The New York Times

Are We in the 'Anthropocene,' the Human Age? Nope, Scientists Say.

A panel of experts voted down a proposal to officially declare the start of a new interval of geologic time, one defined by humanity's changes to the planet.





INTERNATIONAL UNION OF GEOLOGICAL SCIENCES (IUGS, 1961)

INTERNATIONAL COMMISSION ON STRATIGRAPHY (ICS, 1974)

SUBCOMMISSION ON QUATERNARY STRATIGRAPHY



ANTHROPOCENE WORKING GROUP (AWG, 2009)

INTERNATIONAL COMMISSION ON STRATIGRAPHY:

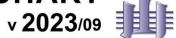
- it precisely defines units of the International Geologic Time Scale, thus setting global standards for the fundamental scale for expressing the history of the Earth
- the official keeper of (geologic) time

IUG

INTERNATIONAL CHRONOSTRATIGRAPHIC CHART

www.stratigraphy.org

International Commission on Stratigraphy



	us	1	do.			
£000	Eratton/	System E	Series / Epoch	Stage / Age	GSSP	numerical age (Ma)
		>	U/L	Meghalayan	3	present 0.0042
		ā	Holocene M	Meghalayan Northgrippian Greenlandian	3	0.0082
		1	U/L M	Upper Chibanian	~	0.129
		ate	Pleistocene	Calabrian	1	0.774
		2	L/E	Gelasian	1	1.80
		0	U/L	Piacenzian	1	2.58
			Pliocene -	Zanclean	1	3.600
			L/E	Messinian	4444	5.333
		ЭС	U/L		1	7.246
		gene	_	Tortonian	1	11.63
	O	9	Miocene [™]	Serravallian	1	13.82
	ZO.	ž	Wilderic	Langhian	3	15.98
	0			Burdigalian		20.44
	ě		L/E	Aquitanian	<	23.03
	U			Chattian	4	
			Oligocene	Rupelian	,	27.82
			***		1	33.9
		e	Eocene	Priabonian	3	37.71
()		Je		Bartonian		41.2
.g		Paleog		Lutetian	5	47.0
eroz				Ypresian	4	47.8 56.0
ਕ				Thanetian	3	59.2
는				Selandian	3	61.6
				Danian	5	
				Maastrichtian	T	66.0 72.1 ±0.2
			Upper	Campanian	4	
				Santonian	3	83.6 ±0.2
				Coniacian	4	86.3 ±0.5
				Turonian	7	89.8 ±0.3
	0	Sno			1	93.9
	20	Sec		Cenomanian	1	100.5
	Jeso	Cretac		Albian	4	~ 113.0
				Aptian		
				Barremian	<	~ 121.4
			Lower	Hauterivian	1	125.77
					1	~ 132.6
				Valanginian		~ 139.8
				Berriasian		~ 145.0
						145.0

	4/4	E73	000	9		
£000	Erath On / E	System (Era	Se	ries / Epoch	Stage / Age	numerical age (Ma)
					Tithonian	~ 145.0
			Upper		Kimmeridgian	149.2 ±0.7
					Oxfordian	134.0 10.0
		o			Callovian	161.5 ±1.0 165.3 ±1.1
		rassi		Middle	Bathonian Bajocian	168.2 ±1.2
					Aalenian	4
		J.			Toarcian	8
				Lower		184.2 ±0.3 192.9 ±0.3
	Mesozoic					4
	02				Hettangian	199.5 ±0.3 201.4 ±0.2
	es				Rhaetian	
	2	ပ		Upper	Norian	~ 208.5
		iass			Carnian	~ 227
		F			Ladinian	~ 237
Phanerozoic			Middle		Anisian	~ 242
0.0			Lower		Olenekian	247.2 251.2
Je.				Lower	Induan Changhsingian	251.902 ±0.024
Jai		_	Lopingian		Wuchiapingian	1
₫					Capitanian	1
			Guadalupian		Wordian	264.28 ±0.16
		iai			Roadian	266.9 ±0.4
		Permian			Kungurian	273.01 ±0.14
		ď	C	isuralian	Artinskian	283.5 ±0.6
	<u>.</u> 2		Ciourdian		Sakmarian	1
	20				Asselian	293.52 ±0.17 298.9 ±0.15
	<u>e</u>		an	Unnor	Gzhelian	250.5 10.10
	Paleozoic		rerous Pennsylvaniar	Upper	Kasimovian	303.7 ±0.1 307.0 ±0.1
		SI		Middle	Moscovian	315.2 ±0.2
		erol	Penr	Lower	Bashkirian	313.2 ±0.2
		Jill		Upper	Serpukhovian	020.2 10.4
		Carboniferous	ississippian	Middle	Visean	330.9 ±0.2
			Miss	Lower	Tournaisian	346.7 ±0.4 358.9 ±0.4

