

Grappling with the Anthropocene

Is there such a thing? Does it matter?

Why are we talking about it?

Defining “Anthropocene”

‘The Anthropocene’ is a term that is increasingly used to define a new planetary era: one in which humans have become the dominant force shaping Earth’s bio-geophysical composition and processes. Initially emerging in the Earth Sciences as the name for a proposed new geological epoch (Crutzen & Stoermer 2000), the Anthropocene has been widely adopted across academia as a catch-all description of the overwhelming impact of human activity on the planet. Its key markers include climate change and its consequences (e.g. sea level rise), the effects of plastic pollution on marine and terrestrial processes, unprecedented rates of biodiversity loss and extinction, and the changing chemical composition of soils, oceans, and the atmosphere.*

* Liana Chua and Hannah Fair, “Anthropocene,” *Cambridge Encyclopedia of Anthropology*, January 8, 2019, <https://www.anthroencyclopedia.com/entry/anthropocene>.

As the source for the previous quote may suggest, this is a definition more favored by social scientists than physical scientists.

What Do the Geologists Say?

“The evolution of vascular land plants and their spread across the continents from late in the Devonian to early in the Permian completely altered Earth’s surface, left a significant stratigraphic record, and dramatically altered CO₂ and O₂ concentrations in the atmosphere and oceans far greater than humans are projected to do (Berner and Canfield, 1989; Berner, 1998). Yet there is no drive to name a unit in the ICS Chart that formally recognizes that profound and irreversible change to the Earth system. ***Perhaps promotion of the Anthropocene is anthropocentric as well as political?***”*

* Stanley C. Finney and Lucy E. Edwards, “The ‘Anthropocene’ Epoch: Scientific Decision or Political Statement?,” *GSA Today* 26, no. 3 (March 1, 2016): 4–10, <https://doi.org/10.1130/GSATG270A.1>.

The Physical Scientists Have Spoken, Officially

“On March 4, 2024, the commission responsible for recognizing time units within our most recent period of geologic time – the Subcommittee on Quaternary Stratigraphy – rejected that proposal, with 12 of 18 members voting no. These are the scientists most expert at reconstructing Earth’s history from the evidence in rocks. They determined that adding an Anthropocene Epoch – and terminating the Holocene Epoch – was not supported by the standards used to define epochs.”*

* Erle C. Ellis, “March 4- 12 To 18 Votes Decide The Anthropocene Is Not An Epoch – But The Age Of Humans Is Most Definitely Underway,” March 7, 2024, <https://umbc.edu/stories/anthropocene-not-an-epoch/>.

So, if it's not a thing, why bring it up at all?

What Do the Geologists Say?

“The term Anthropocene is of similar character to the term Renaissance. Both refer to richly documented, revolutionary, human activities that are dated in the Gregorian calendar. Both carry significant connotation. Although a precise date in calendar years is not specified for the Renaissance, the term is established and conveys a singular meaning of the content of that period, where it began, how it evolved, and how it spread. The same applies to Anthropocene if its concept is the human impact on Earth's surface. Without doubt, scholars have argued over the singular human creation, whether in literature, architecture, or art, that initiated the Renaissance, but there is no need to define its beginning, because the dates and locations of the creations are well established. Furthermore, it would be contrary to current practice to define its beginning at a single point in time because it is a cultural movement that is not tied to a single date. The same is true for the Anthropocene, whether it is a hydroelectric dam constructed in the Italian Alps, a gold mine in South Africa, the dramatic increase in carbon combustion during the Industrial Revolution, the growth of a megacity, the clearing of rain forests, or the increase in CO₂ in the atmosphere and the resulting increase in global surface temperatures. Is putting an official beginning on the Anthropocene any more advantageous than on the Renaissance?*

* Finney and Edwards, “The ‘Anthropocene’ Epoch:”

The Answer in a Nutshell

Official recognition of the concept would invite cross-disciplinary science. And it would encourage a mindset that will be important not only to fully understand the transformation now occurring but to take action to control it. ... Humans may yet ensure that these early years of the Anthropocene are a geological glitch and not just a prelude to a far more severe disruption. But the first step is to recognize, as the term Anthropocene invites us to do, that we are in the driver's seat.*

- “The Human Epoch,” *Nature* 473, no. 7347 (May 2011): 254–254, <https://doi.org/10.1038/473254a>.

