

Eon Era Period/System Epoch/Series	Stages/Ages global (Substages/Subages global)	Epoch/Series regional Stages/Ages regional (Substages/Subages regional)
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This Timescale is mainly based on The Paleology Database (TPD) and the international Commission of Stratigraphy (ICS) with years in millions. Intervals from other sources (e.g. EU010, EU011, EU049, Medit.03, GB99, SYS002:I, → abbreviations) are sometimes without years, but sorted approximately on the right place, if possible. More Sources: <http://www.stratigraphy.org/bak/geowhen/timelinestages.html>, <http://de.wikipedia.org/wiki/Romanium> <http://en.wikipedia.org/wiki/Angoumian>, <http://www.theodora.com/encyclopedia/o/oolite.html> <http://weybourne.ukfossils.co.uk/weybourne-Fossils-Geology/geology-guide.htm> <http://de.wikipedia.org/wiki/Paratethys>, <http://www.britannica.com/media/print/66800>, <https://en.wikipedia.org/List-of-geochronologic-names>



<https://en.wikipedia.org/wiki/Quaternary>
(Mammoth 1,8 Ma-4000 years)

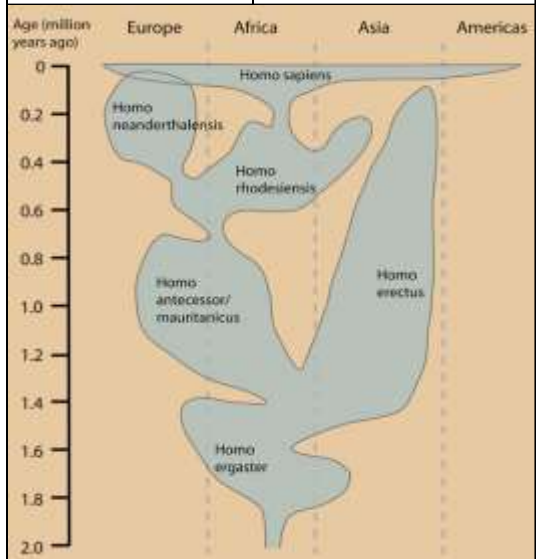


<https://en.wikipedia.org/wiki/Quaternary>

 <p>Homo naledi, Southafrica 2,5 or 3,7 Ma ago (Wikipedia)</p>	 <p>Homo habilis, Africa, 2,1-1,5 Ma (Wikipedia)</p>	 <p>Homo Neanderthalensis 130.000 - 30.000 years, Europe (Neadertal Mus.)</p>	 <p>Homo sapiens 100.000 years - today, Africa, Asia, Europe (Wikipedia)</p>	 <p>The <u>American Lion</u> was abundant in the <u>Pleistocene megafauna</u>, and went extinct about 10,000 years ago</p>
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<p>Phanerozoic 0-590 Cenozoic 0-65,5 Quaternary 0-2,6 Holocene 0-0,012 (= Alluvian, disused)</p>	<p>Flandrian EU (BEG), disused (= Holocene)</p>
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<p>Pleistocene 0,012-2,6 Disused: Diluvian 0,012-2,6 Tertiary 2,6-65,5</p>	<p>Tarantian 0,012-0,13 Ionian 0,13-0,78 Gelasian 1,81-2,6</p>	<p><u>N-EU:</u> Weichselian 0,015-0,075 Eemian 0,11-0,13 = Mikulin (E-EU) Saalian ca. 0,13- 0,25 Holsteinian ca. 0,25-0,3 Elsterian ca. 0,3-0,4 Cromerian ca. 0,4-0,7 Menapian ca. 0,7-0,9 Waalian ca. 0,9-1,35 Eburonian ca. 1,35-1,7 Tiglian ca. 1,7-1,9 Praetiglian ca. 1,9-2,6 = Icenian</p>	<p><u>EU (Alpes):</u> Würm 0,015-0,075 Interglacial 0,11-0,13 Riss 0,13-0,25 Interglacial 0,25-0,3 Mindel ca. 0,3-0,4 Interglacial ca. 0,4-0,7 Günz/Interglacial ca. 0,7-1,35 Donau ca. 1,35-1,7 Interglacial ca. 1,7-1,9 Biber ca. 1,9-2,6</p>	<p><u>AS:</u> Tazovian 0,11-0,13 Kuialnikian 0,81-3 Aktshaglyian 1,8-2,6 Kechienjian 1,5-1,9 (Japan) Tchaudian = U.Plei. (EU/AS) Apscheronian = U.Plei</p>
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<http://en.wikipedia.org/wiki/File:Humanevolutionchart.png>

<p><u>EU (GB)</u> Devensian 0,01-0,12 Ipswichian 0,12-0,13 Wolstonian 0,13-0,20 Hoxnian 0,20-0,25 Anglian 0,25-0,30 Cromerian 0,30-0,40 Beestonian 0,40-0,50 Pastonian 0,50-0,80 Pre-Pastonian 0,80-1,30 Bramertonian 1,30-1,55</p>	<p><u>EU (Medit Region):</u> Tyrrhenian 0,012-0,26 Sicilian 0,26-0,78 (Emilian 0,38-0,78) Calabrian 0,78-1,81 Villafranchian 2-3</p>	<p><u>AM</u> Wisconsinian 0,11-0,75 Wheelerian 0,11-1,7 (Cal.) Sangamonian 0,75-1,25 Illinoian 1,3-1,9 Pre-Illinoian 1,9-2,5 Valdivia 0,11-0,13 (Chile) Pampean = Plei. (ARG)</p>
<p><u>N-AF</u> Saharian = Plei. (WW81.7:48)</p>		