å	Them/5	hen Era	Series / Epoch		SP	
400	450	3	Series / Epoch	Stage / Age	GSSP	numerical age (Ma)
			Upper	Famennian	4	358.9 ±0.4 372.2 ±1.6
		_		Frasnian	4	
		nia	715-30-00 Page 1	Givetian	<	382.7 ±1.6
		Devoniar	Middle	Eifelian	4	387.7 ±0.8
		۵	Top.	Emsian	630	393.3 ±1.2
			Lower	Pragian	VV	407.6 ±2.6 410.8 ±2.8
				Lochkovian	5	
			Pridoli		A AA	419.2 ±3.2
			Ludlow	Ludfordian	3	423.0 ±2.3 425.6 ±0.9
		an		Gorstian Homerian	3	427.4 ±0.5
		L.	Wenlock	Sheinwoodian	3	430.5 ±0.7
		Sil		Telychian	1	433.4 ±0.8
			Llandovery	Aeronian	3	438.5 ±1.1 440.8 ±1.2
.S	O			Rhuddanian	3	440.8 ±1.2 443.8 ±1.5
Z	.Ö			Hirnantian	1	445.2 ±1.4
ner	Paleozoic	_	Upper	Katian	4	453.0 ±0.7
ha	Ра	iar		Sandbian	3	458.4 ±0.9
ш		ovic	Middle	Darriwilian	3	467.3 ±1.1
		Dr.	Dapingi	Dapingian	7	470.0 ±1.4
		U	Lower	Floian	4	477.7 ±1.4
				Tremadocian	4	485.4 ±1.9
			Furongian	Stage 10		~ 489.5
				Jiangshanian	1	~ 494
				Paibian	1	~ 497
			Miaolingian	Guzhangian	1	~ 500.5
		an		Drumian	1	~ 504.5
		Cambrian		Wuliuan	1	~ 509
		шĸ	Series 2	Stage 4		
		Ö		Stage 3		~ 514
				Stage 2		~ 521
			Terreneuvian	Fortunian	4	~ 529
					1	538.8 ±0.2

	Fonothe	Eamen For	System / Period	L 4 0000 numerical 0000 age (Ma)	
		30	Ediacaran	538.8 ±0.2 ~ 635	
		Neo- proterozoic	Cryogeniar		
		protorozolo	Tonian		
			Stenian	2 1000	
		Meso-	Ectasian	2 1200	
	Proterozoic	proterozoic		2 1400	
	roz		Calymmian	2 1600	
27000	ote		Statherian	J 1800	
Precambrian	ď	Paleo-	Orosirian		
Iqu		proterozoic	Rhyacian	2050	
cal					
Pre			Siderian	2500	
		Neo- archean			
	_	Meso-		2800	
	nea	archean		3200	
	Archean	Paleo-		3200	
	4	archean		J 3600	
		Eo- archean			
		arcricari		4031 ± 3	
	На	dean			
Total	1111			4567	
Units of all ranks are in the process of being defined by Global Boundary					

Units of all ranks are in the process of being defined by Global Boundary Stratotype Section and Points (GSSP) for their lower boundaries, including those of the Archean and Proterozoic, long defined by Global Standard Stratigraphic Ages (GSSA). Italic fonts indicate informal units and placeholders for unnamed units. Versioned charts and detailed information on ratified GSSPs are available at the website http://www.stratigraphy.org. The URL to this chart is found below.

Numerical ages are subject to revision and do not define units in the Phanerozoic and the Ediacaran; only GSSPs do. For boundaries in the Phanerozoic without ratified GSSPs or without constrained numerical ages, an approximate numerical age (~) is provided.

Ratified Subseries/Subepochs are abbreviated as U/L (Upper/Late), M (Middle) and L/E (Lower/Early). Numerical ages for all systems except Quaternary, upper Paleogene, Cretaceous, Jurassic, Tinassic, Permian, Cambrian and Precambrian are taken from 'A Geologic Time Scale 2012' by Gradstein et al. (2012), those for the Quaternary, upper Paleogene, Cretaceous, Jurassic, Triassic, Permian, Cambrian and Precambrian were provided by the relevant ICS subcommissions.

