



EDITORIAL NOTE

Anthropocene epoch proposal rejected - does it really matter?

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As has been reported for some time now, several researchers have embraced the idea that we currently live in a time so different from last centuries that we should separate it into a distinct geological time unit. Specialists who fall under the designation of Earth scientists - such as geologists, paleontologists, and geochemists - divide our planet's geological record expressed in rocks and layers according to events that have had an affect on a global scale. Perhaps the best known is the extinction of non-avian dinosaurs and many other organisms that occurred about 66 million years ago due to the impact of a large meteorite (e.g., Renne et al. 2013). This led to the establishment of the Cretaceous-Paleocene (K-Pg) boundary, revealing two very distinct worlds - one with and one without non-avian dinosaurs, separated by a thin layer with a high concentration of iridium - a chemical element that is very rare on the planet, but abundant in meteorites.

The geologic time in which we live is called Holocene, an epoch that began about 11.700 years ago, after the last glaciation (e.g., Walker et al. 2009). At some point, the Dutch environmental chemist Paul Crutzen took up a previous expression used by the American ecologist Eugene Stoermer, the Anthropocene, to make people understand that the current world is quite different from the rest of the Holocene (Crutzen & Stoermer 2000). Just for the sake of fidelity to history, apparently this expression and/or its meaning already existed in the Russian literature before that (e.g., Brookes & Fratto 2020). And the term stuck! Several studies have been published on this subject (e.g., Zalasiewicz et al. 2024), some firmly opposing the idea (e.g., Demos 2017). There have even been periodicals created with what is becoming a popular term, some charging quite hefty fees for open access (e.g., Anthropocene 2024), a problematic issue that will not be addressed here (e.g., Kellner 2023).

An interdisciplinary Anthropocene Working Group (AWG) has been established to study this matter in detail and provide a recommendation to the International Commission on Stratigraphy (ICS). The latter is part of the International Union of Geological Sciences (IUGS) and has the responsibility to validate questions and suggestions that might affect the geologic time scale. Contrary to many expectations, this body of scientists has just refused the introduction and formalization of the Anthropocene epoch (IUGS 2024), which has already led to some protests (e.g., Witze 2024).

But the question on the minds of many scientists (including geologists like me): does it really matter? Would the "extinction" of the Holocene and the introduction of a new epoch change our perception of the world we live in? There is no doubt that our planet is being affected by the wise species *Homo sapiens*. Just to stay local, recent examples in Brazil are the collapse of the

Brumadinho dam (e.g., Machado et al. 2023) and the massive oil spill that affected the northeast coast of the country, the culprit of which is still unclear (e.g., De Andrade & Coutinho 2022). Not to mention the alterations in the Amazon biome which, despite occurring throughout the Holocene (e.g., Silva et al. 2023), is undergoing dramatic changes due to deforestation, a situation that needs to be urgently mitigated (e.g., Fiedler et al. 2023). Even in more remote regions such as Antarctica, the effect of climate change can be measured empirically at a local level (e.g., Lorenz et al. 2023) and at a continental magnitude whose effects transcend environmental issues and can even disrupt sensitive sectors of the economy (e.g., Parise et al. 2022). Despite rejecting the formalization of a new era, the IUGS recognizes the influences of humanity on the environment of the planet.

In order to establish a subdivision regarding geological time, we need rocks and layers that record significant changes on a global scale that must be documented by a very specific geological signal detectable at different points on the planet. Several markers have been presented as potentially useful for marking the boundaries between the Holocene and the Anthropocene, such as the influence of the industrial revolution causing the burning of fossil fuels and the concentration of plutonium, the result of the first nuclear weapons tests (e.g., Rull 2024). The latter ended up being considered by the AWG, which proposed that the beginning of the new epoch be located around 1950 (IUGS 2024). This means that the Anthropocene would be less than a century old. And that constitutes a big problem.

Those who work on the geological time scale know that error bars span centuries, most within thousands or even millions of years. Based on the geochronological tools available, we simply are not able to subdivide the ~4.5 billion years of our planet's history into the scale of centuries. Even if the current effects of humanity could be adequately reflected in the geological record to justify the establishment of a new epoch, we will still need several thousand years to be able to make an assessment that makes any sense. That is, of course, if humanity does not become extinct before learning to overcome current challenges that include the growing dangers of nuclear war. If the latter is not avoidable, perhaps survivors (if any) will have more pressing issues to deal with. Not to mention that such a tragic event (nuclear war) would leave much more evidence in the layers than the ones suggested by the AWG, that might lead to a precocious extinction of the Anthropocene and the need for the introduction of a new unit of geologic time.

What seems to be the beginning of a large public struggle has started right after the IUGS decision and the discussion is taking a direction that is unlikely to bring good results, putting scientists against scientists in the eyes of the public (e.g., Ansedo 2024), an attention that we do not need. I always mention to my students that politics should not enter the classroom or affect scientific issues (Political Science may be an exception). The matter of recognizing geological time units should be left to geologists and other Earth Science researchers. Arguments such as that a new epoch would increase the population's awareness of what is happening (e.g., see discussion in Esteves 2024) are, in my opinion, ill conceived. What we must do is to show the effects that our activities and way of life are having on present ecosystems and seek to discuss viable solutions. Education in schools and activities in cultural and scientific institutions such as museums and universities, as well as raising perception of the current dangers we are facing through the media are perhaps the best ways of sensibilizing society, which in turn can influence policy makers on the need to act.

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