# INTERNATIONAL STRATIGRAPHIC CHART

International Union of Geological Sciences

| EONOTHEM EON | ERATHEM ERA | SYSTEM PERIOD | SERIES EPOCH | STAGE AGE | AGES G.S. ODIN Ma | +/− | AGES S/C Ma | +/− | | STAGE NOTATION | SERIES NOTATION | SYSTEM NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHANEROZOIC PH | CENOZOIC CZ | QUATERNARY | HOLOCENE | | | | | | | | Q₂ | Q |
| | | | PLEISTOCENE | | | | | | | | Q₁ | |
| | | NEOGENE | PLIOCENE | Gelasian ✓ | 1.75 | 0.05 | 1.81 | | GSSP | n₉ | N₂ | N |
| | | | | Piacenzian | 3.4 | | 2.58 | | GSSP | n₈ | | |
| | | | | Zanclean | | | 3.60 | | GSSP | n₇ | | |
| | | | MIOCENE | Messinian | 5.30 | 0.15 | 5.33 | | GSSP | n₆ | N₁ | |
| | | | | Tortonian | 7.30 | 0.15 | 7.1 | | GSSP | n₅ | | |
| | | | | Serravallian | 11.0 | 0.3 | 11 | | | n₄ | | |
| | | | | Langhian | 14.3 | 0.5 | 13.6 | | | n₃ | | |
| | | | | Burdigalian | 15.8 | 0.2 | 16.4 | | | n₂ | | |
| | | | | Aquitanian ✓ | 20.3 | 0.4 | 19.1 | | | n₁ | | |
| | | PALEOGENE | OLIGOCENE | Chattian | 23.5 | 1.0 | 23.8 | | GSSP | e₉ | E₃ | E |
| | | | | Rupelian | 28 | 1 | | | | e₈ | | |
| | | | EOCENE | Priabonian | 33.7 | 0.5 | | | GSSP | e₇ | E₂ | |
| | | | | Bartonian | 37.0 | 1/0.5 | | | | e₆ | | |
| | | | | Lutetian | 40 | 1 | | | | e₅ | | |
| | | | | Ypresian | 46.0 | 1/0.5 | | | | e₄ | | |
| | | | PALEOCENE | Thanetian | 53 | 1 | | | | e₃ | E₁ | |
| | | | | Selandian ✓ | | | | | | e₂ | | |
| | | | | Danian | 65.0 | 0.5 | 65.0 | 0.1 | GSSP | e₁ | | |
| | MESOZOIC MZ | CRETACEOUS | UPPER/LATE | Maastrichtian | 72.0 | 0.5 | 71.3 | 0.5 | | k₆ | K₂ | K |
| | | | | Campanian | 83 | 1 | 83.5 | 0.5 | | k₅ | | |
| | | | | Santonian | 87 | 1 | 85.8 | 0.5 | | k₄ | | |
| | | | | Coniacian | 88 | 1 | 89.0 | 0.5 | | k₃ | | |
| | | | | Turonian | 92 | 2 | 93.5 | 0.2 | | k₂ | | |
| | | | | Cenomanian | 96 | 2 | 98.9 | 0.6 | | k₁ | | |
| | | | LOWER/EARLY | Albian | 108 | 3/1 | 112.2 | 1.1 | | b₆ | K₁ | |
| | | | | Aptian | 113 | 3 | 121.0 | 1.4 | | b₅ | | |
| | | | | Barremian | 117 | 5/2 | 127.0 | 1.6 | | b₄ | | |
| | | | | Hauterivian | 123 | 6/2 | 132.0 | 1.9 | | b₃ | | |
| | | | | Valanginian | 131 | 4 | 136.5 | 2.2 | | b₂ | | |
| | | | | Berriasian | 135 | 5/5 | 144.2 | 2.6 | | b₁ | | |
| | | JURASSIC | UPPER/LATE | Tithonian | 141 | ?/5 | | | | j₇ | J₃ | J |
| | | | | Kimmeridgian | 146 | | | | | j₆ | | |
| | | | | Oxfordian | 154 | 5 | | | | j₅ | | |
| | | | MIDDLE | Callovian | 160 | 2 | | | | j₄ | J₂ | |
| | | | | Bathonian | 164 | 2 | | | | j₃ | | |
| | | | | Bajocian | 170 | 4/3 | | | GSSP | j₂ | | |
| | | | | Aalenian | 175 | 3 | | | GSSP | j₁ | | |
| | | | LOWER/EARLY | Toarcian | 184 | 3 | | | | l₄ | J₁ | |
| | | | | Pliensbachian | 191 | | | | | l₃ | | |
| | | | | Sinemurian | 200 | 4/7 | | | | l₂ | | |
| | | | | Hettangian | 203 | 3 | | | | l₁ | | |
| | | TRIASSIC | UPPER/LATE | Rhetian | 220 | | | | | t₇ | T₃ | T |
| | | | | Norian | | | | | | t₆ | | |
| | | | | Carnian | 230 | 6 | | | | t₅ | | |
| | | | MIDDLE | Ladinian | 233 | 5 | | | | t₄ | T₂ | |
| | | | | Anisian | 240 | 5 | | | | t₃ | | |
| | | | LOWER/EARLY | Olenekian | | | | | | t₂ | T₁ | |
| | | | | Induan | 250 | 3 | 251.1 | 3.6 | | t₁ | | |

