correct core, section, or sample identifiers to IODP style.
- Abbreviate stratigraphic terms as follows:

Age/Stage	Abbrev.	Age/Stage	Abbrev.	Age/Stage	Abbrev.
Cenozoic	Cenoz.	Mesozoic	Mesoz.	Quaternary	Quat. or Q
Tertiary	Tert. or T	Cretaceous	Cret.	Jurassic	Jur.
Neogene	Neog.	Paleogene	Paleog.	Pleistocene	Pleist.
Pliocene	Plio.	Miocene	Mio.	Oligocene	Oligo.
Eocene	Eoc.	Paleocene	Paleoc.	Danian	Dan.
Maastrictian	Maast.	Campanian	Camp.	Santonian	Sant.
Coniacian	Coniac.	Turonian	Tur.	Cenomanian	Cenom.
Albian	Alb.	Aptian	Apt.	Barremian	Barrem.
Hauterivian	Haut.	Valanginian	Val.	Berriasian	Berrias.
Portlandian	Port.	Kimmeridgian	Kimm.		

Biostratigraphy figures

- Close up zone letters/numbers: NN10, CN7, etc.

Column headings

- Use singular labels: Age (Ma) not Ages (Ma).
- Use "Lith. unit" for lithostratigraphic and lithologic unit columns.
- Use "Lithology" for graphic lithology columns.
- Identify all "Unit" columns as Lith., Logging, Basalt, Igneous, Seismic, Physical properties, etc.

Plots

- Plot labels are consistent on like figures.
- If "Depth" is the vertical (*y*-) axis label, *x*-axis labels appear at the top of the plot.
- For other plots, *x*-axis labels appear at the bottom of the plot.
- Numerical scale values appear on the same axis (top or bottom) as labels and units.
- Include enough numbers on axes for clarity but not so many it is hard to read.

Common units on figures

- NGR/natural gamma ray/natural gamma radiation: counts or cps
- MS/magnetic susceptibility/susceptibility: 10^{-x} SI, instrument units or IU, or standard units or SU
- Inclination/Inc. (also Declination/Dec.), orientation, dip: Degrees (°) in header or included in numerical axis labels
- Gamma radiation/gamma ray: API or gAPI (use volume style)
- Stable isotopes: ‰, ‰ PDB, ‰ VPDB, or ‰ SMOW
- Total organic carbon/TOC/OC, inorganic carbon/carbonate/IC/$CaCO_3$, sulfur/TS, nitrogen/TN: % (interstitial water) or wt% (rock, sediment)
- Age: Ma or ka
- Time: m.y. or k.y.
- Linear sedimentation rate (LSR)/Mass accumulation rate (MAR):
  → LSR = depth deposited per time (cm/m.y.)
  → MAR = depth deposited per area per time ($cm/m^2/m.y.$ or $cm/[m^2 \cdot m.y.]$)
- Density/Bulk density/Wet bulk density/GRA density/MAD density/LWD density: g/cm^3 (not g/cc)
- Color reflectance/Reflectance/Lightness/L*a*b*: % (if axis is labeled 10, 20, 30, etc.) or fraction (no unit, if axis is labeled 0.1, 0.2, 0.3, etc.)
- Porosity: % (if axis is labeled 10, 20, 30, etc.) or fraction (no unit, if axis is labeled 0.1, 0.2, 0.3, etc.)
- Ratios: no units unless comparisons are not equivalent (e.g., Sr/Mg may be µM/mM or mM/M)

Common geochemistry symbols and units (interstitial waters):

Analyte (abbrev.)	Unit	Analyte (abbrev.)	Unit	Analyte (abbrev.)	Unit.
pH	none	Alkalinity	mM	Salinity	none
Sulfate (SO_4^{2-})	mM	Chloride (Cl^-)	mM	Ammonium (NH_4^+)	µM or mM
Ammonia (NH_3)	µM or mM	Calcium (Ca^{2+})	mM	Magnesium (Mg^{2+})	mM
Lithium (Li^+)	µM	Strontium (Sr^{2+})	µM	Barium (Ba^{2+})	µM
Iron (Fe^{2+} or Fe_{Tot})	µM	Manganese (Mn^{2+})	µM	Sodium (Na^+)	mM
Potassium (K^+)	mM	Nitrate (NO_3^-)	µM	Phosphate (PO_4^{3-})	µM
Boron (B)	µM	Borate (B_3BO_3)	µM	Silicate (H_4SiO_4)	µM
Trace elements	µM or ppb				

Common geochemistry symbols and units (sediment and rock):

Analyte (abbrev.)	Unit	Analyte (abbrev.)	Unit	Analyte (abbrev.)	Unit.
Silicon dioxide (SiO_2)	wt%	Titanium dioxide (TiO_2)	wt%	Aluminum oxide (Al_2O_3)	wt%
Iron oxide (Fe_2O_3)	wt%	Mangesium oxide (MgO)	wt%	Manganese oxide (MnO)	wt%
Calcium oxide (CaO)	wt%	Sodium oxide (Na_2O)	wt%	Potassium oxide (K_2O)	wt%
Phosphorous pentoxide (P_2O_5)	wt%	Loss on ignition (LOI)	wt%	Trace elements	ppm or mg/kg

Figure captions

- "After…" means possible redrafting but no changes to information in figure.
- "Modified from…" means there have been minor changes made to the original figure.
- "Adapted from…" means substantial changes have been made.
- Define all acronyms and symbols shown on the figure in the caption.
- Symbols in the key or caption must match those used in the figure.
- Do not specify color of symbols in caption if the shape is unique ("squares" rather than "green squares").
- Do not define symbols both in the caption and in a key.

Supplementary material

Supplementary material can be included in the volume associated with expedition reports or research results. Supplementary material can be any information or data to supplement results. Some examples of supplementary material include data sets in proprietary format (seismic data in SEG-Y format, X-ray diffraction data in McDiff format), data tables in Microsoft Excel format, data sets in ASCII or database formats, figures illustrating data sets, and so on. Supplementary material is not edited for volume style and is not converted to accessible formats but is rather presented as submitted.

Example: From the *Proceedings of the Integrated Ocean Drilling Program*, Volume 304/305 table of contents:

Supplementary material

Supplementary material for this volume includes expanded coring summary tables, Formation MicroScanner data, geochemistry data, glass log, igneous petrology logs, alteration logs, vein logs, microbiology logs, metamorphic petrology logs, thin section metadata, paleomagnetism data, thin section photo sheets, physical property data, and structure logs (see **README.TXT** in the SUPP_MAT directory for more details).

