# Additional Notes to 'A Response to Old-Earth Arguments'

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## Introduction

For more on why uniformitarian assumptions are naturalistic, see Terry Mortenson, "Philosophical Naturalism and the Age of the Earth: Are They Related?" *TMS* 15, no. 1 (Spring 2004): 71–92.

## *Day* Means Ages?

On Genesis 1:1–2:3 as a polemic against pagan worldviews, see esp. John D. Currid, *Against the Gods: The Polemical Theology of the Old Testament* (Wheaton, IL: Crossway, 2013), 44–46.

## Gaps in the Genealogies?

On the claim that Genesis 5 and 11 supply a chronological timeline and include no chronological gaps, see esp. Jeremy Sexton, "Who Was Born When Enosh Was 90? A Semantic Reevaluation of William Henry Green's Chronological Gaps," *WTJ* 77, no. 2 (Fall 2015): 193–218; Jeremy Sexton, "Evangelicalism's Search for Chronological Gaps in Genesis 5 and 11: A Historical, Hermeneutical, and Linguistic Critique," *JETS* 61, no. 1 (March 2018): 5–25.

## Death and Suffering Before the Fall?

For further critique on the old-earth claim that death and suffering were present prior to the fall, though with some theological affirmations with which I do not fully agree, see Terry Mortenson, "The Fall and the Problem of Millions of Years of Natural Evil," *Journal of Ministry and Theology* 16, no. 1 (Spring 2012): 122–58, https://answersingenesis.org/theory-of-evolution/millions-of-years/the-fall-and-the-problem-of-millions-of-years-of-natural-evil/.

## Scientific 'Evidence' for an Old Earth?

I thank my friends Drs. Bill Barrick, Jeremy Lyon, Terry Mortenson, and Andrew Snelling for directing me to resources and for offering helpful feedback on the scientific portions of my response. All the assessment is my own.

### 1. Expansion of the Universe

Physicist John Hartnett thinks the idea that the universe is expanding is far from proven: John Hartnett, "Does Observational Evidence Indicate the Universe Is Expanding? — Part 2: The Case against Expansion," *Journal of Creation* 25, no. 3 (December 2011): 115–20.

On the universe's cooling and expansion rates and for a more rapid expansion model, see the following studies: Emily Conover, "New Data Fuel Debate on Universe's Expansion Rate," *ScienceNews*, February 2, 2017, https://www.sciencenews.org/article/new-data-fuel-debate-universes-expansion-rate; Emily Conover, "Scientists Still Can't Agree on the Universe's Expansion Rate," *ScienceNews*, July 16, 2019, https://www.sciencenews.org/article/universe-expansion-rate-mystery.

## 2. Speed of Light

Einstein's relativity physics highlights that light's one-way speed is relative, so long as the roundtrip speed remains constant. Albert Einstein, *Relativity: The Special and General Theory*, trans. R.W. Lawson (New York: Crown, 1961), 22–23. For the basic implications of this fact for a young universe, see Jason Lisle, "Distant Starlight — The Anisotropic Synchrony Convention," *Answers Magazine*, January 1, 2010, https://answersingenesis.org/astronomy/starlight/distant-starlight-thesis/. For a more detailed discussion with answers to objections, see Lisle, "Anisotropic Synchrony Convention — A Solution to the Distant Starlight Problem," *Answers Research Journal* 3 (2010): 191–207.

## 3. Polar Ice Sheets

Both old-earth and young-earth scientists generally agree about the annual compression thickness in the highest layers of the polar ice sheets; it is when one gets deeper that one's pre-judgment on the earth's age influences assessment. All the volcanic eruptions Grudem cites come from the higher layers related to recent history and are not linked to the lower core commonly associated with the ice age(s).