| EONOTHEM EON | ERATHEM ERA | SYSTEM PERIOD | SUBSYSTEM SUBPERIOD | SERIES EPOCH | STAGE AGE | AGES G.S. ODIN Ma | +/− | AGES S/C Ma | +/− | | STAGE NOTATION | SERIES NOTATION | SYSTEM NOTATION |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PHANEROZOIC PH | PALEOZOIC PZ | PERMIAN | | LOPINGIAN | Changhsingian ✓ | 250 | 3 | 251.1 | 3.6 | | p₉ | P₃ | P |
| | | | | | Wuchiapigian ✓ | | | | | | p₈ | | |
| | | | | GUADALUPIAN | Capitanian | | | | | | p₇ | P₂ | |
| | | | | | Wordian | | | | | | p₆ | | |
| | | | | | Roadian | | | | | | p₅ | | |
| | | | | CISURALIAN | Kungurian | | | 272.2 | 3.2 | | p₄ | P₁ | |
| | | | | | Artinskian | | | 280.3 | 2.6 | | p₃ | | |
| | | | | | Sakmarian | | | | | | p₂ | | |
| | | | | | Asselian | 295 | 5 | 298 | | GSSP | p₁ | | |
| | | CARBONIFEROUS | | PENNSYLVANIAN | Gzhelian ✓ | | | | | | c₇ | C₂ | C |
| | | | | | Kazimovian ✓ | | | | | | c₆ | | |
| | | | | | Moscovian ✓ | | | | | | c₅ | | |
| | | | | | Bashkirian ✓ | | | 320 | | | c₄ | | |
| | | | | MISSISSIPPIAN | Serpukhovian ✓ | | | | | GSSP | c₃ | C₁ | |
| | | | | | Visean ✓ | 325 | 5 | 327 | | | c₂ | | |
| | | | | | Tournaisian | 345 | | 342 | 3.6 | | c₁ | | |
| | | DEVONIAN | | UPPER/LATE | Famennian | 355 | 5 | 354 | 4 | GSSP | d₇ | D₃ | D |
| | | | | | Frasnian | 370 | 5 | | | GSSP | d₆ | | |
| | | | | MIDDLE | Givetian | 375 | 5 | | | GSSP | d₅ | D₂ | |
| | | | | | Eifelian | 380 | | | | GSSP | d₄ | | |
| | | | | LOWER/EARLY | Emsian | 390 | 5 | | | GSSP | d₃ | D₁ | |
| | | | | | Pragian | 400 | 5 | | | GSSP | d₂ | | |
| | | | | | Lochkovian | | | | | GSSP | d₁ | | |
| | | SILURIAN | | PRIDOLI | | 410 | 8/5 | | | GSSP | s₈ | S₄ | S |
| | | | | LUDLOW | Ludfordian | 415 | | | | GSSP | s₇ | S₃ | |
| | | | | | Gorstian | | | | | GSSP | s₆ | | |
| | | | | WENLOCK | Homerian | 425 | 5 | | | GSSP | s₅ | S₂ | |
| | | | | | Sheinwoodian | | | | | GSSP | s₄ | | |
| | | | | LLANDOVERY | Telychian | 430 | 6 | | | GSSP | s₃ | S₁ | |
| | | | | | Aeronian | | | | | GSSP | s₂ | | |
| | | | | | Rhuddanian | | | | | GSSP | s₁ | | |
| | | ORDOVICIAN | | UPPER/LATE | | 435 | 6/4 | 440 | | GSSP | | O₃ | O |
| | | | | MIDDLE | Darriwilian | 455 | 5 | | | ←4 ←3 | | O₂ | |
| | | | | | | | | 467.5 | 3 | GSSP | | | |
| | | | | LOWER/EARLY | Tremadocian | 465 | 5 | | | ←2 ←1 | | O₁ | |
| | | | | | | 500 | | 495 | | GSSP | | | |
| | | CAMBRIAN | | UPPER/LATE | | | | 500 | | | | Ɛ₃ | Ɛ |
| | | | | MIDDLE | | 520 | | 520 | | | | Ɛ₂ | |
| | | | | LOWER/EARLY | | 540 | 5 | 545 | | GSSP | | Ɛ₁ | |

