



PART 3

Read the text below and answer questions 27–40.

THE ANTHROPOCENE: A NEW GEOLOGICAL EPOCH?

The term *Anthropocene* has been used to suggest that human activity has become a planetary force, altering Earth's atmosphere, oceans, and biosphere in ways that will remain legible to distant future geologists. For some scientists, this is already an empirical fact: carbon chemistry, extinction rates, and synthetic materials have shifted so dramatically that the Holocene—the relatively stable interval following the last Ice Age—no longer describes the conditions under which Earth systems now operate. For others, *Anthropocene* is a compelling diagnosis but not necessarily a formal unit of geological time. The controversy is therefore not simply about environmental seriousness. It is also about stratigraphic rules, the threshold for naming a new epoch, and the social meanings that attach to scientific labels.

In stratigraphy, epochs are not declared because a phenomenon matters politically or morally. Geological time divisions are defined by physical signals preserved in rock, ice, or sediment layers that can be correlated globally and dated with precision. The modern standard is to identify a GSSP (Global Boundary Stratotype Section and Point), popularly called a “golden spike,” a reference horizon in a particular archive—such as a lake bed, peat deposit, coral core, or ice record—that anchors the boundary. The marker must be sharply defined, widely traceable, and ideally tied to multiple independent signals. This is why supporters of formalisation argue that the Anthropocene must be more than a general sense of human influence: it requires a boundary that can be located in the stratigraphic record with the same rigour used for earlier transitions.

Several candidate signals have been proposed, often grouped under the idea of *technofossils*—novel materials whose abundance and persistence are direct consequences of industrial society. Plastics are an obvious example: fragments and fibres are increasingly found in marine sediments, and certain polymers may endure for long periods under low-oxygen burial. Industrial soot, heavy metals, and distinctive shifts in carbon isotopes associated with fossil-fuel combustion also offer potential stratigraphic signatures. However, perhaps the most sharply datable marker comes from mid-twentieth-century nuclear weapons testing. Atmospheric detonations released radionuclides that were distributed worldwide and deposited rapidly, producing a relatively clear peak in sediments and ice. Because this signal is globally widespread and time-constrained, it has been treated by many proponents as an unusually strong candidate for a boundary horizon.



Supporters commonly connect such mid-century markers to what is sometimes called the Great Acceleration. After roughly 1950, multiple indicators—population, fertiliser use, energy consumption, dam construction, mass production, and greenhouse-gas emissions—rose steeply. Earth-system metrics also show pronounced shifts over the same period, implying that human pressures crossed thresholds that altered planetary functioning. From this perspective, the Anthropocene is not merely the continuation of a long story of human impacts; it is a distinct phase of intensified transformation that can plausibly be pinned to a relatively narrow temporal window. In practical terms, a mid-century boundary would also align well with radionuclide deposition, offering a neat convergence between social history and stratigraphic detectability.

A formal boundary, however, requires more than a persuasive narrative; it requires a specific site that can serve as the reference archive. One widely discussed candidate is Crawford Lake in Canada, whose annually layered sediments are considered capable of preserving a high-resolution record of twentieth-century change. Such sites are attractive because they provide clear year-by-year stratification, allowing proposed signals—radionuclides, industrial particles, or changing biological assemblages—to be located precisely. Yet even if a candidate archive is technically suitable, adopting it would still be a collective decision by the geological community, and it would need to survive scrutiny about representativeness, correlation potential, and the durability of the chosen markers over long time spans.

Critics of formalisation raise several objections that are both scientific and conceptual. One argument is chronological: significant human impacts may have begun long before the 1950s. Agriculture, deforestation, and early mining altered landscapes, greenhouse gases, and biodiversity over millennia. The “Early Anthropocene” view, associated with the Ruddiman hypothesis, suggests that prehistoric farming could have affected atmospheric composition earlier than usually assumed. Another proposal, sometimes called the “Orbis spike,” points to around 1610, when colonial expansion and the reorganisation of global biota coincided with a measurable dip in atmospheric CO₂ and widespread ecological exchange. If human influence has deep roots, critics argue, then selecting a single start date risks appearing arbitrary, reflecting convenience rather than geological necessity.

A second objection concerns scale and disciplinary timing. Stratigraphy typically operates on intervals far longer than decades, and some geologists worry that naming an epoch so soon after its proposed beginning is methodologically premature. They argue that geological units are usually recognised retrospectively, once signals have been tested across multiple contexts and shown to endure over time. A further critique is epistemological: the Anthropocene label can imply that “humanity” as a whole is



responsible, obscuring unequal contributions by particular nations, industries, and economic structures. This has motivated alternative framings such as the Capitalocene, which argues that the driver is not species-level activity but a specific political-economic system that concentrates power and externalises environmental costs. In this view, the term *Anthropocene* risks flattening moral and historical differences into a single planetary subject.