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<p>Neogene 2,6-23,3 Pliocene 2,6-5,3 O.Pli 2,6-3,6</p> <p>U.Pli. 3,6-5,3</p> <p>During the <u>Neogene mammals</u> and <u>birds</u> evolved considerably. Climates cooled somewhat over the duration of the Neogene culminating in continental glaciations in the <u>Quaternary</u>.</p>	<p>Piacenzian 2,6-3,6</p> <p>Zanclean 3,6-5,3</p>	<p><u>EU:</u> Astian 2,6-3,6 Levantinean 2,6-3,6 Plaisancian = Piacenzian Ruscinian 3,4-5,3 Redonian, Tabanian = U.Pli.</p> <p><u>Disused (EU (BEG, GB))</u> Scaldisian = Pli. Poederlian = O.Scaldisian Kattendijkian = U.Scaldisian Merksemian pro Poederlian www.vliz.be/imisdocs/publications/241554.pdf</p> <p><u>NZ:</u> Mangarapanian 2,4-3 Waipipian 3-3,6 Opoitian 3,6-5,28</p>	<p><u>C-Paratethys</u> Romanian 0,81- 3 Dacian 3-5,3 Pontian 5,3-7 (Bosphorian = O.Pontian) Pannonian 7-11,6 Sarmatian 11,6-12,7 Badenian 12.7-16 Karpatian 16-17,4 Otnangian 17,4-18,5 Eggenburgian 18,5-20,4 Egerian 20,4-27,5 Kiscellian 27,5-33,9</p> <p><u>AS (Japan):</u> Suchian 1,9-3 Totomian 3-3,6 Yuian 3,6-9,5 Kakegawanian Koshibanian</p>	<p><u>E-Paratethys</u> Kimmerian 3-5,3 Pontian 5,3-7 Maetian 7-10 Sarmatian 10-13 (Khersonian 10-11 Bessarabian 11-12,5 Vohlynian 12,5-13) Tshokrakian 13-14,5 (Konkian, Karaganian) Tarkhan 14,5-16,4 Kotsakhurian 16,4-18,5 Sakaraulian 18,5-23,3 Karadzhalgian 20,43-23,3 = ? Caucasian Kalmykian 23,3-30 Solenovian 30-32 Pshekian 32-33,9</p>
<p>Miocene 5,3-23,3 O.Mio. 5,3-11,6 M.Mio. 11,6-16</p> <p>U.Mio. 16-23,6</p>	<p>Messinian 5,3-7,3 Tortonian 7,3-11,6 Serravallian 11,6-13,7 Langhian 13,7-16 Burdigalian 16-20,4 Aquitanian 20,4-23</p>	<p><u>EU:</u> Turolian 5,3-9 = Pikermi Vallesian 9-11,6 Astaracian 11,6-16 Orleanian 16-20 Agenian 20-23,8</p>	<p><u>EU (North-Sea-Basin)</u> Scaldisian 2,6-3,6 Morsian 3,6-5,3 Syltian 5,3-8 Gramian 8-10 Langenfelde 10-12 Reinbek 12-15,5 Hemmoor 15,5-20 Vierlande 20-23,3 http://www.mineralienatlas.de/lexikon/index.php</p> <p><u>AUS:</u> Yatalan 2-3,4 Kaliman 3,4-4,3 Mitchellian 5-10,5 Bairnsdalian 7,3-15 Balcombian 15-15,5 Longfordian 16,5-27,5</p> <p><u>AF (MRO, ALG)</u> Sahelian 5,3-11,6</p> <p><u>AS (Japan)</u> Haranoyan 15,97-18,2</p>	<p><u>N-AM</u> Balcan 1,8-4,8 Repettian 2,2-2,9 (Cal.) Delmontian 2,9-7,5 (Cal.) Hemphillian 4,75-9 Hemingfordian 16-20,4 Arikareean 19-30,5 Zemorrian 22-33,5 (Cal.)</p> <p><u>NZ</u> Taranaki 5,3-10,9 Kapitean 5,28-6,5 or 4,8-6 Tongaporutuan 6,5-10,9 Southland 10,9-15,9 Waiauian 10,9-12,7 Lillburnian 12,7-15,1 Cliffdenian 15,1-15,9 Pareora 15,9-21,7 Altonian 15,9-19 Otaian 19-21,7 or Altonian 16,5-17,5 Awamoan 17,5-20 Hutchinsonian 20-21</p>
<div style="text-align: center;">  <p style="text-align: center;">Miocene Fauna of North America http://en.wikipedia.org/wiki/Miocene</p> </div>		<p>Catalonian 5,1-12 Oenigian 5,3-11,6 Helvetian 11,6-13,7 Vindobonian 11,6-16 Pontilevian 13,7-16</p> <p><u>Disused (EU (BEG))</u> Diestian = Deurian = O.Mio Bolderian ca 5,3-7,3 Houthalenian 7,3-11,3 ? Antwerpian 11,3-13,5 = Anversian www.vliz.be/imisdocs/publications/241554.pdf</p>		
<p>Paleogene = Eogene 23,3-65,5 Oligocene 23,3-33,9 O.Oli. 23,3-28,4 U.Oli. 28,4-33,9</p>	<p>Chattian 23,3-28,4 Rupelian 28,4-33,9</p>	<p><u>EU:</u> Avernian 23-33,9, Stamp 20,4-32 Sannoisian 32-33,9 = Lattorfian (Latdorfian) Nummuliticum 23,3-65,5</p>	<p>Aldingian 33-36 (AUS) Refugian 33,5-35 (USA (Cal.)) Chadronian 33,5-37 (N-AM)</p>	<p><u>NZ: Landonian 21,7-34,3</u> Waitakian 21,7-25,2 Duntrooian 25,2-27,3 Whaingaroan 27,3-34,3</p> <p><u>AUS:</u> Janjukian 27,5-30</p>

In the Paleogene mammals evolved after the extinction at the end of Cretaceous. There Species depending on photosynthesis declined or died out because of the reduction in solar energy reaching the Earth's surface due to atmospheric particles blocking the sunlight. As today, photosynthesizing organisms, such as phytoplankton and land plants, formed the primary part of the food chain in the late Cretaceous. Evidence suggests that herbivorous animals, which depended on plants and plankton as their food, died out as their food sources became rare ; consequently, top predators such as Tyrannosaurus rex also perished.

