

# ГЕОХРОНОЛОГИЧЕСКАЯ ШКАЛА

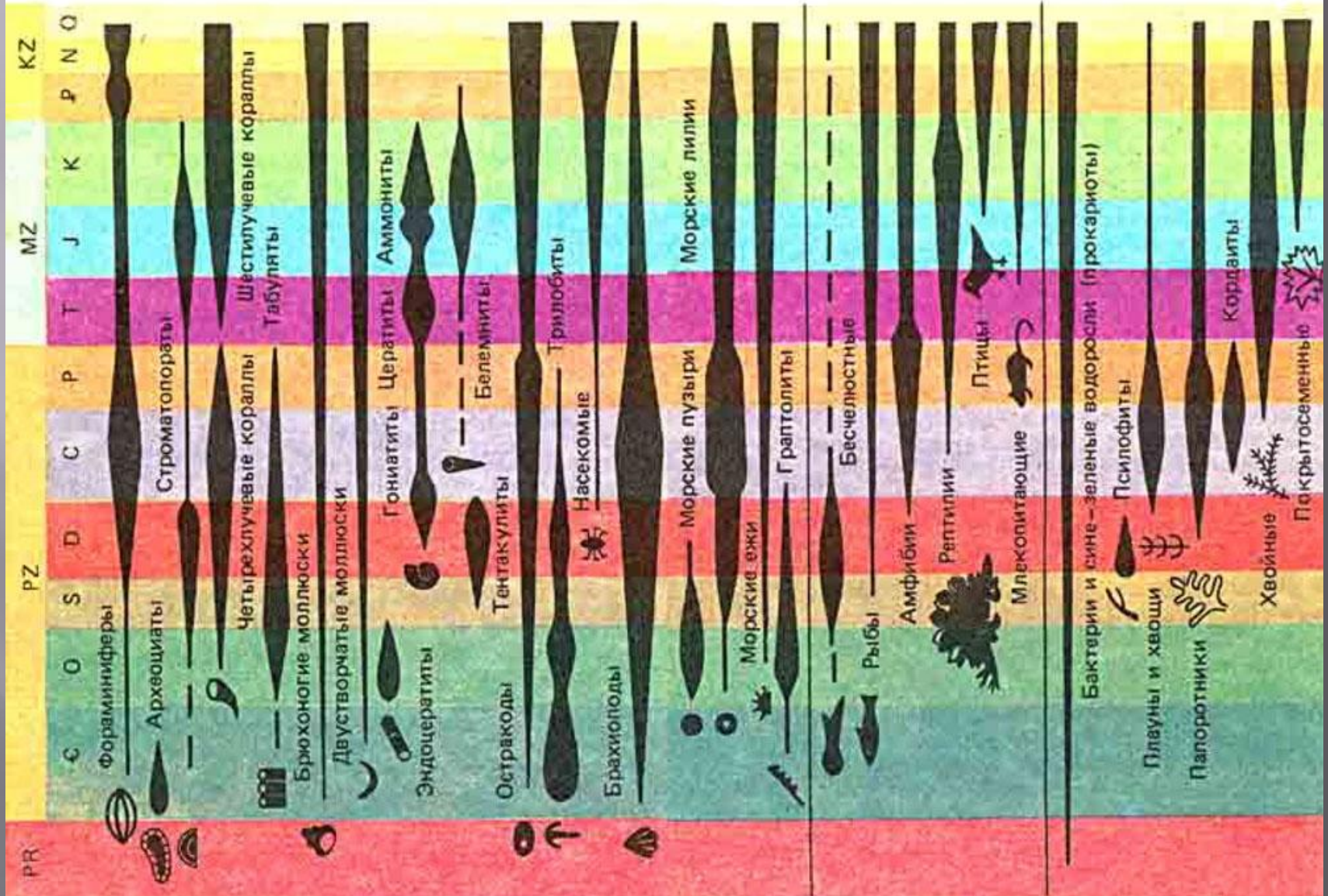
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**ГЕОХРОНОЛОГИЧЕСКАЯ ШКАЛА -**  
шкала геологического времени,  
отражающая в определённой  
последовательности и соподчинённости  
этапы, на которые делится геологически  
документированная история Земли,  
основанная на изучении  
последовательности залегания  
вулканических пород и осадочных  
отложений.