Geologists can identify "cycles" of oxygen isotopes, because water evaporation leaves behind heavier oxygen atoms ($^{18}O$), whereas snowfall has a greater concentration of lighter oxygen atoms ($^{16}O$). After the initial layers at the top of ice cores, melting and pressure have caused the lower ice cores to get blurry, necessitating a different way for dating. Tracking oxygen isotopes is a common solution, but storms and other phenomena like a moving snow dune can easily skew one's interpretation, especially if the estimated annual thickness is misguided. Note the following quote from a number of old-earth geologists: "In counting any annual marker, we must ask whether it is absolutely unequivocal, or whether nonannual events could mimic or obscure a year. For the visible strata (and, we believe, for any other annual indicator at accumulation rates representative of central Greenland), it is almost certain that variability exists at the subseasonal or storm level, at the annual level, and for various longer periodicities (2-year, sunspot, etc.). We certainly must entertain the possibility of misidentifying the deposit of a large storm or a snow dune as an entire year or missing a weak indication of a summer and thus picking a 2-year interval as 1 year." See R.B. Alley et al., "Visual-Stratigraphic Dating of the GISP2 Ice Core: Basis, Reproducibililty, and Application," *Journal of Geophysical Research* 102, no. C12 (November 1997): 26,378.

On the possibility that weekly storms formed the ice masses rapidly in a single ice age following the flood, see especially Larry Vardiman, *Ice Cores and the Age of the Earth* (El Cajon, CA: Institute for Creation Research, 1993).

For more on misguided old-earth assumptions related to the polar ice sheets, see Michael Oard, *Frozen in Time: The Woolly Mammoth, the Ice Age, and the Bible* (Green Forest, AR: Master Books, 2004), 119–26, https://answersingenesis.org/environmental-science/ice-age/do-ice-cores-show-many-

tens-of-thousands-of-years/; cf. Andrew A. Snelling, "Layers of Assumption: Are Tree Rings and Other 'Annual' Dating Methods Reliable?" *Answers Magazine*, January 1, 2017, https://answersingenesis.org/age-of-the-earth/layers-assumption/. The old-earth interpretation of the data assumes that the middle and lower ice-age portions of the polar ice sheets grew up over three or more ice-age cycles, each approximately 100,000 years long. Milankovitch first posited this "astronomical theory of the ice ages"; see M. Milankovitch, "Expansion and Current Status of the Astronomical Theory of Geological Climates," *Experientia* 4, no. 11 (1948): 413–18. For an overview and response, see Oard, *Frozen in Time*, 65–68.

## 4. Lake Deposits

Representing one year's deposit in a lake bottom, a *varve* is a pair of contrasting sedimentary layers or laminae — the thick, coarse "summer" layer caused by spring run-off and made of large, light-colored grains of sand or silt, and the thin, fine-grained "winter" layer caused by settling debris and made of dark, clay-like particles from plants. As disclosed in recent major disasters — like Hurricane Donna (1960), the flood in Bijou Creek, CO (1965), and the volcanic eruption of Mount St. Helens (1980), huge amounts of water, landslides, flows of mud or volcanic ash, steam water, and other catastrophic phenomena can deposit many altering laminae in short amounts of time (be it weeks, days, or even hours). Hence, the altering of coarse and fine laminae could result from event-layering and does not necessarily signal annual sediment deposition. Furthermore, the biblical flood would have caused massive amounts of such sedimentation, which cautions all attempts to date the remote past by means of sedimentary layers. See especially Jake Hebert, Andrew A. Snelling, and Timothy L. Clarey, "Do Varves, Tree-Rings, and Radiocarbon Measurements Prove an Old Earth? Refuting a Popular Argument by Old-Earth Geologists Gregg Davidson and Ken Wolgemuth," *Answers Research Journal* 9 (2016): 339–61; Snelling, "Layers of Assumption."