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<p>Eocene 33,9-55,8 O.Eoc. 33,9-40,4</p> <p>M.Eoc. 40,4-48,6</p> <p>U.Eoc. 48,6-55,8</p>	<p>Priabonian 33,9-37,2 Bartonian 37,2-40,4</p> <p>Lutetian 40,4-48,6</p> <p>Ypresian 48,6-55,8</p>	<p><u>EU:</u> Ludian 33,9-37,2 Tongrian 33,9-35,5 Asschian 33,5-37,2 Marinesian 37,2-38,5 Biarrizian 38,5-40,4 Ludian 33,9-37,2 Wemmelian 37,2-40,4 (BEG) Auversian 38,5-48,6 Bruxellian 46-48,6 Cuisian 48,6-51 Sparnacian 51-55,8 Ilerdian = U.Ypresian</p>	<p>Beloginian 33,9-37,2 (AS)</p> <p>Jacksonian 33,9-37,2 (USA, NZ) Claibornian 37,2-40,4 (AM) Casamayoran 48-54 (AM) Wangerripian 52-61,7 (AUS) Clarkforkian 55,5-56 (N-AM)</p>	<p>NZ: Arnold 34,3-43 Runangan 34,3-36 Kaiatan 36-37 Bortonian 37-43 Dannevirke 43-65 Porangan 43-46,2 Heretaungan 46,2-49,5 Mangaorapan 49,5-53 Waipawan 53-55,5 or 52-56,5 Teurian 55,5-65</p>
<p>Paleocene 55,8-65,5 O.Paleo. 55,8-58,7</p> <p>M.Paleo. 58,7-61,7</p> <p>U.Paleo. 61,7-65,5</p>	<p>Thanetian 55,8-58,7</p> <p>Seelandian 58,7-61,7</p> <p>Danian 61,7-65,5 = Montian (disused)</p>	<p><u>EU:</u> Garumnian 55,8-70</p> <p><u>Disused (EU (BEG))</u> Landenian and Heersian = Thanetian http://en.wikipedia.org/wiki/Thanetian</p>		 <p>Eocene Fauna (Wikipedia)</p>
<p>Cretaceous (Kreide) 65,5-145,5 Mesozoic 65,5-251 O.Kreide 65,5-89,3 = Senon</p> <p>M.Kreide 89,3-130 = Gallic</p> <p>U.Kreide 130-145,5 = Neocom</p>	<p>Maastrichtian 65,5-70,6 Campanian 70,6-83,5 Santonian 83,5-85,8 Coniacian 85,8-89,3</p> <p>Turonian 89,3-93,5 Cenomanian 93,5-99,6 Albian 99,6-112</p> <p>Aptian 112-125</p> <p>Barremian 125-130</p> <p>Hauterivian 130-136 Valanginian 136-140 Berriasian 140-146</p>	<p><u>EU:</u> Rognacian 65,5-68 Begudian 68-70,6 Fuvelian 70,6-77 Valdonnian 70-83,5 Emscherian 83,5-89,3 (also BRA)</p> <p>Angoumian 89,3-93,5 Ligerian = U.Angoumian Vaconian ca. 99-111 Gaultian ca. 99,6-106 Utrillasian ca 99,6-106 Clansayan ca. 112-116 Gargasian ca. 116-120 Bedoulian ca. 120-125 Urgonian ca. 125-127</p> <p>Wealdian ca. 130-158</p> <p>Ryazanian 136,5-142</p>	<p>AM: Gulfian ca. 65.5-91 Lancian 65,5-93,5 Navarroan 65,5-70,6 Tayloran 70,6-83,5 Austinian ca.83,5-91,5</p> <p>Woodbinian ca.91,5-97 Comanchean ca. 97-125 Washitan ca. 97-100 Frederiksburgian 97-111 Trinitian ca. 111-112</p> <p>Coahuilan 125-146 Nuevoleonian 125-136 Durangoan 136-146</p> <p>Alagoan BRA = M.Kreide Bahian BRA = U.Kreide Donjonian BRA = O.Jura www.zobodat.at/pdf/Zitteli_ana_10_0277-0283.pdf</p>	<p>NZ: Mata 65-86,5 Haumurian 65-84 Piripauan 84-86,5 Raukumara 86,5-95,2 Teratan 86,5-89,1 Mangaotanean 89,1-92 Arowhanan 92-95,2</p> <p>Clarence 92,5-108,4 Ngaterian 92,5-100,2 Motuan 100,2-103,3 Urutawan 103,3-108,4</p> <p>Taitai 108,4-145,5 Korangan 108,4-117,5</p>
 <p>Paleocene Fauna (Wikipedia)</p>	<p>The <u>Cretaceous</u> climate began cool, but increased then warmer. New groups of <u>mammals</u> and <u>birds</u> as well as <u>flowering plants</u> appeared. <u>Mammals</u> were a small and still minor component of the <u>fauna</u>. The Cretaceous ended with one of the largest <u>mass extinctions</u> in <u>Earth history</u>, the <u>K-T extinction</u>, when many species, including the dinosaurs, <u>pterosaurs</u>, and large marine reptiles, disappeared.</p>			 <p>Late Cretaceous Tyrannosaurus rex</p>

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<p>Jurassic (Jura) 145,5-199,6 O.Jura 145,5-161,2 = Malm</p> <p>M.Jura 161,2-175,6 = Dogger</p> <p>U.Jura 175,6-199,6 = Lias</p>	<p>Tithonian 145,5-150,8 Kimmeridgian 150,8-155,7 Oxfordian 155,7-161,2</p> <p>Callovian 161,2-164,7 Bathonian 164,7-167,7 Bajocian 167,7-171,6 Aalenian 171,6-175,6</p> <p>Toarcian 175,6-183 Pliensbachian 183-189,6 Sinemurian 189,6-196,5 Hettangian 196,5-199,6</p>	<p>GER: Weißjura = Malm Z ca. 145,5-150,8 Γ, Δ and E ca. 150,8-155,7 A and B ca. 155,7-161,2 Braunjura = Dogger Z ca. 161,2-164,7 E ca. 164,7-167,7 Γ and Δ ca. 167,7-171,6 A and B ca. 171,6-175,6 Schwarzjura = Lias E and Z ca. 175,6-183 Γ and Δ ca. 183-189,6 B ca. 189,6-196,5 A ca. 196,5-199,6</p> <p>EU: Charmouth 183-189,6 (Domer, Carix) Lotharingian 189,6-196,5 Infralias 196,5-203,6</p>	<p>Oolite (GB, FRK, SUI) Upper Oolite 140,2-155,7 = Portland Oolite (Purbeck 140,2-145,5, Portland 145,5-155,7) Middle Oolite 155,7-158 = Oxford Oolite (Corall, Kellaway Beds) Lower Oolite 158-171,6 (Cornbrash 158-164,7 Great Oolite 164,7-167,7 = Bath Oolite (Bathon) Oolite ferruginense = O.Bajoc Fullonian 167,7-171,6 = Inferior Oolite (Bajoc)</p>	<p>EU: Volgian 145,5-150,8 (Virgolian = O.Kimm.) (Pteroceran = U.Kimm.) Lusitanian ca. 153-158 (Rauracian, Argovian) Sequanian, Astartian = O.Lusitanian Vesulian ca. 166-169</p> <p>NZ: Oteke 145,5-148,5 Puarooan 145,5-148,5 Kawhia 148,5-175,5 Ohauan 148,5-153,5 Temaikan 153,5-175,6 Herangi 175,6-199,8 Ururoan 175,6-188 Aratauran 188-199,6</p>
<p>Triassic (Trias) 199,6-251 O.Trias 199,6-228</p> <p>M.Trias 228-245</p> <p>U.Trias 245-251</p>	<p>Rhaetian 199,6-203,6 Norian 203,6-216,5 (Sevatian, Alaunian, Lacian) Carnian 216,5-228 (Julian, Tuvalian, Cordevolian) Ladinian 228-237 (Longobardian, Fassanian) Anisian 237-245 (Illyrian, Pelsonian, Aegean, Bithynian) Olenekian 245-249,7 (Smithian, Spathian) Induanian 249,7-251 (Dienerian, Griesbachian) Permotrias 245-299</p>	<p>E-EU: Bukobyian 228-237 Donguzian 228-245 Yarengian 245-249,7 (Gamian, Fedorovkian) Vetlugian 245-251 (Ustmylian, Sludkian, Rybinskian, Vokhmian)</p> <p>Virglorian = Anisian</p>	<p>Mostly C-EU: Keuper 200-235 Muschelkalk 235-243 Buntsandstein 243-251</p>	<p>Erqiaoan 199,6-209 (China)</p> <p>NZ: Balfour 199,6-227,5 Otapirian 199,6-204,6 Warepan 204,6-212 Otamitan 212-217 Oretian 217-227,5 Gore 227,5-250,4 Kaihikuan 227,5-238,5 Etalian 238,5-244,4 Malakovian 244,5-245,5 Nelsonian 245,5-250,4 Durville 250,4-260,5 Makarewan 250,4-252 Eotrias 245-251 (EU/AS)</p>