CORESUMM

FMS

GEOCHEM

GLASS

IGN_PETR

Appendix A

IODP acronyms and abbreviations

ACRONYM	Organization or Term
ACEX	Arctic Coring Expedition
ACORK	advanced circulation obviation retrofit kit
AESTO	Advanced Earth Science and Technology Organization
AF	Academy of Finland
AGI	American Geological Institute
AGU	American Geophysical Union
ANDRILL	Antarctic Geological Drilling
APCT	advance piston corer temperature tool
APLACON	Alternate Platform Conference
APP	Annual Program Plan
BCR	Bremen Core Repository
BGS	British Geological Survey (U.K.)
BoG	Board of Governors (JOI)
BRG	Borehole Research Group
BSR	bottom-simulating reflectors
CAB	Curatorial Advisory Board
CDAQ	common downhole data acquisition (system)
CDC	Conceptual Design Committee (U.S. SODV)
CDEX	Center for Deep Earth Exploration
CDP	Complex Drilling Project
CGU	Canadian Geophysical Union
CMCR	Center for Advanced Marine Core Research
CMO	Central Management Office
CMT	Conversion Management Team (U.S. SODV)
CNR	Consiglio Nazionale delle Ricerche (Italy)
CNRS	Centre National de la Recherche Scientifique (France)
CNSF	Coalition for National Science Funding
COE	College of Exploration
COMPLEX	Conference on Multiple Platform Exploration of the Ocean
CONCORD	Conference on Cooperative Ocean Riser Drilling
CoOL	Conference on Ocean Literacy
CORE	Consortium for Oceanographic Research and Education
CORK	circulation obviation retrofit kit
COSEE	Centers for Oceanographic Research and Education
no acronym	Consortium for Ocean Leadership (see Ocean Leadership) (formerly JOI)
CRISP	Costa Rica Seismogenesis Project
DESCINFO	Descriptive and Interpretative Information Capture
DFG	Deutsche Forschungs Gemeinschaft (German Research Foundation)
DLESE	Digital Library for Earth System Education
DNSRC	Danish Natural Science Research Council
DSDP	Deep Sea Drilling Project
D/V	Drilling Vessel
DVTP	Davis-Villinger Temperature Probe
DVTPP	Davis-Villinger Temperature Pressure Probe
EC	European Commission
ECORD	European Consortium for Ocean Research Drilling
ECORD-net	EC Research Area Network
ECR	East Coast Repository
EDP	Engineering Development Panel (formerly TAP)
EGU	European Geophysical Union

EIS	environmental impact statement
EMA	ECORD Managing Agency
ENSO	El Niño Southern Oscillation
E&O	Education and Outreach
EOR	expedition objective research
EPC	European Petrophysics Consortium
EPSP	Environmental Protection and Safety Panel
ESO	ECORD Science Operator
ESSAC	ECORD Science Support and Advisory Committee
ESSEP	Environmental Science Steering and Evaluation Panel
GCR	Gulf Coast Repository
GEPON	Geoscience Education and Public Outreach Network
GIFT	Geophysical Information for Teachers
GRICES	Gabineta de Relacoes Internacionais da Ciencias e do Ensino Superior (Portugal)
GSA	Geological Society of America
HBCU	Historically Black Colleges and Universities
HYACE	hydrate autoclave coring equipment
IAVCEI	International Association of Volcanology and Chemistry of the Earth's Interior
ICDP	International Continental Scientific Drilling Program
IFREE	Institute for Frontier Research on Earth Evolution
IGME	Institute of Geology and Mineral Exploration (Greece)
IIS-PPG	Industry-IODP Science Program Planning Group (formerly ILP)
ILWG	Industry Liaison Working Group
ILP	Industry Liaison Panel, predecessor to IIS-PPG
IMAGES	International Marine Past Global Changes Study
INSU	Institut National des Sciences de l'Univers (France)
InterMARGINS	International Margins Program
InterRidge	An initiative for international cooperation in ridge-crest studies
IO	implementing organization
IODP	Integrated Ocean Drilling Program
IODP-MI	Integrated Ocean Drilling Program Management International
ION	International Ocean Network
IRIS	Incorporated Research Institutions for Seismology
iSAS	Interim Science Advisory Structure
ISP	Initial Science Plan (for IODP)
ISSEP	Interior Science Steering and Evaluation Panel
IWG	International Working Group
IWGSO	International Working Group Support Office
JALDT	Joint Applications Development, Lab Capability, Data Management Team (formerly JTT)
JAMSTEC	Japan Agency for Marine-Earth Science and Technology
JASIT	Joint Alliance Systems Integration Team
JASMT	Joint Alliance Systems Management Team
J-DESC	Japan Drilling Earth Science Consortium
JEDT	Joint Engineering Development Team
JEODI	Joint Expedition Project Management Team
JEPMT	Joint Expedition Project Management Team (formerly JOT)
JIT	Joint Information Team
JOI	Joint Oceanographic Institutions, Inc. (now Consortium for Ocean Leadership)
JOI Alliance	Former term for USIO; members are JOI, LDEO, and TAMU
JOIDES	Joint Oceanographic Institutions for Deep Earth Sampling
JOT	Joint Operations Team (see JPMT)
JPIO	Japan Implementing Organization
JPT	Joint Platform Team
JREPORT	Joint Outreach, Education, Public Relations Team
JTT	Joint Technology Team (see JALDT)
KCC	Kochi Core Center