## Геохронологическая шкала

| Эон       | Эра      | Период       |
|-----------|----------|--------------|
| Фанерозой | Кайнозой | Четвертичный |
|           |          | Неоген       |
|           |          | Палеоген     |
|           | Мезозой  | Мел          |
|           |          | Юра          |
|           |          | Триас        |
|           |          | Пермь        |
|           | Палеозой | Карбон       |
|           |          | Девон        |
|           |          | Силур        |
|           |          | Ордовик      |
|           |          | Кембрий      |

|            |                 |            |
|------------|-----------------|------------|
| Протерозой | Неопротерозой   | Эдиакарий  |
|            |                 | Криогений  |
|            |                 | Тоний      |
|            | Мезопротерозой  | Стений     |
|            |                 | Эктазий    |
|            |                 | Калимий    |
|            |                 | Статерий   |
|            | Палеопротерозой | Орозирий   |
|            |                 | Риасий     |
|            |                 | Сидерий    |
|            | Архей           | Неоархей   |
|            |                 | Мезоархей  |
|            |                 | Палеоархей |
| Зоархей    |                 |            |
| Катархей   |                 |            |



MILLIONS OF YEARS  
BEFORE PRESENT

**PERIOD**

**REPRESENTATIVE LIFE**

Quaternary Period →

**CENOZOIC ERA**  
("Recent Life")

13½

Tertiary Period



Primitive Horses

65

Cretaceous Period



Last Dinosaurs

140

Jurassic Period



Quarry Dinosaurs

210

Triassic Period



First Dinosaurs

245

Permian Period



Primitive Reptiles

290

Pennsylvanian Period



Giant Insects

320

Mississippian Period



Brachiopods

360

Devonian Period



Primitive Fishes

410

Silurian Period



"Sea Scorpions"

440

Ordovician Period



Nautiloids

500

Cambrian Period



Trilobites

570

Fossils older than Cambrian age are rare. This earlier span of time is usually called, simply, Precambrian.