Allosaurus fragilis (Horn, 1877)
Life restoration based on the skeletal reconstruction made by Scott Hartman.
Revised based on USNM 4850 specimen.


Allosaurus was one of the largest land predators during the Jurassic

In Jurassic primary vertebrates living in the seas were [fish](#) and marine [reptiles](#). [Archosaurian](#) reptiles remained dominant. The first [birds](#), like [Archaeopteryx](#), evolved. The climate was warm with no evidence of [glaciation](#). During the early Jurassic period, [Pangaea](#) broke up into the northern [Laurasia](#) and the southern continent [Gondwana](#).

In the [Triassic](#) the first flying vertebrates, the [pterosaurs](#), evolved. The climate was hot and dry. The [ammonites](#) recovered, diversifying from a single line that survived the Permian extinction. Late Triassic extinction was accompanied by huge [volcanic](#) eruptions, when the supercontinent Pangaea began to break, or global cooling or even a [bolide](#) impact caused it.



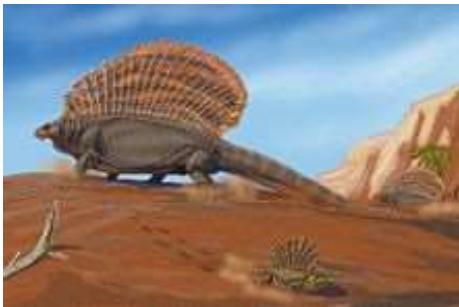
[Proterosuchus](#), a genus of carnivorous reptile, existed in the Early Triassic



[Coelophysis](#), one of the first [Dinosaurs](#), appeared in the mid-Triassic

Another Triassic timescale from Mundi et al 2004 reaches from 201,3-252,2

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Early Permian [Edaphosaurus](#) pogonias and [Platyhystrix](#) (Wikipedia)



Permian Seafloor
http://www.astrobio.net/images/galleryimages_images/Gallery_Image_11118.jpg



Permian [Titanophoneus](#) and [Ulemosaurus](#) (Wikipedia)

<p>Paleozoic 251-360,7 Permian 251-299 Lopingian 251-260,5 = O.Permian</p> <p>Guadalupian 260,5-272,5 = M.Permian</p> <p>Cisuralian 272,5-299 = U.Permian</p>	<p>Changhsingian 251-255 Wuchiapingian 255-260,5 = Longtanian</p> <p>Capitanian 260,5-265 Wordian 265-268 Roadian 268-272,5</p> <p>Kungurian 272,5-279,5 Artinskian 279,5-284 Sakmarian 284-290 Asselian 290-299</p>	<p>EU: Zechstein 252,3-259 Rotliegendes 254-298,9 Autunian 295-298,9 Lebach 295-298,9</p> <p>EU (mostly RUSS Platform): Tatarian 252-268 (Viatkian, Severodvinian, Urzhumian) Biarmanian 265-272,5 (Povolzhian 265-272,5) Kazanian 268-272,5 = Maokovian Sokian 268-272,5 Ufimian 272,5-279,5 (Shesmian, Solikamian, Saranian) (Sarginian, Irginian, Burtsevian 279,5-284) (Sterlitamakian, Tastubian 284-290) (Shikanian, Uskalykian, Sjuranian 290-299)</p> <p>EU (GER): Bundsandstein 251-265 Ohre, Aller 260,5-265 Leine, Stassfurt Evaporites, Hauptdolomitschiefer 265-268 Werra, Zechstein, 272,5-272,5 Kupferschiefer, Weiss-liegendes 272,5-279,5</p>	<p>AS (Pamir): Pamirian 251-265 Murgabian 265-268 Kubergandian 272,5-272,5 Bolorian 272,5-279,5 Yakhtashian 272,5-284 Khoridzhian 284-290 Sebisurkhian 290-299</p> <p>AS (Salt Range): Chhidru 251-255 Kalabagh 255-260,5 Wargal 255-265 Amb 265-272,5</p> <p>AS (China) Lengwuan 260,5-265 Kuhfengian 265-272,5 Luodianian 272,5-279,5 Longlinian 279,5-290 Zisongian 285-299 Mapingian 290-299 or 299-310</p> <p>AS (INE (Timor)) Amarassian Basleoan Tae Weian Bitauian Somoholean (Source: AS108:123)</p>	<p>NZ: Makabewan 251-253,8 Purahauan 253,8-260,4 Waiitian 253,8-260,4 (Source: ICS) Aparima 260,4-283 Braxtonian 260,5-270,6 Flettian 260,4-266,5 Barettian 266,5-273 Mangapirian 273-280 Telfordian 280-283</p> <p>N-AM (USA): Ochoan 251-260,5 Dewey Lake 251-255 Rustler, Salado, Castile 255-260,5</p> <p>N-AM: Leonard 272,5-279,5</p> <p>Wolfcamp 279,5-299</p> <p>Bursumian 290-302</p>
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The Permian is characterized among land vertebrates by the diversification of the early [amniotes](#) into the ancestral groups of the [mammals](#), [turtles](#), [lepidosaurs](#) and [archosaurs](#). The climate varied between warm and cool cycles. The Permian ended with the Permian-Triassic extinction. 90-95 % of the marine and 70 % of the land species died out, may be caused by large volcanic activities which raised temperatures 5°C, or a meteorite with a crater of 500 km in the Antarktis or a combination of this and other reasons. The [ginkgos](#) appeared.



The early Carboniferous Pulmonoscorpius reached a length of up to 1 metre.