Colouring follows the Commission for the Geological Map of the World (www.ccgm.org)



Chart drafted by K.M. Cohen, D.A.T. Harper, P.L. Gibbard, N. Car (c) International Commission on Stratigraphy, September 2023

(c) International Commission on Stratigraphy, September 2023
To cite: Cohen, K.M., Finney, S.C., Gibbard, P.L. & Fan, J.-X. (2013; updated)

The ICS International Chronostratigraphic Chart. Episodes 36: 199-204.

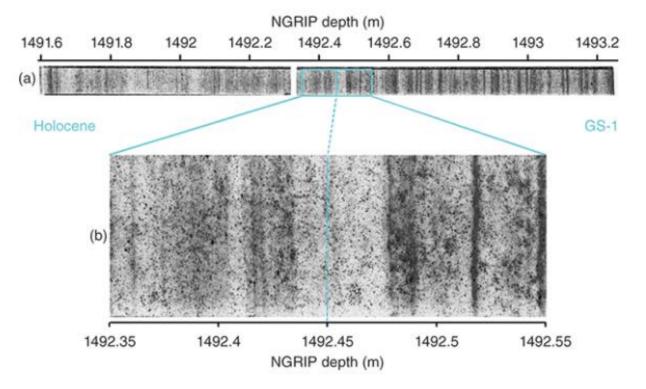
URL: http://www.stratigraphy.org/ICSchart/ChronostratChart2023-09.pdf

Egnothem/Egn Erallem/Era numerical Series / Epoch Stage / Age age (Ma) present 0.0042 0.0082 Meghalayan Northgrippian Greenlandian Holocene M L/E Quaternary 0.0117 Upper 0.129 Chibanian 0.774 Pleistocene Calabrian 1.80 Gelasian 2.58 Piacenzian Pliocene 3.600 Zanclean 5.333 Messinian Neogene 7.246 U/L Tortonian 11.63 Serravallian 13.82 Miocene [™] Cenozoic Langhian 15.98 Burdigalian 20.44 Aquitanian 23.03 Chattian 27.82 Oligocene Rupelian 33.9 Priabonian Paleogene 37.71 Bartonian 41.2 **Phanerozoic** Eocene Lutetian 47.8 Ypresian 56.0 Thanetian 59.2 Paleocene Selandian 61.6 Danian 66.0

Global Boundary Stratotype Section and Points (GSSPs), "golden spikes"



Ediacara, Austrálie



12. The Holocene GSSP. The lower boundary of the Holocene is marked at a depth of 1492.45 metres in an ice core extracted from the Greenland ice sheet.

(E. C. ELLIS, ANTHROPOCENE: A VERY SHORT INTRODUCTION, OUP 2018)

MOŽNÉ POČÁTKY ANTROPOCÉNU

(návrhy na GSSP tučně)

Event	Dates	Stratigraphic markers
Stone tools	3.2 million to 2.5 million yr BP	Stone artefacts
Control of fire	1.6 million to 200,000 yr BP	Charcoal
Anatomically modern Homo sapiens	~300,000 yr BP	Bones
Behaviourally modern Homo sapiens	110,000 to 60,000 yr BP	Complex artefact assemblages, symbolic markings, advanced tools, etc.
Megafauna extinction	50,000 to 10,000 yr BP	Bones, human artefacts, charcoal
Ceramics	30,000 to 15,000 yr BP	Ceramic minerals
Origin of farming	~11,000 yr BP	Pollen (domesticates, weeds), phytoliths, animal bones, charcoal
Extensive farming	~11,000 to 6,000 yr BP	~8,000 yr BP CO ₂ minima in glacier ice, pollen (domesticates, weeds), phytoliths, animal bones, charcoal
Rice production, ruminant methane	~6,000 to 3,000 yr BP	5,020 yr BP CH ₄ minima in glacier ice, animal bones, paddy soils, pollen, phytoliths
Bronze age	~5000 to 3000 yr BP	Metal artefacts, mining, pollution, legacies of deforestation
Biotic homogenization (Homogocene / Homogenocene)	~5000 to 500 yr BP	Pollen, phytoliths, animal bones
Iron age	~3000 to 1,000 yr BP	Iron artefacts, mining, pollution, legacies of deforestation
Anthropogenic soils	~3,000 to 500 yr BP	Soil organic matter, phosphorus accumulations, isotope ratios, pollen
Capitalism (Capitalocene)	~1450	None proposed
Columbian Exchange (Orbis)	1492 to 1610	1610 CO2 minima in glacier ice, pollen, phytoliths, bones, charcoal
Industrial Revolution (Carbocene)	1760 to 1800	Fly ash from coal burning, carbon and nitrogen isotope ratios, diatom composition in lakes, CO ₂ in glacier ice.
The Great Acceleration	1945 to 1964	Radionuclides (1964 ¹⁴ C & ²³⁹ Pu peak), black carbon, plastics, pollutants, other isotopes