**PALEOZOIC ERA**  
("Ancient Life")



# INTERNATIONAL STRATIGRAPHIC CHART

International Commission on Stratigraphy



| Eonothem<br>Eon | Erathem<br>Era | System<br>Period | Series<br>Epoch | Stage<br>Age | Age<br>Ma    | GSSP          | Eonothem<br>Eon | Erathem<br>Era | System<br>Period | Series<br>Epoch | Stage<br>Age | Age<br>Ma     | GSSP          | Eonothem<br>Eon | Erathem<br>Era | System<br>Period | Series<br>Epoch | Stage<br>Age | Age<br>Ma   | GSSP        | Eonothem<br>Eon | Erathem<br>Era | System<br>Period | Age<br>Ma | GSSP<br>GSSA |               |                 |            |           |             |           |               |               |              |            |             |          |         |               |             |         |            |             |         |           |               |            |            |            |             |          |              |               |             |                  |               |             |              |               |                   |            |             |            |              |             |            |            |               |           |            |             |             |          |             |           |            |             |             |              |             |             |           |             |           |            |               |             |              |             |             |            |               |          |             |            |           |               |              |            |             |           |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|-----------------|----------------|------------------|-----------------|--------------|--------------|---------------|-----------------|----------------|------------------|-----------------|--------------|---------------|---------------|-----------------|----------------|------------------|-----------------|--------------|-------------|-------------|-----------------|----------------|------------------|-----------|--------------|---------------|-----------------|------------|-----------|-------------|-----------|---------------|---------------|--------------|------------|-------------|----------|---------|---------------|-------------|---------|------------|-------------|---------|-----------|---------------|------------|------------|------------|-------------|----------|--------------|---------------|-------------|------------------|---------------|-------------|--------------|---------------|-------------------|------------|-------------|------------|--------------|-------------|------------|------------|---------------|-----------|------------|-------------|-------------|----------|-------------|-----------|------------|-------------|-------------|--------------|-------------|-------------|-----------|-------------|-----------|------------|---------------|-------------|--------------|-------------|-------------|------------|---------------|----------|-------------|------------|-----------|---------------|--------------|------------|-------------|-----------|------------|-------------|------------|--------------|-----------|-----------|-------------|-------------|---------|-----------|---------|---------|-------------|----------|-----------|------------|-----------|---------|------------|-------------|-----------|-------------|--------|-------------|-------------|--------|-------------|-----------|-----------|-------------|----------|-------------|----------|-------------|-------------|-------------|----------|------------|-------------|-------------|------------|-------------|------------|-----------|-------------|-------------|------------|-------------|-------------|--------------|-------------|------------|--------|-------------|---|-----------|--------------|-------------|
|                 |                |                  |                 |              |              |               |                 |                |                  |                 |              |               |               |                 |                |                  |                 |              |             |             |                 |                |                  |           |              |               |                 |            |           |             |           |               |               |              |            |             |          |         |               |             |         |            |             |         |           |               |            |            |            |             |          |              |               |             |                  |               |             |              |               |                   |            |             |            |              |             |            |            |               |           |            |             |             |          |             |           |            |             |             |              |             |             |           |             |           |            |               |             |              |             |             |            |               |          |             |            |           |               |              |            |             |           |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
| Phanerozoic     | Cenozoic       | Quaternary*      | Holocene        |              | 0.0117       | ↗             | Phanerozoic     | Mesozoic       | Jurassic         | Upper           | Tithonian    | 145.5 ± 4.0   |               | Phanerozoic     | Paleozoic      | Devonian         | Upper           | Famennian    | 359.2 ± 2.5 | ↗           | Phanerozoic     | Proterozoic    | Neo-proterozoic  | Ediacaran | 542          | ↗             | Mesoproterozoic | Cryogenian | ~635      | ↗           | Tonian    | 850           | ↗             | Stenian      | 1000       | ↗           | Ectasian | 1200    | ↗             | Calymmian   | 1400    | ↗          | Statherian  | 1600    | ↗         | Orosirian     | 1800       | ↗          | Rhyacian   | 2050        | ↗        | Siderian     | 2300          | ↗           | Paleoproterozoic | Neoarchean    | Mesoarchean | Paleoarchean | Eoarchean     | Hadean (informal) |            |             |            |              |             |            |            |               |           |            |             |             |          |             |           |            |             |             |              |             |             |           |             |           |            |               |             |              |             |             |            |               |          |             |            |           |               |              |            |             |           |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                |                  | Pleistocene     | Upper        | Kimmeridgian | 150.8 ± 4.0   |                 |                |                  |                 |              | Frasnian      | 374.5 ± 2.6   |                 |                |                  |                 | ↗            | Givetian    | 385.3 ± 2.6 |                 |                |                  | ↗         | Eifelian     | 391.8 ± 2.7   |                 | ↗          | Emsian    | 397.5 ± 2.7 | ↗         | Pragian       | 407.0 ± 2.8   | ↗            | Lochkovian | 411.2 ± 2.8 | ↗        | Pridoli | 416.0 ± 2.8   | ↗           | Ludlow  | Ludfordian | 418.7 ± 2.7 | ↗       | Gorstian  | 421.3 ± 2.6   | ↗          | Wenlock    | Homerian   | 422.9 ± 2.5 | ↗        | Sheinwoodian | 426.2 ± 2.4   | ↗           |                  |               |             |              |               |                   | Telychian  | 436.0 ± 1.9 | ↗          | Aeronian     | 439.0 ± 1.8 | ↗          | Rhuddanian | 443.7 ± 1.5   | ↗         | Hirnantian | 445.6 ± 1.5 | ↗           | Katian   | 455.8 ± 1.6 | ↗         | Sandbian   | 460.9 ± 1.6 | ↗           | Darnwilian   | 468.1 ± 1.6 | ↗           | Dapingian | 471.8 ± 1.6 | ↗         | Floian     | 478.6 ± 1.7   | ↗           | Tremadocian  | 488.3 ± 1.7 | ↗           | Furongian  | Stage 10      | ~492*    | ↗           | Paibian    | ~496*     | ↗             | Guzhangian   | ~499       | ↗           | Drumian   | ~503       | ↗           | Stage 5    | ~506.5       | ↗         | Stage 4   | ~510*       | ↗           | Stage 3 | ~515*     | ↗       | Stage 2 | ~521*       | ↗        | Fortunian | ~528*      | ↗         | Stage 2 | ~528*      | ↗           | Fortunian | 542.0 ± 1.0 | ↗      |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                |                  |                 | Pliocene     | Piacenzian   | 2.588         |                 |                |                  |                 | ↗            |               | Zanclean      |                 |                |                  |                 | 3.600        |             | ↗           |                 |                |                  | Messinian |              | 7.246         |                 | ↗          |           | Tortonian   | 11.608    |               | ↗             | Serravallian |            | 13.82       | ↗        |         | Langhian      | 15.97       |         | ↗          | Burdigalian | 20.43   |           | ↗             | Aquitanian |            | 23.03      | ↗           | Chattian |              | 28.4 ± 0.1    | ↗           |                  |               |             |              |               |                   |            | Rupelian    | 33.9 ± 0.1 |              | ↗           | Priabonian |            | 37.2 ± 0.1    | ↗         |            | Bartonian   | 40.4 ± 0.2  |          | ↗           | Lutetian  |            | 48.6 ± 0.2  | ↗           |              | Ypresian    | 55.8 ± 0.2  |           | ↗           | Thanetian |            | 58.7 ± 0.2    | ↗           |              | Selandian   | ~61.1       |            | ↗             | Danian   | 65.5 ± 0.3  |            | ↗         | Maastrichtian |              | 70.6 ± 0.6 | ↗           |           | Campanian  | 83.5 ± 0.7  |            | ↗            | Santonian |           | 85.8 ± 0.7  | ↗           |         | Coniacian | ~88.6   |         | ↗           | Turonian |           | 93.6 ± 0.8 | ↗         |         | Cenomanian | 99.6 ± 0.9  |           | ↗           | Albian | 112.0 ± 1.0 | ↗           | Aptian | 125.0 ± 1.0 | ↗         | Barremian | 130.0 ± 1.5 | ↗        | Hauterivian | ~133.9   | ↗           | Valanginian | 140.2 ± 3.0 | ↗        | Berriasian | 145.5 ± 4.0 | ↗           |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                |                  |                 |              | Neogene      | Miocene       |                 |                |                  |                 | Oligocene    |               |               |                 |                |                  |                 | Eocene       |             | Paleocene   |                 |                |                  |           |              | Triassic      |                 | Upper      |           |             | Rhaetian  |               | 203.6 ± 1.5   |              |            | ↗           | Norian   |         |               | 216.5 ± 2.0 |         | ↗          |             | Carnian |           | ~228.7        |            |            | ↗          | Ladinian    |          |              | 237.0 ± 2.0   | ↗           |                  |               |             |              |               |                   |            |             | Anisian    |              | ~245.9      |            |            | ↗             | Olenekian |            |             | ~249.5      |          | ↗           |           |            | Induan      | 251.0 ± 0.4 |              |             | ↗           |           | Lopingian   |           |            | Changhsingian | 253.8 ± 0.7 |              |             | ↗           |            | Wuchiapingian |          | 260.4 ± 0.7 |            | ↗         |               |              | Capitanian | 265.8 ± 0.7 |           |            | ↗           |            | Wordian      |           |           | 268.0 ± 0.7 | ↗           |         |           | Roadian |         | 270.6 ± 0.7 |          |           | ↗          | Kungurian |         |            | 275.6 ± 0.7 |           | ↗           |        | Artinskian  | 284.4 ± 0.7 |        | ↗           | Sakmanian |           | 294.6 ± 0.8 | ↗        |             | Asselian | 299.0 ± 0.8 |             | ↗           | Gzhelian |            | 303.4 ± 0.9 | ↗           | Kasimovian | 307.2 ± 1.0 | ↗          | Moscovian | 311.7 ± 1.1 | ↗           | Bashkirian | 318.1 ± 1.3 | ↗           | Serpukhovian | 328.3 ± 1.6 | ↗          | Viséan | 345.3 ± 2.1 | ↗ | Tournaian | 359.2 ± 2.5  | ↗           |
|                 |                |                  |                 |              |              |               |                 |                |                  |                 |              |               |               |                 |                |                  |                 |              |             |             |                 |                |                  |           |              |               |                 |            |           |             | Paleogene |               | Eocene        |              |            | Paleocene   |          |         |               | Triassic    |         | Lower      |             |         |           | Permian       |            |            | Upper      |             |          |              | Changhsingian | 251.0 ± 0.4 |                  |               |             |              |               |                   |            |             |            |              | ↗           |            |            | Wuchiapingian |           |            |             | 253.8 ± 0.7 |          | ↗           |           |            |             | Capitanian  |              |             | 260.4 ± 0.7 |           |             |           |            | ↗             | Wordian     |              |             | 265.8 ± 0.7 |            |               |          | ↗           |            | Roadian   |               |              |            | 270.6 ± 0.7 |           |            | ↗           |            |              |           |           | Kungurian   | 275.6 ± 0.7 |         |           |         |         | ↗           |          |           | Artinskian |           |         |            | 284.4 ± 0.7 |           | ↗           |        |             | Sakmanian   |        | 294.6 ± 0.8 |           |           | ↗           | Asselian |             |          | 299.0 ± 0.8 |             | ↗           |          |            | Gzhelian    | 303.4 ± 0.9 |            | ↗           | Kasimovian |           | 307.2 ± 1.0 | ↗           |            | Moscovian   | 311.7 ± 1.1 |              | ↗           | Bashkirian |        | 318.1 ± 1.3 | ↗ |           | Serpukhovian | 328.3 ± 1.6 |
|                 |                | Mesozoic         |                 |              |              |               |                 |                |                  | Cretaceous      |              |               |               |                 |                |                  | Upper           |              |             |             |                 |                | Carboniferous    |           |              |               | Pennsylvanian   |            |           |             |           |               |               |              |            |             |          |         |               |             |         |            |             |         |           |               |            |            |            |             |          |              | Upper         | Permian     | Lopingian        | Changhsingian | 251.0 ± 0.4 | ↗            | Wuchiapingian | 253.8 ± 0.7       |            |             |            |              | ↗           |            |            |               |           |            |             | Capitanian  |          | 260.4 ± 0.7 |           |            |             |             |              |             | ↗           |           |             |           |            | Wordian       |             |              |             | 265.8 ± 0.7 |            |               |          | ↗           |            |           |               |              |            | Roadian     |           |            | 270.6 ± 0.7 |            |              |           |           |             | ↗           |         |           |         |         | Kungurian   |          |           |            |           |         |            | 275.6 ± 0.7 |           | ↗           |        |             |             |        | Artinskian  |           |           | 284.4 ± 0.7 |          |             |          | ↗           |             | Sakmanian   |          |            |             | 294.6 ± 0.8 |            | ↗           |            |           | Asselian    | 299.0 ± 0.8 |            |             | ↗           |              | Gzhelian    |            |        | 303.4 ± 0.9 | ↗ |           |              | Kasimovian  |