[Hylonomus](#), the earliest [sauropsid reptile](#), appeared in the Pennsylvanian



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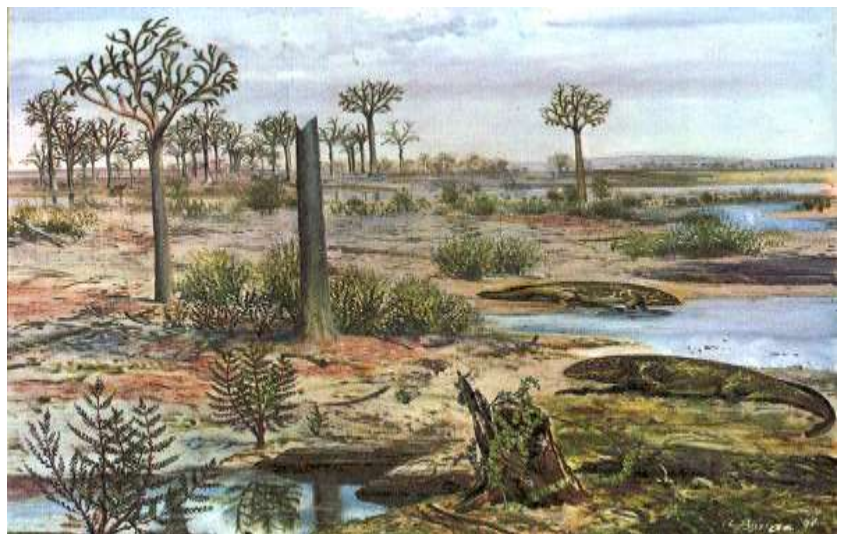
<p>Carboniferous (Karbon) 299-360,7</p> <p>Pennsylvanian 299-318,1</p> <p>O.Pennsylvanian (O.Karbon) 299-305</p> <p>M.Pennsylvanian (o.M.Karbon) 305-312</p> <p>U.Pennsylvanian (u.M.Karbon) 312-318,1</p> <p>Mississippian (U.Karbon) 318,1-360,7</p> <p>O.Mississippian (o.U.Karbon) 318,1-326,4</p> <p>M.Mississippian (m.U.Karbon) 326,4-345,3</p> <p>U.Mississippian (u.U.Karbon) 345,3-360,7</p> <p>In ICS Carboniferous reaches from 299 to 359,2</p>	<p>Gzhelian 299-302</p> <p>Kasimovian 302-305 (Klazminskian)</p> <p>Moscovian 305-312</p> <p>Bashkirian 312-318,1 (Duckmantian, Langstellian)</p> <p>Serpukhovian 318,1-326,4</p> <p>Visean 326,4-345,3</p> <p>Tournaisian 345,3-360,7</p>	<p><u>Mostly EU:</u> Kuzel 299-302 Silesian 299-326,4 Stephanian 299-305</p> <p>Cantabrian 302-305</p> <p>Westphalian D 305-307,1 Westphalian C 307,1-311,3 Westphalian B 311,3-313,4 also BRA</p> <p>Namurian 312-326,4 also China Westphalian A 313,4-318,1 (Yeadonian, Marsdenian, Kinderscoutian, Ammanian) Pendleian 318,1-326,4 (Alportian, Chokierian, Elvirian, Arnsbergian) also USA Dinantian 326,4-360,7 Brigantian 326,4-336 (St. Genevieve, Gasperian) also MRO Asbian 336-339,4 also USA Holkerian 339,4-342,8 Also USA Arundian 342,8-345 Chadian 345-349,5 AUS (Keokuk) Ivorian 349,5-353,8 Hastarian 353,8-360,7</p>	<p><u>Mostly EU (Russ. Platform):</u> Noginian = 299-302 also USA Pavlovoposadian 299-302 Rusavkian 299-302 Dorogovilovian 302-305 Khamovnichean 302-305 Krevyakian 302-305 Peskovian 305-305 Podolskian 305-307,1 Myachkovian 306-309 also USA Kashirian 307,1-309,2 also USA Vereian 307,1-311,3 Tsinnian 309,2-311,3 Melekesian 311,3-313,4 Cheremshanian 313,4-318,1 Prikarnian 313,4-318,1 Severokeltmenian 313,4-318,1 Krasnopolyanian 313,4-318,1 Voznesenian 313,4-318,1 Zapaltyubian 312-326,4 Protvian 318,1-326,4 Steshevian 318,1-326,4 Tarussian 318,1-326,4 Venevian 326,4-336 Mikhailovian 336-339,4 Aleksian 339,4-342,8 Tulian 339,4-342,8 Bobrikovian 342,8-345 Radaevian 345-349,5 Kosvinian 345-353,8 Kizolovian 349,5-353,8 Cherepetsian 353,8-360,7 Karakubian 353,8-360,7 Upinian 353,8-360,7 Malevian 353,8-360,7 Gumerovian 353,8-360,7</p>	<p><u>AS (China):</u> Xiaodushanian 299-305 Dalanian 302-312 Huashibanian 305-318,1 Luosuan 312-318,1 Dewunian 318,1-326,4 Shanghsian 326,4-339,4 Jiusian 339,4-345,3 Tangbagouan 345,3-360,7</p> <p><u>AM:</u> Virgilian 299-305 Missourian 302-305 Desmoinesian 305-312 Atokan 305-318,1 Morrowan 312-318,1 Chesterian 318,1-339,4 Meramecian 336-345 Osagean 342,8-353,8 Kinderhookian 353,8-360,7</p>
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Late Carboniferous giant dragonfly-like insect Meganeura grew to wingspans of 0,75 m.




Devonian Trilobites (Denver Musum of Natural History)



Devonian http://www.creationism.ws/devonian_land_scape_501a.jpg

The Carboniferous climate was warm, but cooled to the end. Flora and fauna increased. It was a time of [glaciation](#), low sea level and mountain building with a minor marine [extinction](#)