LDEO	Lamont-Doherty Earth Observatory, Columbia University
LIP	large igneous province
M&A	Management and Administration
MCVT	Ministerio de Ciencia Y Technologia (Spain)
MENRT	Ministerio de l'Education Nationale, de la Recherche de la Technologie (France)
MEXT	Ministry of Education, Culture, Sports, Science, and Technology (Japan)
MOST	Ministry of Science and Technology (People's Republic of China)
MOU	Memorandum of Understanding
MRC	Micropaleontological Reference Centers
MREFC	Major Research Equipment and Facilities Construction (NSF)
MSP	Mission-Specific Platform
NAGT	National Association of Geosciences Teachers
NanTroSEIZE	Nankai Trough Seismogenic Zone Experiment
NCMR	National Center for Marine Research (Greece)
NERC	National Environmental Research Council (U.K.)
NSDL	National Science Digital Library
NSF	National Science Foundation (U.S.)
NSTA	National Science Teacher's Association
NWO	Netherlands Organisation for Scientific Research
Ocean Leadership	Consortium for Ocean Leadership
OD21	Ocean Drilling in the 21st Century (Japan)
ODASES	Ocean Drilling and Sustainable Earth Science
ODL	Overseas Drilling Limited
ODP	Ocean Drilling Program
OEAW	Austrian Academy of Sciences
OGS	Instituto Nazionale di Oceanograpfiae di Geofisica Sperimentale (Italy)
OOI	Ocean Observing Initiative
OPCOM	The former Operations Committee (now Operations Task Force)
ORION	Ocean Research Interactive Observatory Networks
ORTF	Operations Review Task Force (formerly REVCOM)
OTF	Operations Task Force (formerly OPCOM)
PAC	Program Advisory Committee
PEAT	Pacific Equatorial Age Transect (expeditions)
PEIS	Programmatic Environmental Impact Statement (USIO)
PETM	Paleocene/Eocene Thermal Maximum
PMO	Program Member Office
POC	platform operating cost(s)
PPG	Program Planning Group
PPSP	Pollution Prevention and Safety Panel, predecessor of EPSP
QA/QC	quality assurance/quality control
RANNIS	The Icelandic Centre for Research
REVCOM	Review Committee (see ORTF)
SAC	Sample Allocation Committee
SAFOD	San Andreas Fault Observatory at Depth
SAS	Science Advisory Structure (IODP)
SASEC	Science Advisory Structure Executive Committee
SBTF	Simulated Borehole Test Facility
SciMP	Scientific Measurements Panel, predecessor of STP
SEDIS	Scientific Earth Drilling Information Service
SIC	systems integration contract cost(s)
SMCS	Sample Material Curation System
SNF	Swiss National Science Foundation
SOC	science operating cost(s)
SODV	Scientific Ocean Drilling Vessel
SPC	Science Planning Committee
SPPOC	Science Planning and Policy Oversight Committee

SSDB	Site Survey Data Bank
SSEP	Science Steering and Evaluation Panel
SSP	Site Survey Panel
STP	Science Technology Panel (formerly SciMP)
TAMU	Texas A&M University
TAMRF	Texas A&M Research Foundation
TAP	Technology Advice Panel, predecessor to EDP
TAWG	Technical Advice Working Group
TE&SS	Technical, Engineering, and Science Support
TFAC	Test Facility
ToR	Terms of Reference
USGS	U.S. Geological Survey
USIO	U. S. Implementing Organization
USSAC	U.S. Science Advisory Committee (for Scientific Ocean Drilling)
USSSP	U.S. Science Support Program
no acronym	U.S. Systems Integration Contractor
VR	Swedish Research Council
VSAT	very small aperture terminal
WBE	work breakdown element
WCR	West Coast Repository
WG	working group

Appendix B

IODP *Proceedings* list of open compounds

To avoid unnecessary hyphenation of unambiguous science and engineering terms used in the IODP *Proceedings*, treat the following words as open compounds in both the noun and adjectival forms:

A
acoustic impedence
air fall
air gun
ash fall

B
barrel sheet
bulk density
bottom water

C
color reflectance
compressional wave
core catcher
contact probe

D
debris flow
drill pipe
drill string
drill collar
drilling fluid
drill floor
dry bulk

E
echo sounder
end cap
end point

F
fluid flow

G
gamma ray
gas hydrate
geomagnetic field
geomagnetic reversal
greenhouse gas
ground water
guide horn

H
hard rock
hanging wall
headspace gas
heat flow
heat flux
hand specimen

I
ice sheet
inorganic carbon
insertion probe
interstitial water
island arc

M
magnetic anomaly
magnetic field
magnetic susceptibility
major element
magnetic polarity
magnetic reversal
minor element
mud clast

N
needle probe

O
ocean water
organic carbon
organic matter

P
physical properties
pore water
port call
plate tectonic
pore fluid

R
reef front
rig floor
rare earth element

S
sea level
seismic stratigraphic
seismic wave
site survey
smear slide
squeeze cake
stainless steel
sediment accumulation

S (cont.)
seismic reflection
shear wave
shear zone
sonic velocity
source rock
sulfate reduction
surface water

T
terrigenous matter
thin section
tool string
trace element
triple combination (triple combo)
top drive
total inorganic carbon

W
wall rock
water table
wet bulk
water column
water depth

Appendix C

IODP depth scale terminology June 2007, version 1.0

Definitions

Depth: A distance measured on a depth scale. A numeric value with units specified in the depth scale definition.

Depth scale: is a linear scale defined by the following parameters:

- Origin
- Path
- Unit of length (IODP recommends SI)
- Method/tool by which the scale was created.
- If any one of these parameters changes, a new depth scale is defined because stratigraphic features may be represented at different nominal depths.
- Sub-methods further qualify depth scales and are noted as appropriate. Multiple sub-methods typically do not occur for one hole and it is therefore not practical to define a depth scale type for each sub-method.

Depth map: Series of pairs of control points, each pair representing depth values from two depth scales, the FROM scale and the TO scale. Depth values from the FROM depth scale are interpolated between the control points on the TO depth scale. A depth map has the following information associated with it:

- TO scale name (the scale to be used for rendering the data)
- FROM scale name (the scale mapped to the TO scale)
- Method used for associating control points, Date, Author

For all depth scales:

Path: All paths are Measured Depth; True Vertical Depth would constitute a new depth scale.
Unit: The unit used in all schemes is m; if another unit is used (e.g., ft) it would constitute a new depth scale.

Drillers depth scale

The drillers depth scale is based on the length of drill pipe lowered below the drill floor.

Depth Scale Name	Acronym	Origin	Method Description	Sub-Method	Path	Unit	Previous Name	Previous Unit
Drilling depth below rig floor	DRF	Drill floor	Add the lengths of all drill string components deployed beneath the rig floor, from bit to the point on the rig floor where the length of the deployed portion of the last string is measured.	Describe sub-method of measuring drill string component length and length deployed at rig floor.	Measured depth	m	Depth	mbrf
Drilling depth below seafloor	DSF	Seafloor	Subtract the distance between rig floor and sea level from an estimate of sea floor depth at the drilling depth below rig floor scale using one of the sub-methods.	A. Tag seafloor B. Mudline core C. Visual control D. Inherit depth E. Other	Measured depth	m	Depth	mbsf

Logging while drilling (LWD) and measurement while drilling (MWD) depth scale

LWD measures in situ formation properties with instruments that are located in the drill collars immediately above the drill bit. Measurements are made shortly after the hole is cut and before it is adversely affected by continued drilling or coring operations.