|                 |                |                  | Paleozoic       |              |              |               |                 |                |                  |                 |              | Carboniferous |               |                 |                |                  |                 |              | Middle      |             |                 |                |                  |           | Permian      |               |                 |            | Lopingian |             |           | Wuchiapingian |               |              | Capitanian |             |          | Wordian |               |             | Roadian |            |             |         | Kungurian |               |            | Artinskian |            |             |          | Sakmanian    |               |             |                  | Asselian      | Gzhelian    | Kasimovian   |               | Moscovian         | Bashkirian |             |            | Serpukhovian | Viséan      |            | Tournaian  |               |           |            |             |             |          |             |           |            |             |             |              |             |             |           |             |           |            |               |             |              |             |             |            |               |          |             |            |           |               |              |            |             |           |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                |                  |                 | Paleozoic    |              |               |                 |                |                  |                 |              |               | Carboniferous |                 |                |                  |                 |              |             |             |                 |                |                  | Lower     |              |               |                 |            |           | Permian     |           |               |               | Lopingian    |            |             |          |         | Wuchiapingian |             |         |            | Capitanian  |         |           |               | Wordian    |            |            |             | Roadian  |              |               |             |                  |               |             |              |               |                   |            | Kungurian   |            |              |             | Artinskian |            |               |           | Sakmanian  | Asselian    |             | Gzhelian | Kasimovian  | Moscovian | Bashkirian |             |             | Serpukhovian | Viséan      | Tournaian   |           |             |           |            |               |             |              |             |             |            |               |          |             |            |           |               |              |            |             |           |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                |                  |                 |              | Paleozoic    | Carboniferous |                 |                |                  |                 | Upper        |               |               |                 |                |                  |                 | Permian      |             | Lopingian   |                 |                |                  |           |              | Wuchiapingian |                 | Capitanian |           |             |           |               |               |              |            |             | Wordian  |         |               |             |         |            |             | Roadian |           |               |            |            |            | Kungurian   |          |              |               |             |                  |               |             |              |               |                   |            |             | Artinskian |              |             |            |            |               | Sakmanian |            |             |             |          |             |           |            | Asselian    |             |              |             |             | Gzhelian  | Kasimovian  | Moscovian | Bashkirian |               |             | Serpukhovian | Viséan      | Tournaian   |            |               |          |             |            |           |               |              |            |             |           |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                |                  |                 |              |              |               |                 |                |                  |                 |              |               |               |                 |                |                  |                 |              |             |             |                 |                |                  |           |              |               |                 |            |           |             | Paleozoic |               | Carboniferous |              |            | Lower       |          |         |               | Permian     |         | Lopingian  |             |         |           | Wuchiapingian |            |            | Capitanian |             |          |              |               |             |                  |               |             |              |               |                   |            |             |            |              |             |            |            | Wordian       |           |            |             |             |          |             |           |            |             | Roadian     |              |             |             |           |             |           |            |               | Kungurian   |              |             |             | Artinskian | Sakmanian     | Asselian | Gzhelian    | Kasimovian | Moscovian | Bashkirian    | Serpukhovian | Viséan     |             | Tournaian |            |             |            |              |           |           |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |
|                 |                | Paleozoic        |                 |              |              |               |                 |                | Carboniferous    | Upper           |              |               |               |                 |                | Permian          | Lopingian       |              |             |             |                 |                | Wuchiapingian    |           |              |               | Capitanian      |            |           |             |           |               |               |              |            |             |          |         |               |             |         |            |             |         |           |               |            |            |            |             |          |              | Wordian       | Roadian     | Kungurian        |               |             |              | Artinskian    |                   |            |             |            |              |             |            |            |               |           |            |             | Sakmanian   |          |             |           |            |             |             |              |             |             |           |             |           |            | Asselian      |             |              |             |             |            |               |          |             |            |           |               |              |            | Gzhelian    |           | Kasimovian | Moscovian   | Bashkirian | Serpukhovian | Viséan    | Tournaian |             |             |         |           |         |         |             |          |           |            |           |         |            |             |           |             |        |             |             |        |             |           |           |             |          |             |          |             |             |             |          |            |             |             |            |             |            |           |             |             |            |             |             |              |             |            |        |             |   |           |              |             |