The Mission of ALST

Cross-Disciplinary Science lies at the heart of the Ancient Landscapes of South Texas Project. We stand at the nexus of social and natural science, like classic Enlightenment Era natural historians, we seek to place humans within nature and nature beneath and around humans. The natural sphere and the human sphere are one. The connection between the Renaissance and the Anthropocene is more than just analogical, is elemental to our humanistic approach.

So What are We Talking About?

a Geologic Time Scale 2012

Cenozoic Era	Quaternary Period	Holocene Epoch			0
		Pleistocene Epoch	Upper	Tarantian Stage	0.0117
			Middle	Ionian Stage	0.126
			Lower	Calabrian Stage	0.781
				Gelasian Stage	1.806
	Neogene Period	Pliocene Epoch	Piacenzian Stage		2.588
			Zanclean Stage		3.600
		Miocene Epoch	Messinian Stage		5.333
			Tortonian Stage		7.25
			Serravallian Stage		11.63
			Langhian Stage		13.82
			Burdigallian Stage		15.97
			Aquitanian Stage		20.40
					23.03

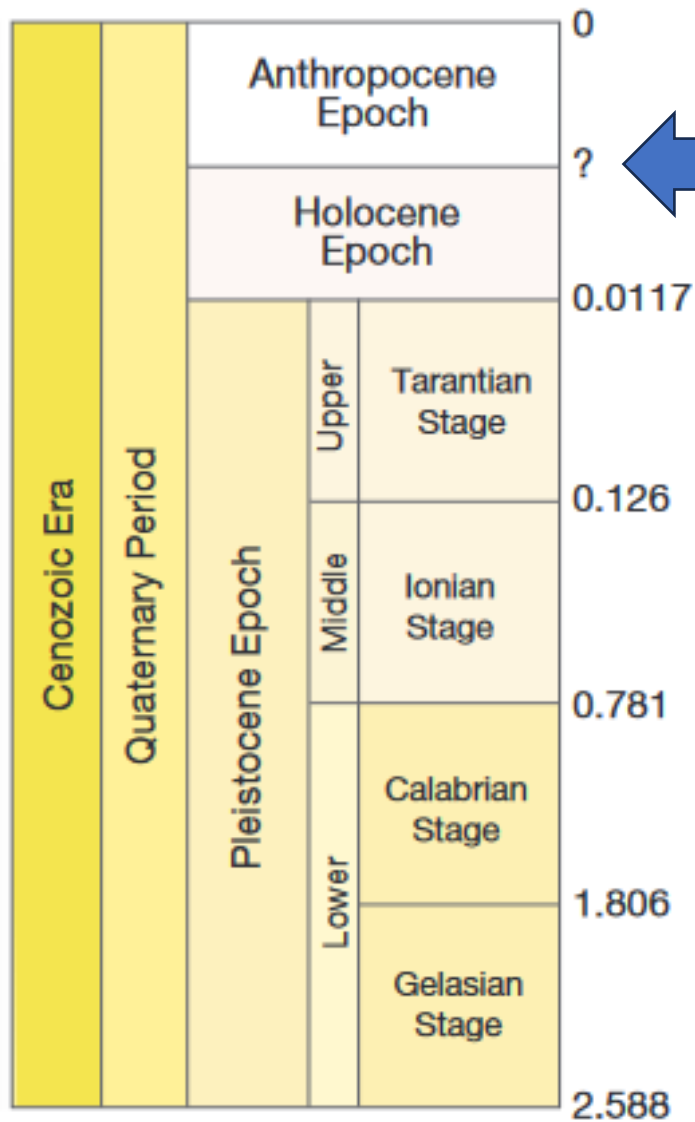
The Classic Division of Geological Epochs
timescale in millions of years

So What are We Talking About?