Depth Scale Name	Acronym	Origin	Method Description	Sub-Method	Path	Unit	Previous Name	Previous Unit
LWD depth below rig floor	LRF	Drill floor	Add the lengths of all drill string components deployed beneath the rig floor, from bit to Kelly Bushing where the length of the deployed portion of the last string is measured. Account for constant offset of measured area for each sensor.	Describe sub-method of measuring traveling block position with time.	Measured depth	m	Depth	mbrf
LWD depth below seafloor	LSF	Seafloor	Subtract the distance between rig floor and sea level from an estimate of seafloor depth at the LWD below rig floor scale using one of the sub-methods	A. Tag seafloor B. Visual control C. Inherit depth D. Other	Measured depth	m	Depth	mbsf

Mud depth scale

Mud logging is the process of collecting, analyzing and recording the meaningful solids, fluids, and gasses brought to the surface by the drilling fluid (mud).

Depth Scale Name	Acronym	Origin	Method Description	Sub-Method	Path	Unit	Previous Name	Previous Unit
Mud depth below sea level	MSL	Sea level	Estimate lag time between cutting of fragments and their arrival at the rig floor and associate with drill bit depth times.	Describe sub-method used to determine lag time/lagged depth	Measured depth	m	Depth	N/A

Wireline depth scale

The wireline depth scale is based on the wire length between downhole tool and shipboard winch.

Depth Scale Name	Acronym	Origin	Method Description	Sub-Method	Path	Unit	Previous Name	Previous Unit
Wireline log depth below rig floor	WRF	Drill floor	Measure length of wireline extended beneath the rig floor.	Describe sub-method.	Measured depth	m	Depth	mbrf
Wireline log depth below seafloor	WSF	Seafloor	Subtract the distance between rig floor and sea level from an estimate of seafloor depth at the wireline depth below rig floor scale using one of three sub-methods.	A. Seafloor signal B. Drilling depth C. Inherit depth D. Other	Measured depth	m	Depth	mbsf
Wireline log speed-corrected depth (below seafloor)	WSSF	Seafloor	Correction for irregular motion of the tool during logging using accelerometer data; used for high-resolution logs such as microresistivity (FMS).	Describe sub-method if applicable.	Measured depth	m	Depth	mbsf
Wireline log matched depth (below seafloor)	WMSF	Seafloor	Pick log data from one run as a reference and map other run data using several tie points.	Describe reference log and number/ type of tie points used.	Measured depth	m	Depth	mbsf

Core depth scale

The core depth scale is based on the actual length of core recovered and the driller's depth. It can vary with time as core expands or contracts. Technically it is not a depth but it could be used to derive a depth by cumulating all core lengths.

Depth Scale Name	Acronym	Origin	Method Description	Sub-Method	Path	Unit	Previous Name	Previous Unit
Core depth (below seafloor)	CSF	Seafloor	Measure core sample or measurement offset below the core top and add it to the core top's drilling depth below seafloor; apply one of the sub-methods.	A. Let overlap if long B. Scale if long C. Other	Measured depth	m	Depth	mbsf
Core composite depth	CCSF	Seafloor	Align cores from one hole or multiple adjacent holes based on one of the sub-methods. The result is a newly constructed depth scale.	A. Append if long B. Scale by factor C. Correlate features D. Splice E. Other	Measured depth	m	Depth	mcd

Seismic depth

The seismic depth is based on the time traveled of seismic wave converted to a depth.

Depth Scale Name	Acronym	Origin	Method Description	Sub-Method	Path	Unit	Previous Name	Previous Unit
Seismic depth scale	SSF	Seafloor	Convert seismic traveltime to depth domain	A. Use local/regional velocity model B. Use ties to borehole data referenced to depth C. Use log (and core) data for seismic modeling (synthetic seismogram) D: Use check shot for interval velocity E: Combination of above method(s) F: Other	Measured depth	m	Depth	m

Appendix D

Common IODP units

Inorganic geochemistry

Measurement	Unit	Abbreviation
Loss on ignition (LOI)	weight percent	wt%
Salinity	dimensionless	
Dissolved constituents (Sr, Ba, Fe, Mn, Li, B, Si, Cu, Mo, Ni, V, Zn)	micromolar	µM
	parts per billion	ppb
Dissolved cations/anions (alk, Cl, SO_4, Ca, Mg, K, Na)	millimolar	mM
Dissolved anions (PO_4, NO_3, NH_4)	micromolar	µM
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	
Total N and total S in sediment	weight percent	wt%
Dissolved oxygen	micromolar	µM
	micrograms per liter	µg/L
pH	dimensionless	
Manheim squeezer pressure	megapascal	MPa
Solution concentration	molar	M
Standard deviation	same as measurement	

Organic geochemistry

Measurement	Unit	Abbreviation
Total organic carbon (TOC)	weight percent	wt%
Total carbon (TC), inorganic carbon (IC)	weight percent	wt%
Total inorganic carbon (TIC)	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	
GC-MS ion scan range	mass per atomic number	*m*/*z*

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 or modal percent	% or mod%
Calcium carbonate by smear slide	percent	%
Grain size	phi	Θ
Color reflectance wavelength	nanometer	nm
Color reflectance unit (L*, a, b)	percent	%
Brightness/Lightness	percent	%

Paleomagnetism

Measurement	Unit	Abbreviation
NRM and ARM intensity	ampere per meter	A/m
Magnetization	ampere meter squared per kilogram	Am^2/kg
Magnetic moment	ampere per square meter	A/m^2
Applied field	tesla or millitesla	T or mT
Inclination and declination	degrees	°
Magnetic susceptibility (κ)	dimensionless (SI)	
Coercivity (*B*)	millitesla	mT

