Should we declare the Anthropocene?

The human species has a major impact on the planet. This is why the International Union of Geological Sciences has proposed introducing a new epoch, the Anthropocene. Is this a good idea?

Manu Friederich (photomontage)

Yes

says Flavio Anselmetti of the University of Bern.

The Holocene epoch began at the end of the last Ice Age: 11,700 years ago. The world population grew quickly after that, and in recent decades it has begun to alter the Earth's system so drastically in such a brief geological time, that we shall probably soon reach the limits of what the human species needs to exist.

This is why it makes sense to announce a new epoch, the Anthropocene. As with many other geochronological units, this epoch is being initiated by a mass extinction, and it has already begun through human intervention. Nuclear experiments have released radionuclides that did not exist in the preceding 4.6 billion years in the history of the Earth. The use of fossil fuels that are millions of years old is releasing a huge quantity of greenhouse gases. This in itself is not unique in the history of the Earth, but the speed of change and the fact that a single species has triggered it knows no precedent. In certain areas, soil erosion caused by agriculture has brought about deposits of thick clay layers that are clearly different from 'natural' sediments. The 'Maya clay' in the Central American rainforest is impressive testimony to the impact of high civilisation.

In order for all scientists to be speaking the same language, the International Commission on Stratigraphy must also define this epoch precisely. Recent geological deposits offer different possible dates for the commencement of the Anthropocene, but this is not surprising given the different sediment-forming processes involved. What characteristic, human-induced layer the Commission ultimately chooses, and what date it determines for its starting point, is thus of secondary importance.

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>
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The stratigraphic marking of the start of the Anthropocene is not just symbolically significant. The epoch will signify a new state of things on the Earth's system and also explain major trends in the chronology of numerous benchmarks. The striking shifts in geological deposits show clearly that we are not dealing with a short-lived phenomenon. The Anthropocene will not have to hide behind the Holocene in terms of its duration. Humans will have played a key role in the Anthropocene, and will serve future species as an index fossil in stratigraphic classification.

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No

says Jed O. Kaplan of the University of Lausanne.

While 'anthropocene' is a valid political concept, it requires no formal definition or stratigraphic 'golden spike'. As the lower-case 'anthropocene', it acknowledges the contemporary observation that human activities are now as important as variations in the Earth's orbit around the sun, or plate tectonics as an ultimate driver of Earth's system processes. It is important to recognise that humanity's actions have consequences for the planet that are truly global in extent and may be leading to changes in ecosystems, landscapes and climate that are effectively irreversible on geologic timescales. On the other hand, a capitalised 'Anthropocene' epoch as part of the geologic time scale is not only problematic to define without any hindsight, it is wholly unnecessary.

The geologic time scale was a triumph of 19th-century science, but it has largely been supplanted in scientific and educational value by absolute radiometric dating. Lacking any method for absolutely dating events in earth history, early geologists presumed that rock layers containing similar fossils must have been laid down at about the same time, and the first geologic time scale containing the divisions of time still used today was developed by 1850. Transitions between geologic epochs were defined by the first appearance of certain fossils that could be observed in strata at a number of localities. The boundary between one geologic epoch and another is marked at a specific locality with a 'golden spike', literally a plaque or other marker identifying the transition in the rock layers. Much of the recent discussion and debate around defining an Anthropocene has therefore centred around where to place the 'golden spike' defining the beginning of our epoch.

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However, most modern scientific and even lay literature does not refer to stratigraphic epochs when defining events, except in an introductory sentence. Few people beyond geology undergraduates have memorised the order and variable length of the epochs of the geologic time scale, but it is immediately obvious to any reader that the extinction of the dinosaurs about 65 million years ago happened long before the evolution of modern humans, about 200,000 years before the present.

Beyond being fraught with problems of perspective: how can we define an epoch in which we are currently living and without an obvious endpoint? The concept of the Anthropocene epoch is completely unnecessary in modern science. Even without it we can precisely date the successive influences of humans on the Earth's system, from our evolutionary beginnings to the present.

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