| EONOTHEM EON | ERATHEM ERA | SYSTEM PERIOD | AGES (Ma) S/C | | NOTATION SYSTEM | NOTATION ERA |
|---|---|---|---|---|---|---|
| PRECAMBRIAN PC | PROTEROZOIC PR | NEOPROTEROZOIC | Neoproterozoic III | 540 | NP₃ | NP |
| | | | Cryogenian | 650 GSSA | NP₂ | |
| | | | Tonian | 850 GSSA | NP₁ | |
| | | MESOPROTEROZOIC | Stenian | 1000 GSSA | MP₃ | MP |
| | | | Ectasian | 1200 GSSA | MP₂ | |
| | | | Calymmian | 1400 GSSA | MP₁ | |
| | | PALEOPROTEROZOIC | Statherian | 1600 GSSA | PP₄ | PP |
| | | | Orosirian | 1800 GSSA | PP₃ | |
| | | | Rhyacian | 2050 GSSA | PP₂ | |
| | | | Siderian | 2300 GSSA | PP₁ | |
| | ARCHEAN AR | NEOARCHEAN | | 2500 GSSA | | NA |
| | | MESOARCHEAN | No subdivision into periods | 2800 | | MA |
| | | PALEOARCHEAN | | 3200 | | PA |
| | | EOARCHEAN | | 3600 | | EA |

This new edition of the Global Stratigraphic Chart gives a clear picture of the present state of the art in the chronostratigraphic division of geological time, mentioning only units recommended for international use. The 1986 Guidelines of ICS (Cowie et al. 1986) and their revision (Remane et al. 1996) regulate the procedure to be followed in defining international chronostratigraphic/geochronologic units. The Revised Guidelines were ratified in a formal vote by the Full Commission of ICS. They stipulate that global chronostratigraphic units are NOT defined by unit-stratotypes, but by their lower boundary only, following the principle introduced with the definition of the base of the Devonian in 1972 (Martinsson, 1977). This is indeed the only way to arrive at a global chronostratigraphic scale made up of strictly contiguous units.

Phanerozoic global chronostratigraphic boundaries are thus formally defined by a Global Stratotype Section and Point (**GSSP** - Cowie et al. 1986), whereas Precambrian chronostratigraphic boundaries are formally defined in terms of absolute age by a Global Standard Stratigraphic Age (**GSSA** - Remane et al. 1996). In order to become formal, boundary definitions have to be accepted by a 60% majority in successive votes, first by the working group responsible for the choice of the GSSP, then by the concerned Subcommission of ICS, and finally by ICS. With its ratification through IUGS, a GSSP or GSSA becomes formal. International agreements of this kind should be respected in scientific publications.

In the present chart, a typographical distinction is made among **formal,** semiformal, and *informal* units. **FORMAL UNITS** (in bold characters): all those that have their lower boundary defined by a GSSP or a GSSA voted on by ICS and ratified by IUGS. SEMIFORMAL UNITS (normal characters): several Subcommissions of ICS (Neogene, Paleogene, Jurassic, Triassic, Permian) have conducted a formal vote by postal ballot on the stage names which should be used and codified by a GSSP. As long as no GSSP has been adopted, these units, recommendable as they are, have no formal status. *INFORMAL UNITS* (in italics): Cretaceous stages have never been voted upon, but they follow a long-standing tradition and tacit international agreement.

The divisions used in the present Global Chart are based on the proposals made by the concerned Subcommissions. Simplified subdivisions have, however, been adopted for the Carboniferous and the Ordovician, in order to maintain the necessary homogeneity of presentation. More detailed versions are included in the attached extended explanatory note. Also, some traditional names which are becoming obsolete have been omitted: Lias, Dogger, Malm in the Jurassic and Tertiary in the Cenozoic (the latter already abandoned in the first edition of this chart). 'Tertiary' can be used as an informal name like *Permotrias*.

Numerical ages of the Phanerozoic chronostratigraphic boundaries were provided by G. Odin (Chairman of the Subcommission on Geochronology of ICS). Differing ages indicated by some of the Subcommissions of ICS are mentioned in a parallel column.

The letter/number symbols and the colours used for divisions down to stage/age rank are the same as those employed in the Geological Atlas of the World. They were established in concert with the Commission on the Geological Map of the World (CGMW/CCGM).

Courtesy of the division of Earth Sciences UNESCO

Compiled by Jürgen Remane, Chairman of the International Commission on Stratigraphy (ICS) with the collaboration of all ICS Subcommissions, A. Faure-Muret (Université Paris Sud and G. S. Odin (ICS-CNRS)
Edited by an intercommission working group with J. Remane, M. B. Cita (IUGS - ICS); J. Dercourt, P. Bouysse (CGMW); F.L. Repetto (UNESCO) and A. Faure-Muret (UPS)
Composition: G. Roche and L. Daumas (CNRS, Université Paris Sud, Orsay)