Cenozoic Era	Quaternary Period	Anthropocene Epoch		0	
		Holocene Epoch		?	
		Pleistocene Epoch	Upper	Tarantian Stage	0.0117
				Ionian Stage	0.126
			Lower	Calabrian Stage	0.781
				Gelasian Stage	1.806

The Proposed Division of Geological Epochs

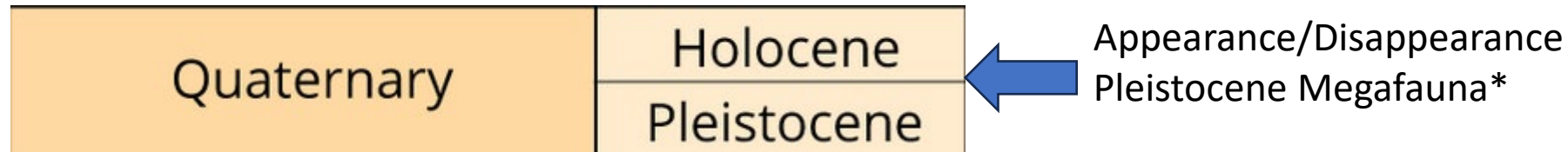
But Here's the Problem



Where, exactly, is this?

Assumptions About Epoch Change

“Most of the boundaries on the geological time scale correspond to the origination or extinction of particular kinds of fossils.” To qualify as “epochal change” the alterations must be permanent and irreversible.



Fixing a Moment in Time

The Holocene Began 11.8 KYA – When did it end?

* Is the extinction of Pleistocene Megafauna “permanent and irreversible?”

The Woolly Mammoth Project*

* “We Could Resurrect the Woolly Mammoth. Here’s How,” *National Geographic* accessed June 2, 2024,
<https://education.nationalgeographic.org/resource/we-could-resurrect-woolly-mammoth-heres-how>.

Was There a Holocene At All?

Recent evidence from California

Fire and the Pleistocene Megafauna

“The authors report that samples of a sediment core from Lake Elsinore, California — about 80 miles away from the tar pits — revealed the presence of charcoal, which likely came from wildfires.”

Humans and fire

“Those wildfires would have coincided with the spread of human beings and the end of the ice age, according to archaeological and geological evidence and a data analysis technique called time-series modeling. Prior to that, very little charcoal is present in the geological record”

“The evidence suggests unprecedented fire activity occurring with the changing climate, along with people coming into the area. It’s during this interval that the megafauna species disappeared.”*

* F. Robin O’Keefe et al., “Pre–Younger Dryas Megafaunal Extirpation at Rancho La Brea Linked to Fire-Driven State Shift,” *Science* 381, no. 6659 (August 18, 2023): eabo3594, <https://doi.org/10.1126/science.abo3594>.

So, was there no Holocene? Has the entire period since 11.8 Ka been the Anthropocene?

- Evidence VERY limited
- Would megafauna have disappeared without fire? Most likely, yes.

The Next Likely Date – The Neolithic Revolution

“The Neolithic Revolution was viewed as a single event—a sudden flash of genius—that occurred in a single location, Mesopotamia, between the Tigris and Euphrates Rivers in what is now southern Iraq, specifically the site of a realm known as Sumer, which dates back to about 4000 B.C.E. It then spread to India, Europe, and beyond. Most archaeologists believed this sudden blossoming of civilization was driven largely by environmental changes: a gradual warming as the Ice Age ended that allowed some people to begin cultivating plants and herding animals in abundance.”*

- Charles C. Mann, “The Birth of Religion,” *Smithsonian Magazine*, June 1, 2011, <https://www.nationalgeographic.com/magazine/article/gobeki-tepe>.