Eon Era Period/System Epoch/Series	Stages/Ages global (Substages/Subages global)	Epoch/Series regional Stages/Ages regional (Substages/Subages regional)		
<p>Devonian 360,7-418,1 O.Devon (Neodevon) 360,7-383,7</p> <p>M.Devon (Mesodevon) 383,7-391,9</p> <p>U.Devon (Eodevon) 391,9-418,1</p>	<p>Famennian 360,7-376,1 Frasnian 376,1-383,7</p> <p>Givetian 383,7-388,1 Eifelian 388,1-391,9</p> <p>Emsian 391,9-409,1 Pragian 409,1-412,3 Lochkovian 412,3-418,1</p>	<p><u>EU (GB):</u> Pilton, Baggy, Upcott, Pickwell Down 360,7-376,1</p> <p>Morte 376,1-388,1</p> <p>Ilfracombe 383,7-388,1</p> <p>Hangman 388,1-391,9 Lynton 388,1-409,1 Brecon 391,9-409,1</p> <p>Ditton 409,1-418,1 Downton 412,3-418,7</p> <p><u>EU (FRK, BEG):</u> Couvinien 383,7-409,1 Coblencien 392,9-412,3 Gedinnine 412,3-418,1</p>	<p><u>EU (GER):</u> Wocklum, Dasberg, Hemberg, Nehden 360,7-376,1</p> <p>Adorf 376,1-388,1</p> <p>Eifel 388,1-391,9 Ems 391,9-409,1 = Koblenz Siegen 409,1-412,3 Gedinne 412,3-418,1</p> <p><u>EU (CZ):</u> Srbsko 383,7-388,1 Chotec 388,1-391,9 Dalej 388,1-409,1 Zlichovian 391,9-409,1</p>	<p><u>AM (e N-AM):</u> Chautauquan 360,7-376,1 Conewango, Canadaway, Conneaut, Cassadagan 360,7-376,1 Senecan 376,1-383,7 Chemungian, West Falls, Fingerlakesian, Sonyea 376,1-383,7 Genesee 376,1-388,1 Erian 383,7-391,9 Taghanican, Tioughnioga 383,7-388,1 Cazenovia 383,7-391,9 Southwood 388,1-391,9 Ulsterian 391,9-418,1 Sawkill, Deer Park 391,9-409,1 Helderberg 391,9-418,1 also SPN <u>China</u> Lianhuashanian 413-416</p>
<p>In ICS Devon reaches from 359,2 to 416,0 and Silur from 416,0-443,7</p>				
<p>The <u>Devonian</u> period marks the beginning of extensive land colonization by plants. In the late Devonian extinctions, of which the reasons are still unknown, many marine genera disappeared. The climate was warm, and probably lacked any glaciers</p>				
<p>Silurian 418,1-443,7 Pridoli (o.O.Silur) 418,1-418,7</p> <p>Ludlow (u.O.Silur) 418,7-422,9</p> <p>Wenlock (M.Silur) 422,9-428,2</p> <p>Llandovery (U.Silur) 428,2-443,7</p>	<p>Gotlandian 418,1-443,7</p> <p>Ludfordian 418,7-421,3 Gorstian 421,3-422,9</p> <p>Homerian 422,9-426,2 Sheinwoodian 426,2-428,2</p> <p>Telychian 428,2-436 = Tarannonian Aeronian 436-439 Rhuddanian 439-443,7</p>	<p><u>EU (SV (Gotland))</u> Sundre 418,1-418,7 Hamra, Burgsvik, Eke 418,7-421,3 Hemse = Klinteberg, Kopaninaschichten 418,7-425,4 Mulde = Halla 422,9-428,2 Slida = Tofta, Hogklint, Upper Visby 426,2-428,2 Lower Visby 428,2-436</p> <p><u>EU (GB):</u> Red Downtonian, Temeside Shales, Downton Castle 418,1-418,7 Whitecliffe, Leintwardine 418,7-421,3 Salopian 418,7-428,2 Bringewood, Elton Salopian 421,3-422,9 Wenlock, Tickwood 422,9-425,4 Coalbrookdale 422,9-428,2 Buildwas 426,2-428,2 Woolhope, Wych 428,2-436 Cowleigh Park, Valentian 436-443,7</p>	<p><u>EU (BTK):</u> Ohesaare, Kaugetuma 418,1-418,7 Kuressaare 418,7-421,3 Paadia 418,7-422,9 Rootsikula 422,9-426,2 Jaagarahu 422,9-428,2 Jaan 426,2-428,2 Adavere 428,2-439 Raikkula 436-443,7 Juuru 439-443,7</p> <p><u>EU (CZ):</u> Priddlischichten = Budnanian 418,1-418,7 Litenschichten 422,9-443,7</p> <p><u>AUS</u> Melbournian 416-428,2 Keiloran 433-443,7</p> <p><u>China</u> Longmaxian 438-443,7</p>	<p><u>N-AM:</u> Cayugan 418,1-422,9 or 416-428,2 Keyseran Tonolowayan Salinan</p> <p>Lockportian 421,3-428,2</p> <p>Niagaran 422,9-436 Clintonian 422,9-425,4 Whitwellian 425,4-426,2 Tonawandan 426,2-436</p> <p>Ontarian 428,2-439</p> <p>Medinan 436-443,7 Alexandrian 436-443,7</p>
				
<p>Silurian Bildung von Korallenriffen, erste primitive Landpflanzen http://www.google.de/imgres?imgurl</p>				
		<p><u>Silurian</u> Climate warm, glaciers retreated back into the South Pole until they almost disappeared in the middle of Silurian. The first fossil records of <u>vascular plants</u>, that is, land plants with tissues that carry food, appeared in the second half of the Silurian. Sea Scorpions, some of them several meters in length, exist. <u>Brachiopods</u>, <u>bryozoa</u>, <u>molluscs</u>, <u>hederelloids</u> and <u>trilobites</u> were abundant and diverse.</p>		