Supporters respond that formal naming has value beyond technical classification. Many climate scientists, ecologists, and social researchers already analyse accelerating change without requiring a new epoch, but proponents argue that labels influence how problems are understood. Declaring an Anthropocene could signal that human impacts are not peripheral disturbances around a stable natural baseline; rather, they are structural forces reshaping Earth's trajectory. This perspective emphasises a shift from Holocene stability to Anthropocene volatility, where feedbacks, thresholds, and cascading risks become more prominent. Yet the cross-disciplinary popularity of the term is also a source of confusion: outside geology, *Anthropocene* may function as a broad environmental condition, a cultural metaphor, or a moral frame for responsibility, none of which necessarily aligns with the strict stratigraphic meaning of an epoch boundary.

Whether the Anthropocene becomes a formal geological epoch therefore depends on two questions: first, whether a globally correlatable marker and reference site can be agreed upon within the discipline; and second, whether formalisation improves scientific clarity rather than importing political dispute into stratigraphic practice. Regardless of the official outcome, the debate has already made one point difficult to deny: human activities are producing signals—chemical, biological, and material—that will persist in the archives of Earth, and interpreting those signals has become part of understanding the planet itself.

Questions 27–31

Choose **YES** if the statement agrees with the claims of the writer, choose **NO** if the statement contradicts the claims of the writer, or choose **NOT GIVEN** if it is impossible to say what the writer thinks about this.

27 The writer suggests that a geological epoch can be formally established solely because the change it represents is environmentally important.

28 Radionuclide deposits from nuclear weapons testing are presented as an unusually precise and widely traceable potential boundary marker.

29 The writer reports that most geologists have already endorsed Crawford Lake as the final reference archive.



30 The writer presents the Orbis spike at around 1610 as the only credible alternative to a mid-twentieth-century boundary.

31 The term “Anthropocene” may conceal unequal contributions from particular nations, industries and economic systems.

Questions 32–35

Complete the summary below. Choose **NO MORE THAN TWO WORDS** from the text for each answer.

Defining and dating the Anthropocene

Formally defining the Anthropocene requires a GSSP, informally known as a **32**, placed within a particular physical archive. Possible evidence includes plastic particles preserved in marine **33**, while radionuclide concentrations resulting from weapons testing reached a clearly identifiable **34**, Many supporters connect a mid-twentieth-century boundary with the post-1950 **35**, when indicators of human pressure climbed rapidly.

Questions 36–40

Select the correct answer.

36 Why does the passage suggest that the Anthropocene debate is not purely scientific?

- A** Because only social scientists accept that human activity has altered planetary systems.
- B** Because the label carries political and historical implications about responsibility.
- C** Because choosing a reference site determines which country controls geological classification.
- D** Because the term now has one universally accepted meaning across all academic disciplines.

37 What role does Crawford Lake play in the discussion?

- A** It is a candidate reference site whose annual sediment layers may preserve precisely dated signals.
- B** It provides a global average assembled from sediment records collected in several countries.
- C** It demonstrates that major industrial impacts began with prehistoric agriculture.
- D** It has already been accepted as the uncontested GSSP for a new geological epoch.

38 Why do some critics argue that selecting a single start date can appear arbitrary?



A Suitable reference archives are found only in regions affected by nuclear weapons testing.

B Different archives preserve the same modern markers at substantially different times.

C Important human effects on the planet may have begun long before the mid-twentieth century.

D Mid-century radionuclides cannot be dated as accurately as evidence from early agriculture.

39 What concern does the “Capitalocene” critique raise about the term Anthropocene?

A It places too little emphasis on environmental changes caused by prehistoric farming.

B It names a geological unit before its physical markers have been tested for long enough.

C It gives excessive importance to the geographic location chosen as the reference site.

D It spreads responsibility across humanity instead of identifying particular political and economic systems.

40 What is the writer’s overall conclusion?

A Formal recognition is inevitable because Crawford Lake has resolved the remaining scientific objections.

B Formalisation requires agreement on a global marker and reference site, although lasting human traces are undeniable.

C Disagreement over the starting date shows that modern human signals are unlikely to survive in geological archives.

D The political uses of the term mean that it can no longer contribute to scientific understanding.

Answer Key

27. NO

28. YES

29. NO

30. NO

31. YES

32. golden spike

33. sediments

34. peak



35. Great Acceleration

36. B

37. A

38. C

39. D

40. B