Remember the defining characteristics of a change in epoch:

“origination or extinction of particular kinds of fossils”

Previously peripheral species of plants and animals became dominant

--goats, sheep, cows – depending on climate and soil

--wheat, barley, sorghum – again depending on climate and soil

Once dominant species of plants and animals became peripheral

--predators of all kinds – EXCEPT dogs

--weeds defined as weeds

Preferential hunting of unproductive or dangerous animals

Eradication of unproductive or dangerous plants

What’s wrong with this picture?

The Next Likely Date – The Industrial Revolution

Favored by the “father” of the Anthropocene -- Paul J. Crutzen

The Steam Engine

The Newcomen Fire Engine – 1712

The Watt Steam Engine – 1776

Steam and the Petrochemical Revolution

Mining of coal and disruption of the geological environment

Onset of liquid fossil fuels

First commercial oil production – Russia, 1825-1850

North America, 1850s

Internal Combustion Engine – United States, 1794

First commercial production – Karl Benz, Germany, 1886

Mass Commercial Production – Henry Ford, USA, 1908

Atmospheric Carbon and Climate Change

Climate Change and Geophysical Change

Climate Change and Biological Change – extinctions

The Next Likely Date – The Atomic Age

First Nuclear Detonation-- July 16, 1945*

- “Trinity: World’s First Nuclear Test,” accessed June 2, 2024, <https://www.afnwc.af.mil/About-Us/History/Trinity-Nuclear-Test/>.

“In the 1950s, radioactive fallout from nuclear weapons tests was the first phenomenon to be defined as a planetary environmental issue, and today, radioactive traces are quintessential indicators of humanity’s impact on the Earth. The dispersal of artificial radionuclides from atmospheric detonations that started in 1945 and peaked in 1961–1962 has emerged as one of the best candidate signatures to fulfil the required criteria for a marker of the Anthropocene: It is synthetic, globally synchronous, and enduring on a geological timescale.”*

* Andy Cundy et al., “Nuclear Anthropocene,” accessed June 2, 2024, <https://www.anthropocene-curriculum.org/anthropogenic-markers/nuclear-anthropocene>.

Evidence from Crawford Lake, Ontario, Canada

“There are distinct and multiple signals starting around 1950 in Crawford Lake showing that ‘the effects of humans overwhelm the Earth system,’ said Francine McCarthy, a committee member who specializes in that site as an Earth sciences professor at Brock University in Canada.”*

* The Associated Press, “Scientists Say New Epoch Marked by Human Impact — the Anthropocene — Began in 1950s,” *NPR*, July 11, 2023, sec. Climate, <https://www.npr.org/2023/07/11/1187125012/anthropocene-crawford-lake-canada-beginning>.

Are Human-Generated Changes Reversible?

“man no longer struggles with nature, but with the side-effects of man’s conquest of nature”*

* Ernest Gellner, “Recollection in Anxiety: *Thought and Change* Revisited,” In *Culture, Identity, and Politics*, by Ernest Gellner, 111–22. Cambridge: Cambridge Univ. Pr., 1999, 121.

“Since the beginning of humankind, our planet's global ecology has never been in such a critical state as it is today. But we have also never been better equipped with the tools to understand what is happening and what needs to be done.”*

* Katie Pavid, “What Is the Anthropocene and Why Does It Matter?,” accessed June 2, 2024, <https://www.nhm.ac.uk/discover/what-is-the-anthropocene.html>.

The Viewscape and the Miracle of Wind Turbines?

What happened to the “miracle” of waterpower?

What happened to the “miracle” of internal combustion?

What happened to the “miracle” of atomic energy?

The Woolly Mammoth Project: “Jurassic Park” revisited?

Man And Nature: The Persistent Conundrum