Based in part on Simon L. Lewis and Mark A. Maslin, 'Defining the Anthropocene', Nature, 519/7542 (2015), 171-80

MOŽNÉ POČÁTKY ANTROPOCÉNU

(návrhy na GSSP tučně)

Event		Dates	Stratigraphic markers		
Stone tools		3.2 million to 2.5 million yr BP	Stone artefacts		
Control of fire		1.6 million to 200,000 yr BP	Charcoal		
Anatomically modern Ho	mo sapiens	~300,000 yr BP	Bones		
Behaviourally modern Ho	omo sapiens	110,000 to 60,000 yr BP	Complex artefact assemblages, symbolic markings, advanced tools, etc.		
Megafauna extinction		50,000 to 10,000 yr BP	Bones, human artefacts, charcoal		
Ceramics W/il	lliam Ruddiman Far	arly Anthropocene Hypothesis	Ceramic minerals		
Origin of farming VV II	main Kudumian, Lai	Ty Mithiopoeene Trypothesis	Pollen (domesticates, weeds), phytoliths, animal bones, charcoal		
Extensive farming		~11,000 to 6,000 yr BP	~8,000 yr BP CO ₂ minima in glacier ice, pollen (domesticates, weeds), phytoliths, animal bones, charcoal		
Rice production, ruminar	nt methane	~6,000 to 3,000 yr BP	$5,020~{ m yr}~{ m BP}~{ m CH_4}$ minima in glacier ice, animal bones, paddy soils, pollen, phytoliths		
Bronze age		~5000 to 3000 yr BP	Metal artefacts, mining, pollution, legacies of deforestation		
Biotic homogenization (H	Iomogocene / Homogenocene)	~5000 to 500 yr BP	Pollen, phytoliths, animal bones		
Iron age Anthropogenic soils	Andreas Malm, Jason	n Moore; <i>Plantationocene,</i> "dlouhé	phosphorus ac		
Capitalism (Capitalocene)		~1450	None proposed Orbis Hypothesis		
Columbian Exchange (C	Orbis) David Courtmon	92 to 1610	1610 CO2 minima in glacier ice, pollen, phytoliths, bones, charcoal		
Industrial Revolution (Car	Paul Crutzen	60 to 1800	Fly ash from coal burning, carbon and nitrogen isotope ratios, diatom composition in lakes, CO ₂ in glacier ice.		
The Great Acceleration	AWG	1945 to 1964	Radionuclides (1964 ¹⁴ C & ²³⁹ Pu peak), black carbon, plastics, pollutants, other isotopes		

Based in part on Simon L. Lewis and Mark A. Maslin, 'Defining the Anthropocene', Nature, 519/7542 (2015), 171-80

AKTUÁLNÍ FORMULACE OTÁZKY: JE ANTROPOCÉN EPOCHA, NEBO UDÁLOST?

• E. Ellis:

"We need to think about this as a broader process, not as a distinct break in time.... By voting 'no', they [the SQS] actually have made a stronger statement, that it's more useful to consider a broader view — a deeper view of the Anthropocene."

Journal of Quaternary Science

Rapid Communication | 🙃 Full Access

The Anthropocene as an Event, not an Epoch

Philip Gibbard X, Michael Walker, Andrew Bauer, Matthew Edgeworth, Lucy Edwards, Erle Ellis, Stanley Finney, Jacquelyn L. Gill, Mark Maslin, Dorothy Merritts, William Ruddiman

First published: 09 March 2022 | https://doi.org/10.1002/jqs.3416 | Citations: 22



Journal of Quaternary Science

Rapid Communication | 🙃 Full Access

The proposed Anthropocene Epoch/Series is underpinned by an extensive array of mid-20th century stratigraphic event signals