Physical properties

Measurement	Unit	Abbreviation
Density (GRA, bulk, dry, grain) (ρ)	grams per cubic centimeter	g/cm^3
Moisture	weight percent	wt%
Temperature	degrees celsius	°C
	degrees kelvin	K
Thermal conductivity	watts per meter degree kelvin	W/(m·K)
Compressional wave (*P*-wave) velocity	meters per second	m/s
	kilometers per second	km/s
Natural gamma radiation	counts per second	cps
Heat flow	milliwatts per square meter	mW/m^2
Porosity (ϕ)	percent	%
Vane shear strength	kilopascal	kPa
Pressure	bar	bar

Microbiology

Measurement	Unit	Abbreviation
Perfluorocarbon tracer in sediment	nanograms PFT per gram sediment	ng PFT/g sediment
Seawater contamination of cores	microliter 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 centimeter	$cells/cm^3$

Biostratigraphy/Age models

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

Downhole logging

Measurement	Unit	Abbreviation
Photoelectric effect	barns per electron	b/e^-
Barrels		bbl
Resistivity	ohm meters	Ωm
Thermal gradient	degrees per meter	°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
Formation thorium and uranium	parts per million	ppm
Formation potassium	weight percent	wt%
TAP tool pressure	pounds per square inch	psi

Operations

Measurement	Unit	Abbreviation
Rate of penetration	meters per hour	m/h
Ship speed	knots	kt
Ship distance traveled	nautical miles	nmi
Weight on bit	kilo-pounds	klb
Time	Universal Time Coordinated	UTC
Pumping rate	gallons per minute	gpm
PDR frequency	kilohertz	kHz
Pressure	pounds per square inch	psi
Mud weight	pounds per gallon	ppg or lb/gal

Seismic

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

Mechanical properties

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

NOTES: µM = µmol/L, mM = mmol/L = meq/L, W/(m·K) = W/(m·C), 1 bar = 100 kPa

Appendix E

Species lists and systematic paleontology

Species lists or systematic paleontology descriptions are generlly not included in the main body of text, but are treated as an appendix.

Species nomenclature

The full, formal species designation consists of four parts. The Latin genus name, the Latin species name, the surname of the "author" (discoverer and/or namer), and the official date on which the species was "published" (named). Genera and species names are always italicized, the name and date of the species author, whether or not it is in parentheses, is set in roman type:

Coccolithus radiatus Kamptner, 1955

The author's use of parentheses should be retained; they tell the reader that the species was originally included in a different genus:

Reticulofenestra minutula (Gartner, 1967) Haq and Berggren, 1978

Actinocyclus ingens (Baldauf) Whiting and Schrader, 1985

The complete four-part species description is not necessary in the text of the chapter or in tables, figures, or plates, especially if there is an alphabetized systematic description or species list included in an appendix. If there is no list, it is preferable that the full four-part designation be used for the first occurrence.

The author and date that often follow the Latin genus and species name do not constitute a bibliographic reference proper, but are part of the formal nomenclature. A corresponding bibliographic entry in the reference list is required only if the author of the chapter has cited page, plate, or figure references.

Genus abbreviation

In text the genus name can be abbreviated using only the first letter of the genus, italicized, and followed by a period, for each mention of a genus either with each particular species after the first or in a list of several species of the same genus. The genus name should be spelled out at first mention. For example:

> A relatively pure nannofossil ooze in the top of Section 183-1139A-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 contained few *E. huxleyi* is assigned to the lower portion of the *E. huxleyi* Zone.

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 chapter, the genus name may be abbreviated. The species name is never abbreviated. Generally, genus names should be spelled out in range charts and biostratigraphic event tables.

Species list formatting

Simple species list

A simple species list, consisting only of the formal species name with our without references and/or plate citations is formatted as follows. The first line of the entry is set flush left, with carryover lines indented The genus names of each entry are spelled out. For example:

Actinocyclus ehrenbergii Ralfs in Pritchard, 1861; Hustedt, 1929, p. 525, pl. 1, fig. 298.
Actinocyclus ellipticus var. *javanica* Reinhold, 1937; Barron 1985a, pl. 7, fig. 12
Actinocyclus tennellus (Jørgensen) Andrews, 1976, p. 14, pl. 3, figs. 8, 9; as *A. ehrenbergii* var. *tenella* (Jørgensen) Hustedt, 1929, p. 530, pl. 1, fig. 302.

Extended species description

The extended species description is used if descriptive material, remarks, or other information is given in addition to the usual one- or two-line entry. The primary entry is hanging indent. Additional information is given in a new paragraph, first line indented. List entries should be separated by a space, and the genus name of each entry should be spelled out. For example:

Crucidenticula nicobarica (Grunow) Akiba and Yanagisawa, 1986, p. 486, pl. 1, fig. 9, pl. 2, figs, 1–7, pl. 5, figs. 1–9; Akiba, 1986, pl. 26, figs. 1–4; Yanagisawa and Akiba, 1990, p. 232, pl. 1, figs. 23–29.

Remarks: *Crucidenticula paranicobarica* vars. described by Akiba and Yanagisawa (1986) are tabulated together.

Actinocyclus ingens var. 1 (Pl. **P1,** figs. 7, 12).

Description and Remarks: This precursor form to *A. ingens* is characterized by closely packed areolae and light silicification of the central area. In Hole 1138A, *A. ingens* var. 1 has a lowest occurrence in Sample 183-1138A-23R-CC (210.85 mbsf), just below the FO of *A. ingens* s.s.

Araniscus lewisianus (Greville) Komura, 1998, pp. 6–8, figs. 20–22, 87–104, and text fig. 1.

Basionym: *Coscinodiscus lewisianus* Greville; Schrader, 1973, p. 703, pl. 8, figs. 1–6, 10, 15; Schrader, 1976, p. 631, pl. 14, fig. 3; Harwood and Maruyama, 1992, p. 702, pl. 6, fig. 13.

Azpeitia harwoodii Bohaty and Shiono n. sp. (Pl. **P3,** figs. 1–6, 10–13).

Synonym: *Azpeitia* sp. B of Shiono, 2000a (doctoral thesis), pl. 34, figs. 1–6; pl. 35, figs. 1–6.

Description: Valve is heavily silicified and circular in outline. Two to three areolae are present on the mantle between the valve face and valve edge. Some specimens display a weakly developed central hyaline ring on the exterior of the valve and/or increased silicification between the central areolae.

Type Level and Locality: Sample 183-1138A-11R-6, 100–101 cm, Hole 1138A, Central Kerguelen Plateau.