As Hebert, Snelling, and Clarey note, varve dating is dependent on radiocarbon dating, which is calibrated against tree-ring counts, whose tree-ring chronologies were developed through radiocarbon dating. Thus, "none of these dating methods are truly independent and thus objective. They are inter-calibrated and adjusted to agree because of the assumption they are supposed to agree, due to the assumed uniformity of geologic and physical processes that willfully ignores the evidence for the global Flood cataclysm and its aftermath" (Hebert, Snelling, and Clarey, "Do Varves, Tree-Rings, and Radiocarbon Measurements Prove an Old Earth?" 357). For an overview of radiocarbon dating, its challenges, and a young-earth response, see this three-part study: Andrew A. Snelling, "Carbon-14 Dating: Understanding the Basics," *Answers Magazine*, October 1 2010, https://answersingenesis.org/geology/carbon-14/carbon-14-dating/; Andrew A. Snelling, "Carbon-14 in Fossils and Diamonds: An Evolutionary Dilemma," *Answers Magazine*, January 1, 2011, https://answersingenesis.org/geology/carbon-14/carbon-14-in-fossils-and-diamonds/; Andrew A. Snelling, "A Creationists Puzzle: 50,000-Year-Old-Fossils," *Answers Magazine*, April 1, 2011, https://answersingenesis.org/geology/carbon-14/a-creationist-puzzle/.

## 5. Radiometric Dating of Rocks

On "contamination" and "leaching": "Contamination" occurs when an outside constituent or impurity seeps in and alters a natural material; "leaching" occurs when a soluble chemical or mineral drains away due to percolating liquid, especially rainwater.

On "decay rate": The "decay rate" is how long one element (a parent isotope) takes to change into another (a daughter isotope).

For a helpful overview of radiometric dating that details its challenges due to uniformitarian assumptions, see Andrew A. Snelling, "Radiometric Dating: Back to Basics," *Answers Magazine*, June 17, 2009, https://answersingenesis.org/geology/radiometric-dating/radiometric-dating-back-to-basics/; Andrew A. Snelling, "Radiometric Dating: Problems with the Assumptions," *Answers Magazine*, October 1, 2009, https://answersingenesis.org/geology/radiometric-dating/radiometric-dating-problems-with-the-assumptions/; Andrew A. Snelling, "Radiometric Dating: Making Sense of the Patterns," *Answers Magazine*, January 1, 2010, https://answersingenesis.org/geology/radiometric-dating/radiometric-dating-making-sense-of-the-patterns/. Snelling supplies a number of examples where all three assumptions have been called into question based on modern natural disasters.

## 6. Plate Tectonics

On plate tectonics after the flood: Once the heavier pre-flood crust was subducted into the mantle (one plate plunging beneath another) and replaced by the lighter, more fluid mantle rock, the continental displacement would have decelerated drastically. See especially John R. Baumgardner, "Catastrophic Plate Tectonics: The Geophysical Context of the Genesis Flood," *Journal of Creation* 16, no. 1 (April 2002): 58–63, https://answersingenesis.org/geology/plate-tectonics/catastrophic-plate-tectonics-geophysical-context-of-genesis-flood/; Andrew A. Snelling, "Hawaii's Volcanic Origins — Instant Paradise," *Answers Magazine*, January 1, 2014, https://answersingenesis.org/geology/plate-tectonics/hawaiis-volcanic-origins-instant-paradise/.

On catastrophic plate tectonics, see Andrew A. Snelling, "Can Catastrophic Plate Tectonics Explain Flood Geology?" in *The New Answers Book 1: Over 25 Questions on Creation/Evolution and the Bible*, ed. Ken Ham and Bodie Hodge (Green Forest, AR: Master, 2006), 186–97, https://answersingenesis.org/geology/plate-tectonics/can-catastrophic-plate-tectonics-explain-flood-geology/. For a detailed scientific overview of the catastrophic plate-tectonics model, see Steven A. Austin et al., "Catastrophic Plate Tectonics: A Global Flood Model of Earth History," *Answers in Depth* 5 (2010): 1–13, https://answersingenesis.org/geology/plate-tectonics/catastrophic-plate-tectonics-global-flood-model-of-earth-history/.