Martin I. Head M. Jan A. Zalasiewicz, Colin N. Waters, Simon D. Turner, Mark Williams, Anthony D. Barnosky, Will Steffen, Michael Wagreich, Peter K. Haff, Jaia Syvitski ... See all authors 🗸

First published: 24 August 2022 | https://doi.org/10.1002/jqs.3467 | Citations: 15







The Anthropocene is best understood as an ongoing, intensifying, diachronous event

Michael J. C. Walker, Andrew M. Bauer, Matthew Edgeworth, Erle C. Ellis, Stanley C. Finney, Philip L. Gibbard X, Mark Maslin

First published: 08 October 2023 | https://doi.org/10.1111/bor.12636 | Citations: 1

E. ELLIS, WHY I RESIGNED FROM THE ANTHROPOCENE WORKING GROUP (13 JULY 2023)

After 14 years of professional work as a member of the <u>Anthropocene Working Group</u> (AWG), I've now tendered my formal resignation...

Nevertheless I must resign, for two reasons. The first is that things have changed within the group, as exemplified by the increasingly corrosive nature of discussions surrounding two recent resignations. AWG has become so focused on promoting a single narrow definition of the Anthropocene that there is no longer room for dissent or for a broader perspective within the group. This narrowing of perspective began to emerge years ago, with the 2016 vote deciding that only evidence supporting a mid-20th century start date would be considered in Anthropocene definition. ... But recent efforts to promote the group's final GSSP and site proposal have now established beyond doubt that there is no longer any place for broader perspectives on Anthropocene definition within AWG. The group exists only to promote one single narrow perspective, and differing views are no longer acceptable. I clearly no longer have any useful role in the group. ...

E. ELLIS, WHY I RESIGNED FROM THE ANTHROPOCENE WORKING GROUP (13 JULY 2023)

Second, it is no longer possible to avoid the reality that narrowly defining the Anthropocene in the way AWG has chosen to do has become more than a scholarly concern. The AWG's choice to systematically ignore overwhelming evidence of Earth's long-term anthropogenic transformation is not just bad science, it's bad for public understanding and action on global change. This, at a time when broader cooperation to address these grave societal challenges is more critical than ever.

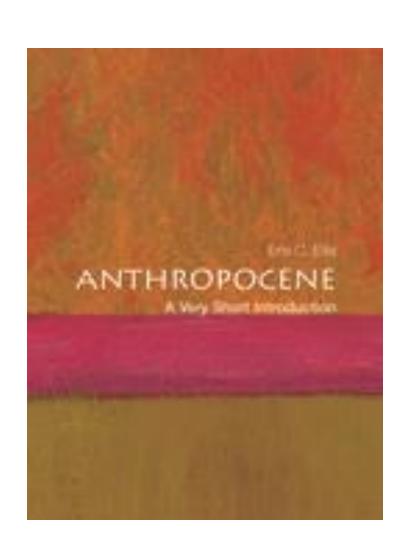
To define the Anthropocene as a shallow band of sediment in a single lake is an esoteric academic matter. But dividing Earth's human transformation into two parts, pre- and post-1950, does real damage by denying the deeper history and the ultimate causes of Earth's unfolding social-environmental crisis. Are the planetary changes wrought by industrial and colonial nations before 1950 not significant enough to transform the planet? The political ramifications of such a misleading and scientifically inaccurate portrayal are clearly profound and regressive. Perhaps AWG's break in Earth history will simply be ignored outside stratigraphy. But this is undoubtedly neither AWG's goal, nor is it the way AWG's narrative is being interpreted across the public media ...

E. ELLIS, WHY I RESIGNED FROM THE ANTHROPOCENE WORKING GROUP (13 JULY 2023)

As a scholar who has actively worked within a group now promoting a misleading and regressive perspective on Earth's transformation by human societies, I feel obligated to respond. First, by formally ending my association with the group, and in the long term, by doing my best to counteract the damage created by this misleading perspective based on the best available science.....

I remain hopeful that the Anthropocene as a concept will continue to inspire efforts to understand and more effectively guide societal interactions with our only planet. I no longer believe that the AWG is helping to achieve this and is increasingly actively accomplishing the opposite.

https://anthroecology.org/why-i-resigned-from-the-anthropocene-working-group/



E. C. ELLIS, ANTHROPOCENE: A VERY SHORT INTRODUCTION:

"Until this time, the Anthropocene happened while we were busy making other plans. It remains a work in progress." (2018, p. 130)