\* Definition of the Quaternary and revision of the Pleistocene are under discussion. Base of the Pleistocene is at 1.81 Ma (base of Calabrian), but may be extended to 2.59 Ma (base of Gelasian). The historic "Tertiary" comprises the Paleogene and Neogene, and has no official rank.

This chart was drafted by Gabi Ogg. Intra Cambrian unit ages with \* are informal, and awaiting ratified definitions. Copyright © 2008 International Commission on Stratigraphy

Subdivisions of the global geologic record are formally defined by their lower boundary. Each unit of the Phanerozoic (~542 Ma to Present) and the base of Ediacaran are defined by a basal Global Standard Section and Point (GSSP ↗), whereas Precambrian units are formally subdivided by absolute age (Global Standard Stratigraphic Age, GSSA). Details of each GSSP are posted on the ICS website ([www.stratigraphy.org](http://www.stratigraphy.org)).

Numerical ages of the unit boundaries in the Phanerozoic are subject to revision. Some stages within the Cambrian will be formally named upon international agreement on their GSSP limits. Most sub-Series boundaries (e.g., Middle and Upper Aptian) are not formally defined.

Colors are according to the Commission for the Geological Map of the World ([www.cgmw.org](http://www.cgmw.org)). The listed numerical ages are from 'A Geological Time Scale 2004', by F.M. Gradstein, J.G. Ogg, A.G. Smith, et al. (2004; Cambridge University Press) and 'The Concise Geologic Time Scale' by J.G. Ogg; G. Ogg and F.M. Gradstein (2008).

Рис. 8. Подразделения Международной стратиграфической шкалы и границы ратифицированные МСТН по состоянию на март 2008 г. (Ogg et al., 2008, fig. 1.1)