Holotype: Pl. **P3,** fig. 1 (high and low focus).

Type Specimen: Slide deposited in the California Academy of Science microfossil slide collection, CAS Slide Number 221034, CAS Accession Number 619994.

Stratigraphic Distribution: *A. harwoodii* is documented in Pliocene sections from both the Southern and North Pacific Oceans. The stratigraphic range for *A. harwoodii* in Hole 1138A (corresponding to Core 183-1138A-11R), falls within Subchron C2Ar, with an estimated age range of ~4.2–3.7 Ma.

In the northwest Pacific, *A. harwoodii* is recorded in Pliocene samples from DSDP Hole 579A. In this section, rare specimens of *A. harwoodii* were observed in middle Pliocene Sample 86-579A-11-2, 30–31 cm. The Pliocene interval of Hole 579A is assigned an age of ~3.6–3.4 Ma, which is a slightly younger occurrence than documented at Southern Ocean Site 1138.

Remarks: A pseudonodulus on the valve margin of *A. harwoodii* was not identified in SEM examination of specimens from Hole 1138A but was, however, noted on some specimens from Hole 579A (Shino, 2000b, pl. 34, fig. 4). Pending further SEM work on this taxon, we have elected not to include the presence of a pseudonodulus as part of the description of *A. harwoodii*.

A. harwoodii belongs to the "*Azpeitia nodulifera* group" described by Shiono and Koizumi (2002) and is taxonomically similar to *Azpeitia nodulifera* (see Fryxell et al., 1986, p. 19, 20, figs. XVII, XVIII-1, 2, 4, 5, and XXX-3, 4), a modern species found in warm-water regions. *A. harwoodii,* however, is typically smaller in diameter (18–55 µm) than *A. nodulifera* (20–100 µm).

Paleoecology: Given the warm-water affinity of modern taxa in the "*Azpeitia nodulifera* group" (Hasle and Syvertsen, 1996), the presence of *A. harwoodii* at Sites 579, 1138, and 1165 may be associated with local Pliocene warming at these sites in the North Pacific and Southern Oceans.

Derivation of Name: This species is named in honor of Dr. David Harwood at the University of Nebraska-Lincoln for his contributions to the development of Southern Ocean diatom biostratigraphy.

Authorship: The description of this new taxon is co-authored by Dr. Masamichi Shiono at Hokkaido University, Sapporo, Japan.

Systematic paleontology

Systematic paleontology is a section containing an extended, formal description of anything from two or three to a hundred species, usually including level(s) of subheads above the species level (genus, family, class, order, etc.) and subheads within the species description itself. All entries down to and including the species designation should be bold and centered. For example:

Subclass RADIOLARIA Muller, 1858
Order POLYCYSTINA Ehrenberg, 1838; emend. Riedel, 1967
Suborder SPUMELLARIA Ehrenberg, 1875
Family COLLOSPHAERIDAE Muller, 1858
Genus *POLYSOLENIA* Ehrenberg, 1872; emend. Nigrini, 1967

***Polysolenia murrayana* (Haeckel)**
(Pl. **P2,** fig. 2)

Choenicosphaera murrayana (Haeckel) Benson, 1966, p. 120, pl. 2, fig. 3.
Polysolenia murrayana (Haeckel) Nigrini and Moore, 1979, p. 517, pl. 2, figs. 4a, 4b.

Subfamily ARTISCINAE Haeckel, 1881, emend. Riedel, 1967
Genus *OMMATARTUS* Haeckel, 1881, emend. Riedel, 1971

Ommatartus avitus Riedel
(Pl. **P1,** figs. 9–11)

Ommatartus avitus riedel, Riedel and Sanfilippo, 1971, p. 1588, pl. 4, fig. 6; Zachariasse et al., 1978, p. 10, pl. 2, fig. 9.

Remarks: The polar caps of this species frequently are broken, so it is sometimes difficult to distinguish this species from *O. penultimus*. *O. avitus* is characterized by its tuberculate (knobby) cortical shell. In this study, the extinction of *O. avitus* (~3.2 Ma) is considered a chronostratigraphic datum level.

Genus *BACHMANNOCENA* Locker, 1974, emend. Bukry, 1987

Remarks: For discussion on our use of *Bachmannocena* see McCartney and Wise (1990).

Bachmannocena apiculata (Schulz)

Mesocena oamaruensis apiculata Schulz, 1928, p. 240, fig. 11.
Bachmannocena apiculata (Schulz); Bukry, 1987, pp. 403–404; McCartney and Wise, 1990, pl. 2, figs. 6–10; McCartney and Harwood, 1992, pl. 1, fig. 9.

Remarks: This taxon is not subdivided into multiple subspecies (see Bukry, 1987) in this study because of the low number of specimens that were observed and the lack of biostratigraphic significance.

Bachmannocena circulus (Ehrenberg)

Mesocena circulus (Ehrenberg), Ehrenberg, 1844, p. 65.
Bachmannocena circulus (Ehrenberg); Bukry, 1987, p. 404; McCartney and Harwood, 1992, pl. 2, figs. 1, 2; McCartney et al., 1995, pl. 4, figs. 1, 7; pl. 8, fig. 8.

Remarks: *B. circulus* has a large polygonal ring with small pointed spines. It was the dominant taxon in Sample 183-1138A-15R-CC, occurring two cores below the base of the *Distephanus speculum speculum* f. *pseudofibula* plexus. In low latitudes, *B. circulus* can be abundant in the Pliocene but is less common in the Miocene (McCartney et al., 1995).

Bachmannocena diodon diodon (Ehrenberg)

Mesocena diodon Ehrenberg, 1844, pp. 71, 84.
Bachmannocena diodon (Ehrenberg); Bukry, 1987, p. 404.
Bachmannocena diodon diodon (Ehrenberg); McCartney et al., 1995, pl. 4, fig. 8.

Remarks: This taxon was abundant in Sample 183-1138A-21R-CC and co-occurs with the dominant *B. circulus*.

Bachmannocena elliptica (Ehrenberg)

Dictyocha (Mesocena) elliptica Ehrenberg, 1840, p. 208; Ehrenberg, 1854, pl. 20(1), fig. 44a, 44b.
Mesocena elliptica (Ehrenberg); Bukry, 1978a, p. 819, pl. 6, figs. 6–13.
Bachmannocena elliptica (Ehrenberg); McCartney et al., 1995, p. 145.