Eon Era Period/System Epoch/Series	Stages/Ages global (Substages/Subages global)	Epoch/Series regional Stages/Ages regional (Substages/Subages regional)
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<p>Ordovician 443,7-490 O.Ord. = Llandeilo 443,7-460,5</p> <p>M.Ord. 460,5-472</p> <p>U.Ord. 472-490</p>	<p>O.Llandeilo 443,7-457,5 Hirnantian 443,7-445,6 Katian 445,6-455 Sandbian 455-460,5 U.Llandeilo 457,5-460,5</p> <p>Darriwillian 460,5-468,1 Dapingian 468,1-472 Volkhovian 640,5-472</p> <p>Disused: Arenigian 466-478,6</p> <p>Latorpian, Floian 472-479 Tremadoc, Gasconadian 479-490 Dolgellian 488,3-492,5 Mansian 490-490</p>	<p><u>Mostly EU</u> <u>(also China and USA):</u> Rawtheyan, Cautleyan, Pusgillian 445,6-449 Longvillian 449-449,7 Soudleyan 449,7-457,5 Harnagian, Costonian 457,5-460,5 Marshbrookian, Onnian, Cheneyan, Streffordian, Actonian, Volfreyan, Burellian, Aurelucian 449-460,5 Woolstonian 449-449,7 Ashgill 443,7-449,5 Caradoc 449,5-460,5 Llanvirn 460,5-466 Llandeilian, Abereiddian 460,5-468 Fennian, Whitlandian, Moridunian 472-478 Migneintian 479-490 Cressagian 486-488,3</p> <p><u>EU (N-EU, BTK):</u> Harju 443,7-452 (Boda Ls.) Viru 452-463,5 Porkuni, Pirgu 443,7-449,5 Nabala, Rakvere, Oandu, Idavere, Kukruse, Haljala, Keila, Johvi 449,5-460,5 Vormsi 443,7-460,5 Oandu 452-457,5 Lasnamagi 460,5-468 Oeland 460,5-490 Uhaku, Aseri 460,5-466 Aluoja 460,5-468 Valaste, Hunderum, Saka, Langevoia, Vaana 460,5-490 Kunda 463,5-467 Hunneberg 466-484,5 Volkhov 467-472 Billingen 472-479 Pakerort 479-490 Latorp 472-484,5 Varangu 484,5-490 Olentian 484,5-501</p> <p><u>EU (SPN, PTG)</u> Dobrotivian 449-460,5 Oretanian 460,5-468</p>	<p>EU (CZ, ...): Kralodvorian, Kosovian 443,7-449 Kosov 443,7-445,6 Kraluv Dvur 445,6-449 Bohdalec 445,6-449,7 Berounian, Dobrotivian 449-460,5 Lodenice 449,7-457,5 (Vinice, Zahorany) Chrutenice 457,5-460,5 (Liben, Letna) Dobrotiva 457,5-460,5 Sarka 460,5-466 Llanvirnian 460,5-468</p> <p><u>AS (China):</u> Quiantianjiang, Chientangkian 443,7-449,5 Wufeng 443,7-449,5 Aijiashan 443,7-460,5 Xiaoxita, Shikou 443,7-460,5 Neichiashanin 449,5-460,5 Hanjiang 449,5-460,5 Zhejiangian 460,5-479 Guniu 460,5-468 Hulo 460,4-479 Yangtzi 460,5-490 Dawan, Daobaowan 460,5-490 Yushanian 466-479 Ningkuo 466-479 Hunjiang 466-490 Yichang, Ichangian 479-490 Ungurian, Lianghekou 479-490</p> <p><u>AUS:</u> Bolindian 443,7-449,7 Eastonian 449,7-456,1 Gisbornian 456,1-460,5 Yapeenian 466-468,9 Castlemanian 468,9-472 Chewtonian 472-473,9 Bendigonian 473,9-476,8 Lancefieldian 476,8-490 Warendian 479,8-490</p>	<p><u>N-AM:</u> Cincinnati 443,7-452,5 Gamach 443,7-445,6 Richmond 445,6-449 Maysville 445,6-460,5 Maysvillian 449,5-460,5 Edenian 449,5-460,5 Mohawkian 452,5-457,5 Champlainian 452,5-460,5 Whiterockian 457,5-472 Gamachian, Richmondian 443,7-449,5 Chazy 443,7-460,5 USA, CAN Shermanian 449-457,5 USA, Kirkfieldian 449,7-460,5 USA Rocklandian 457,5-460,5, Blackriveran 457,5-460,5, Ashbyan, Franklinian, Chatfieldian, Trentonian, Turinian, Wildernessian Caradoc 449-460,5 Canadian 460,5-490 Ibexian 472-490 Chazyan, Marmor 460,5-468 White Rock 460,5-479 USA Jeffersonian 460,5-490 Cassinian, Blackhillsian 466-479 Jeffersonian, Tuelan 466-490 Rangerian 468-472 Demingian 479-490 USA Gasconadian, Stairsian, Skullrockian 479-490</p>
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In ICS Ordovician reaches from 443,7 to 488,3



Ordovician Life

nearly all marin Sponges, Bryozoans, Trilobites, raptolites, Conodonts, first Arthropods on land
<http://www.ucmp.berkeley.edu/ordovician/ordolife.html>



Ordovician Orthoceras



Ordovician Ammonites

In the Ordovician the climate is quite warm, but glaciers exist. At the end of the period, many forms died out or were reduced, which may have been caused by a very cold ice age. The first Bryozoa and coral reefs appeared, Mollusca became common.

Eon Era Period/System Epoch/Series	Stages/Ages global (Substages/Subages global)	Epoch/Series regional Stages/Ages regional (Substages/Subages regional)
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<p>Cambrian (Kambrium) 490-542 Merioneth, Furongian (O.Kam.) 490-501</p> <p>St. Davids (M.Kam.) 513-513</p> <p>Caerfai (o.U.Kam.) 513-530</p> <p>Manikayan (u.U.Kam.) 530-542</p>	<p>Ketyan, Ensyau, Maduan, Tavgian, Yurakian, Dogellian, Maentwrogian 490-501 Nganasanian 490-503</p> <p>Solvan, Menevian 501-513</p> <p>Lenian 513-516 Botomian 513-516 Atdabanian 516-520 Tommotian 520-530 Nemaktit-Daldynian 530-542</p>	<p>EU: Ffestinog 490-501 Gamian 490-513</p> <p>Arcadian, Clogau, Hafotty, Barmouth 501-513</p> <p>Branchian 513-520 Rhinog 513-520 Llanbedr 516-520 Dolwen 516-530 Placentian 516-542</p>	<p>AS: Batyrbaiian 488,3-491 Aksayan, Sakian, Youshuanian Taoyuanian 490-501 Ayusokkanian, Wangkunanian 490-513 Jiangshanian 492-496 Zhanarykian, Tyesian, Mayan, Taijiangian 501-513 Toyonian 510-513 Duyunian, Nangoaian 513-516 Meishucunian 516-542</p> <p>Jinningian 530-542</p>	<p>N-AM: Millardan 490-501 Sunwaptan, Dresbachian, Steptoan, Trempealauan, Franconian 490-501 Lincolnian 490-513 Marjumian 490-513 Delamaran 501-513 Albertian 501-530</p> <p>Waucoban 513-530 Dyeran 513-516 Montezuman 516-530 Branchian 513-520 Begadean 520-542</p> <p>AUS: Datsonian 490-491,5 or 485-488,3 Paytonian 491,5-494 or 488,3-491 Iverian 494-498,5 Idamean 498,5-501 Mindyallan 501-503 Boomerangian 503-504 Undillan 504-505 Floran 505-507 Templetonian 507-510 Ordian, Toyonian 510-513</p>
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In the Cambrian rapid appearance of representatives of nearly all of the modern [phyla](#) and perhaps venturing on to land. Climate rather warm. First Gastropods appear.



Cambrian life

<http://www.astrobio.net/albums/origins/agb.jpg>

Timescale of ICS:
Furongian 488,3-499

Series 3 499-510

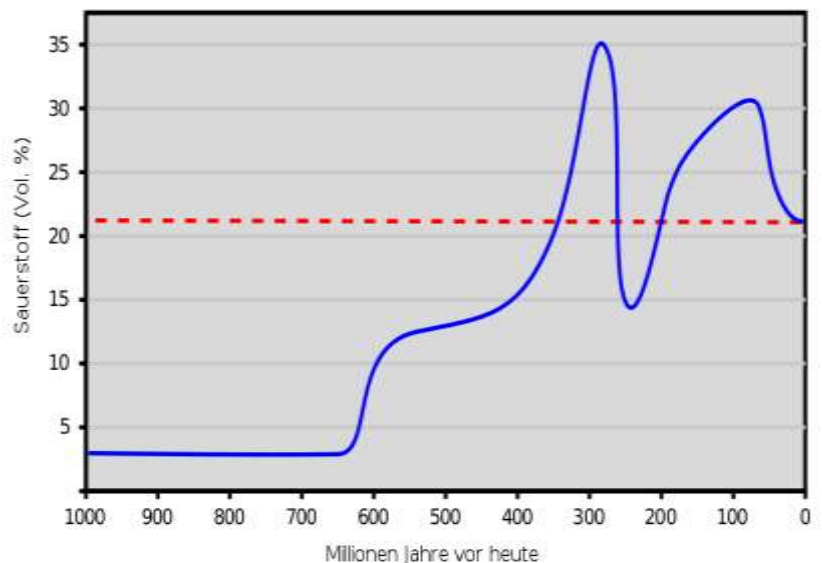
Series 2 510-521

Terreneuvian 521-542

Stage 10 488,2-492
Stage 9 492-496
Paibian 496-499
Guzhangian 499-503
Drumian 503-506,5
Stage 5 506,5-510
Stage 4 510-515
Stage 3 515-521
Stage 2 521-528
Fortunian 528-542

Sauerstoffanteil der Erdatmosphäre

im Verlauf der letzten 1000 Mio. Jahre







<http://www.wikinfo.org/Multilingual/upload/9/92/Sauerstoffgehalt-1000mj.svg>



Cambrian Nectocaris pteryx (Reconstruction), 5-7 cm, certainly a ancestor of the modern Species

Foto: Marianne Collins dpa

Eon Era Period/System Epoch/Series	Stages/Ages global (Substages/Subages global)	Epoch/Series regional Stages/Ages regional (Substages/Subages regional)
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Timescale of ICS Proterozoic 542-2500 Neoproterozoic 542-1000 Ediacaran 542-635 Cryogenian 635-850 Tonian 850-1000 Mesoproterozoic 1000-1600 Stenian 1000-1200 Ectasian 1200-1400 Calymmian 1400-1600 Palaeoproterozoic 1600-2500 Statherian 1600-1800 Orosirian 1800-2050 Rhyacian 2050-2300 Siderian 2300-2500	Timescale of TPD <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Period</th> <th style="text-align: left;">Epoch</th> <th style="text-align: left;">Stage</th> </tr> </thead> <tbody> <tr> <td>Vendian 542-610</td> <td>Ediacara 530-590</td> <td>Poundian 530-580</td> </tr> <tr> <td>Sinian 542-1050</td> <td>Varanger 590-610</td> <td>Wonokan 580-590</td> </tr> <tr> <td></td> <td></td> <td>Mortensnes 590-600</td> </tr> <tr> <td></td> <td></td> <td>Smalfjord 600-610</td> </tr> <tr> <td>Sturtian 610-1050</td> <td>Karatau 610-1050</td> <td></td> </tr> <tr> <td>Rhiphean 610-1650</td> <td></td> <td></td> </tr> <tr> <td>Stenian, Ectasian, Calymnian 1000-1600</td> <td>Yurmatin 1050-1350</td> <td></td> </tr> <tr> <td></td> <td>Burzyan 1350-1650</td> <td></td> </tr> <tr> <td>Statherian, Siderian, Rhyacian, Orosirian 1650-2500</td> <td>Animikean 1650-</td> <td></td> </tr> <tr> <td>Neoarchean 2500-2800</td> <td>Randian 1650-</td> <td></td> </tr> <tr> <td>Mesoarchean 2800-3200</td> <td>Swazian 1650-</td> <td></td> </tr> <tr> <td>Paleoarchean 3200-3600</td> <td>Isuan 1650-</td> <td></td> </tr> <tr> <td>Eoarchean 3600-3850</td> <td>Imbrian 1650-3850</td> <td></td> </tr> <tr> <td>Nectarian 3850-4250</td> <td>Huronian 2100-2400</td> <td></td> </tr> <tr> <td>Basin Groups 1-9 3950-4150</td> <td></td> <td></td> </tr> <tr> <td>Cryptic 4150-4650</td> <td></td> <td></td> </tr> </tbody> </table>	Period	Epoch	Stage	Vendian 542-610	Ediacara 530-590	Poundian 530-580	Sinian 542-1050	Varanger 590-610	Wonokan 580-590			Mortensnes 590-600			Smalfjord 600-610	Sturtian 610-1050	Karatau 610-1050		Rhiphean 610-1650			Stenian, Ectasian, Calymnian 1000-1600	Yurmatin 1050-1350			Burzyan 1350-1650		Statherian, Siderian, Rhyacian, Orosirian 1650-2500	Animikean 1650-		Neoarchean 2500-2800	Randian 1650-		Mesoarchean 2800-3200	Swazian 1650-		Paleoarchean 3200-3600	Isuan 1650-		Eoarchean 3600-3850	Imbrian 1650-3850		Nectarian 3850-4250	Huronian 2100-2400		Basin Groups 1-9 3950-4150			Cryptic 4150-4650			http://www.stratigraphy.org/bak/geowhen/timelinestages.html Poundian 542-570 Vendian 542-650 Sinian 542-800 (China) Hadrynian 542-850 (N-AM) Namibian 842-900 (S-AF) Adelaidean 842-1300 (AUS)
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	 <p style="text-align: center;">Vendian / Ediacaran fauna Some of the earliest known multicellular animals from about 570 million years ago Smithsonian Natural History Museum Ediacara Diorama</p>	<p>In the <u>Cryogenian</u> first appearance of amoeba and sponges, and several glaciations In the <u>Tonian</u> begins breakup of <u>supercontinent Rodinia</u> During the <u>Statherian</u> the first complex singlecellular life appeared. Probably during the <u>Orosirian</u> <u>Earth's atmosphere</u> changed to <u>oxygen</u>-rich due to <u>photosynthesis</u>. The <u>Huronian glaciation</u> extended from 2400 Ma to 2100 Ma, during the <u>Siderian</u> and <u>Rhyacian</u>.</p>	 <p style="text-align: center;"><u>Archaean</u> Halobacteria each cell about 5 µm long</p>																																																		
Archean 2500-4000 Neoarchean 2500-2800 Mesoarchean 2800-3200 Paleoarchean 3200-3600 Eoarchean 3600-4000	 <p style="text-align: center;">Impression of a magma ocean on the <u>Hadean</u> Earth</p>	 <p style="text-align: center;">Archaea were first detected in extreme environments, such as volcanic <u>hot springs</u></p>																																																			
Hadean 4000-4600																																																					