Remarks: Only three specimens of this taxon were found in Sample 183-1138A-21R-CC. These specimens were fairly small, 30–50 µm, in comparison with other silicoflagellates viewed in this study, which placed them in *B. elliptica* rather than the somewhat larger and typically younger *Bachmannocena quadrangula*.

Genus *CORBISEMA* Hanna, 1928, emend. Frenguelli, 1940

Corbisema triacantha (Ehrenberg)

Dictyocha triacantha Ehrenberg, 1844, p. 80.
Corbisema triacantha (Ehrenberg); Busen and Wise, 1977, p. 713.

Appendix F

Examples of IODP reference format

DSDP

Reference to entire DSDP *Initial Reports* volume

Bader, R.G., Gerard, R.D., et al., 1970. *Init. Repts. DSDP,* 4: Washington, DC (U.S. Govt. Printing Office). **doi:10.2973/dsdp.proc.4.1970**

Chapter from DSDP *Initial Reports*

Stelting, C.E., Droz, L., Bouma, A.H., Coleman, J.H., Cremer, M., Meyer, A.W., Normark, W.R., O'Connell, S., and Stow, D.A.V., 1986. Late Pleistocene seismic stratigraphy of the Mississippi Fan. *In* Bouma, A.H., Coleman, J.M., Meyer, A.W., et al., *Init. Repts. DSDP,* 96: Washington, DC (U.S. Govt. Printing Office), 437–456. **doi:10.2973/dsdp.proc.96.119.1986**

DSDP *Technical Note*

Nierenberg, W.A., and Peterson, M.N.A. (Eds.), 1984. Drill-in-casing system. *DSDP Tech. Note,* 2. **doi:10.2973/dsdp.tn.2.1984**

DSDP *Technical Report*

Nierenberg, W.A., and Peterson, M.N.A. (Eds.), 1984. Design and operation of an Advanced Piston Corer. *DSDP Tech. Rept.,* 21. **doi:10.2973/dsdp.tr.21.1984**

ODP

Reference to entire ODP *Proceedings, Initial Reports*

Wefer, G., Berger, W.H., and Richter, C., et al., 1998. *Proc. ODP, Init. Repts.,* 175: College Station, TX (Ocean Drilling Program). **doi:10.2973/odp.proc.ir.175.1998**

Chapter from ODP *Proceedings, Initial Reports*

Wefer, G., Berger, W.H., Richter, C., and Shipboard Scientific Party, 1998. Facies patterns and authigenic minerals of upwelling deposits off southwest Africa. *In* Wefer, G., Berger, W.H., and Richter, C., et al., *Proc. ODP, Init. Repts.,* 175: College Station, TX (Ocean Drilling Program), 487–504. **doi:10.2973/odp.proc.ir.175.116.1998**

Reference to entire ODP *Proceedings, Scientific Results*

Weissel, J., Peirce, J., Taylor, E., Alt, J., et al., 1991. *Proc. ODP, Sci. Results,* 121: College Station, TX (Ocean Drilling Program). **doi:10.2973/odp.proc.sr.121.1991**

Article in ODP Proceedings, Scientific Results

Watts, K.F., Varga, L.L., and Feary, D.A., 1993. Origins, timing, and implications of Miocene to Pleistocene turbidites, debris flows, and slump deposits of the Queensland Trough, northeastern Australia (Site 823). *In* McKenzie, J.A., Davies, P.J., Palmer-Julson, A., et al., *Proc. ODP, Sci. Results,* 133: College Station, TX (Ocean Drilling Program), 379–445. **doi:10.2973/odp.proc.sr.133.248.1993**

ODP *Technical Note*

Gieskes, J.M., Gamo, T., and Brumsack, H., 1991. Chemical methods for interstitial water analysis aboard *JOIDES Resolution. ODP Tech. Note,* 15. **doi:10.2973/odp.technote.15.1991**

IODP

IODP *Scientific Prospectus*

Channell, J.E.T., Sato, T., Kanamatsu, T., Stein, R., Malone, M.J., and the Expedition 303/306 Project Team, 2004. North Atlantic climate. *IODP Sci. Prosp.,* 303/306. **doi:10.2204/IODP.SP.303306.2004**

IODP *Preliminary Report*

Expedition 311 Scientists, 2005. Cascadia margin gas hydrates. *IODP Prel. Rept.,* 311. **doi:10.2204/iodp.pr.311.2005**

Reference to entire IODP *Proceedings*

Riedel, M., Collett, T.S., Malone, M.J., and the Expedition 311 Scientists, 2006. *Proc. IODP,* 311: Washington, DC (Integrated Ocean Drilling Program Management International, Inc.). **doi:10.2204/iodp.proc.311.2006**

Chapter from IODP *Proceedings*

Expedition 311 Scientists, 2006. Expedition 311 summary. *In* Riedel, M., Collett, T.S., Malone, M.J., and the Expedition 311 Scientists, *Proc. IODP,* 311: Washington, DC (Integrated Ocean Drilling Program Management International, Inc.). **doi:10.2204/iodp.proc.311.101.2006**

Article in *Science Drilling*

Ferdelman, T., Kano, A., Williams, T., and the IODP Expedition 307 Scientists, 2006. IODP Expedition 307 drills cold-water coral mound along the Irish continental margin. *Sci. Drill.,* 2:12–16. **doi:10.2204/iodp.sd.2.02.2006**

Nonprogram publications

Abstract

Weis, D., Gautier, I., and Mennessier, J.P., 1988. MD48 dredged basalts (S. Indian Ocean): Nd, Sr, Pb isotopic study-Kerguelen type signature. *Chem. Geol.,* 70:58. (Abstract)

Article in conference proceedings

Espitalié, J., Madec, M., Tissot, B., Mennig, J.J., and Leplat, P., 1977. Source rock characterization method for petroleum exploration. *Proc. 9th Annu. Offshore Technol. Conf.,* 3:439–448.

Article in a journal

Okada, H., and Bukry, D., 1980. Supplementary modification and introduction of code numbers to the low-latitude coccolith biostratigraphic zonation (Bukry, 1973; 1975). *Mar. Micropaleontol.,* 5:321–325.

Article in press

Wei, W., in press. Calcareous nannofossils of subantarctic cores and Eocene glacial record reassessed. *Palaeogeogr., Palaeoclimatol., Palaeoecol.*

Article submitted

Nielsen, M.E., and Fisk, M.R., submitted. Specific surface area and physical properties of subsurface basalt samples from the east flank of the Juan de Fuca Ridge. *Earth Planet. Sci. Lett.*

Book

Blow, W.H., 1979. *The Cainozoic Globigerinida:* Leiden (E.J. Brill).

Chapter in a book with multiple editors

Perch-Nielsen, K., 1985. Cenozoic calcareous nannofossils. *In* Bolli, H.M., Saunders, J.B., and Perch-Nielsen, K. (Eds.), *Plankton Stratigraphy:* Cambridge (Cambridge Univ. Press), 427–554.

Dissertation/Thesis

Allen, C.P., 1989. History of ice-rafting at ODP Leg 114 sites, subantarctic/South Atlantic [M.S. thesis]. Calif. State Univ., Hayward.

Map

Bornhold, B.D., Currie, R.G., and Sawyer, B., 1989. Patton-Murray Seamount Group: 3 maps: bathymetry, magnetic anomaly, sediment thickness, 1:250,000. *Geol. Surv. Can. Open File,* 2075.

References with DOIs

Ando, M., 1975. Source mechanisms and tectonic significance of historical earthquakes along the Nankai Trough, Japan. *Tectonophysics,* 27(2):119–140. **doi:10.1016/0040-1951(75)90102-X**

References with URLs

Newton, G.B., 2005. The Science Ice Exercise Program: history, achievements and the future of SCICEX. *Hydro Int.,* 9(1):2–7. **http://www.hydro-international.com/issues/articles/id419-The_Science_Ice_Exercise_Program.html**

Appendix G

Caption examples

Plate caption

Plate P1. Helicosphaeraceae, Pontosphaeraceae, Noelaerhabdaceae, *Reticulofenestra*. Taxonomic organization and concepts are generally comparable to those of Young and Bown (1997) and Young (1998). Images with black background are cross-polarized light images; those with light backgrounds are phase-contrast images. **1.** *Helicosphaera carteri* (Sample 198-1208A-8H-CC). **2.** *Helicosphaera granulata* (Section 198-1208A-34X-5). **3, 4.** *Helicosphaera inversa* (Sample 198-1208A-3H-CC). **5, 6.** *Helicosphaera sellii* (Section 198-1208A-13H-5). **7, 8.** *Pontosphaera discopora;* (7) Sample 198-1208A-9H-CC, (8) Section 198-1208A-2H-5. **9.** *Pontosphaera multipora* (Sample 198-1208A-18H-CC). **10.** *Syracosphaera pulchra* (Sample 198-1208A-8H-CC). **11.** *Rhabdosphaera clavigera* (Section 198-1208A-1H-4). **12.** *Calciosolenia brasiliensis* (Section 198-1208A-1H-4). **13.** *Cyclic*

argolithus ?*abisectus* (11.4 µm) (Sample 198-1208A-32X-CC). **14–17.** *Cyclicargolithus floridanus;* (14) 10.1 µm (Sample 198-1208A-27X-CC), (15) 9.3 µm (Sample 198-1208A-32X-CC), (16) 7.5 µm (Sample 198-1208A-32X-CC), (17) Sample 198-1208A-35X-CC. **18.** *Reticulofenestra bisecta* (10.6 µm) (Sample 198-1208A-35X-CC). **19.** Small reticulofenestrids (~1.7 µm) (Sample 198-1208A-18H-CC). **20.** *Reticulofenestra minuta* (2.8 µm) (Sample 198-1208A-5H-CC). **21–25.** *Reticulofenestra haqii;* (21) 3.1 µm (Sample 198-1208A-18H-CC), (22) 4 µm (Sample 198-1208A-27X-CC), (23) 4.3 µm (Sample 198-1208A-16H-CC), (24) 4.1 µm (Sample 198-1208A-14H-CC), (25) 4.7 µm (Sample 198-1208A-9H-CC). **26, 27.** *Reticulofenestra haqii-asanoi;* (26) 5.4 µm (Core 198-1208A-7H), (27) 6.3 µm (Sample 198-1208A-6H). **28, 29.** *Reticulofenestra asanoi;* (28) 6.6 µm (Sample 198-1208A-6H-CC), (29) 6.8 µm (Section 198-1208A-6H-5). **30.** *Reticulofenestra rotaria* (Section 198-1208A-25X-4). **31–37.** *Reticulofenestra pseudoumbilicus;* (31) 5.0 µm (Sample 198-1208A-27X-CC), (32) 6.1 µm (Sample 198-1208A-26X-CC), (33) 6.9 µm (Sample 198-1208A-26X-CC), (34) 7.8 µm (Sample 198-1208A-19H-CC), (36) 11.5 µm (Sample 198-1208A-28X-CC), (37) 9.2 µm with grill (Sample 198-1208A-18H-CC). **38, 39.** *Pseudoemiliania lacunosa;* (38) Sample 198-1208A-16H-CC, (39) Sample 198-1208A-4H-CC. **40.** *Pseudoemiliania ovata* (Sample 198-1208A-9H-CC). **41, 42.** *Emiliania huxleyi* (Section 198-1208A-1H-4).

Photomicrograph captions

Figure F24. Mineralized volcanic breccia (Unit 1256D-42a) and volcanic breccia interbedded with sheet flow (Unit 1256D-42b). Breccia consists of angular fragments of glassy to cryptocrystalline basalt embedded in altered glass, sulfides, and late carbonate. Pieces indicated by arrows in Unit 1256D-42b are brecciated. **A.** Interval 309-1256D-122R-1 (Piece 12, 50–66 cm). **B.** Interval 309-1256D-122R-1 (Piece 13, 67–80 cm). **C.** Interval 309-1256D-123R-1 (Piece 4, 15–20 cm). **D.** Interval 309-1256D-122R-2 (Pieces 2 and 3, 15–30 cm).

Figure F49. Cataclastic zone at contact with clast of chilled basalt (cataclastic massive unit) (Thin Section 67; Sample **309-1256D-117R-01 [Piece 12, 122–125 cm**]). **A.** Core piece and thin section. **B.** Detail of thin section. Inset shows the crosscutting relationships between different events of veining (1 is the oldest); protocataclasite (protoc) and cataclasite are cut by ultracataclasite (ultracat) and gouge veins (plane-polarized light, blue filter; field of view = 10 mm).