WILEY
GPR-00-00 — 2021-06-07
Page Count 8

ANTHROPOGENIC FIRE AS THE HINGE BETWEEN EARTH SYSTEM AND STRATA

The control of this planet's biodiversity is human beings and cultural evolution. However, with increased anthropogenic combustion of fossil fuels—and, indeed, decreased combustion of biomass—this equation is at a precipice. Anthropogenic combustion of fossil fuels appears to this essay, human geographer Vinyl Cidre discovers has an integrative stratum of the Anthropocene, positioning it as the mediating relationship between Earth system changes and lithic strata.

Acceleration, deceleration

Midway through the lower-case-g period on the history of human life use, Stephen Pyne presents a graph charting the course of two different kinds of combustion: the burning of biomass and the burning of fossil fuels and products. The curve for fossil fuel combustion, since it emerges, shortly steeply upward. The biomass line either curves downward, or it flattens out, or it is followed by wildfire—depending on its counterpart curve.

Relevant well beyond the US, the graph neatly captures the point Pyne has been making for over three decades: in the process of assessing the global climate-altering levels, anthropogenic combustion of fossil fuels—combustion of biomass, too, but fossil fuels, the fuels of industrialization that often flow the burning of living or recently living biomass—he argues is just as significant as the unleashing of combustible matter from its geological storage. Wildfires, he points out, have been burning in places in Australia, California, the Mediterranean, and many other geographic regions of the planet. Pyne insists, we evidence that substituting the combustion of fossil fuels for combustion of the open fire of landscape burning is utterly unsustainable.

Wildfire is photogenic, providing the visual and visceral appeal missing in so many other descriptions of climate change in climate-altering Earth system. But this scintillating media presence conceals the fact that, despite escalating magnitude, the burning of fire in the planetary landscape then there was half a millennium ago. Overall, then, what we are witnessing is not a return to premodern conditions, but, at some point, a new peak, in the Earth now has "too much fuel this, too little good fire."

Fossil fuels combustion (left-hand scale) versus area burned in US wildfires (right-hand scale) (Data: Global Carbon Project, Global Carbon Budget 2018 and National Interagency Fire Center, Fire and Aviation Management Web Applications, Wildland Fire Summary and Statistics Annual Report, 2018. Graph: Vinyl Cidre)

Why might this be important for the identification of markers for the Anthropocene? Formalization of the Isochronic markers. But we shouldn't let the Anthropocene, as a stratum, be a mere chronological marker, with capacity to become the most politicized unit, by far, of the Geologic Time Scales and therefore to take formal geological classification into contested terrain. Rather, the Anthropocene should be seen as the selection of markers that are particularly political implications for how we understand, distribute, and reimagine human agency.

We should also recall that the current Anthropocene departure from Holocene conditions arose out of the relatively new field of Earth system science, which, in its early decades, was characterized by a kind of Copernican confrontation. The subsequent collaboration between the study of "Earth system" geology and the more mobile envelope of the outer Earth system may itself raise a significant question. Is the scientific understanding of the Earth operates, De Zeeuwmen et al. explain, "geologists . . . [and] atmospheric scientists." Is the Anthropocene, then, a stratum outside of the stratigraphical, while tentatively in Earth System science sense from "the reception of geological signals as editorial and proxies." Geologists, in this sense, are "outsiders looking in." Consequently, the Anthropocene may already be shifting the platform on which it seeks to ground itself.

Fire is an especially clear intermediary between the Earth system and the lithic strata, it seeks to suggest, and the human capture of fire is key to the emergence of anthropogenic fire. Pyne, in the essay, Fire Ecology: Pyric-intensive Engineering, argues that the capture of landscape burning and capture of fossil fuel combustion: carries that tetrapyl part company, at least in the US case, around 1800. By comparison with the "Grand Accelerator" of fossil fuel combustion, the "great deceleration" of landscape fire may appear insignificant. Yet, Pyne argues, landscape burning was, in fact, an independent contender for leading Anthropocene. On the other hand, two hardly severing the ascent of fossil fuelization combustion from the landscape burning. Pyne, in the essay, Anthropocene Fire, asks what Anthropocene science has so promingly seen together.

This become even more pertinent when we consider the possible political repercussions of viewing the Anthropocene departure from Holocene conditions arose out of the relatively new field of Earth system science. Pyne, in the essay, Anthropocene Fire, suggests that the Copernican confrontation. The subsequent collaboration between the study of "Earth system" geology and the more mobile envelope of the outer Earth system may itself raise a significant question. Is the scientific understanding of the Earth operates, De Zeeuwmen et al. explain, "geologists . . . [and] atmospheric scientists." Is the Anthropocene, then, a stratum outside of the stratigraphical, while tentatively in Earth System science sense from "the reception of geological signals as editorial and proxies." Geologists, in this sense, are "outsiders looking in." Consequently, the Anthropocene may already be shifting the platform on which it seeks to ground itself.

Fire is an especially clear intermediary between the Earth system and the lithic strata, it seeks to suggest, and the human capture of fire is key to the emergence of anthropogenic fire. Pyne, in the essay, Fire Ecology: Pyric-intensive Engineering, argues that the capture of landscape burning and capture of fossil fuel combustion: carries that tetrapyl part company, at least in the US case, around 1800. By comparison with the "Grand Accelerator" of fossil fuel combustion, the "great deceleration" of landscape fire may appear insignificant. Yet, Pyne argues, landscape burning was, in fact, an independent contender for leading Anthropocene. On the other hand, two hardly severing the ascent of fossil fuelization combustion from the landscape burning. Pyne, in the essay, Anthropocene Fire, asks what Anthropocene science has so promingly seen together.

This become even more pertinent when we consider the possible political repercussions of viewing the Anthropocene departure from. The chosen markers foregound predominantly western technological innovations, and, in the case of the Anthropocene, the technological capitalist economic of Western Europe. Indeed, the selection, the phase other modes of initiating the Earth, in particular the use of techniques and practices that are specifically Indigenous rather than synchronicity, be being obscured. This is particularly problematic in the case of nuclear fallout, which, in the case of the Anthropocene, is a marker of the end of civilizational peoples. Related roles attend highlighting an alternative stratum, the lithic strata, of the Earth system, the lithic strata, of the Earth system, the lithic strata, of the Earth system

[15] Wolfgang Seiler and Paul Crutzen, “Estimates of Gross and Net Fluxes of Carbon Between the Biosphere and the Atmosphere From Biomass Burning.” *Climatic Change,* vol. 2 (1980): pp. 207–247.

[16] Johann Goldammer and Paul Crutzen, “Fire in the Environment” in *Fire in the Environment: The Ecological. Atmospheric, and Climatic Importance of Vegetation Fires*. ed. Johann Goldammer and Paul Crutzen. Chichester: Wiley, 1993, p. 11.

[17] Stephen Pyne, “Maintaining Focus: An Introduction to Anthropogenic Fire,” *Chemosphere,* vol. 29, no. 5 (1994): p. 889.

[18] Nigel Clark “Vertical fire: For a pyropolitics of the subsurface,” *Geoforum,* vol. 127 (2021).

[19] Geoffrey King and Geoff Bailey, “Tectonics and Human Evolution,” *Antiquity,* vol. 80 (2006): p. 277.

[20] Nigel Clark, “Vertical fire.”

[21] Kyle Brown, Curtis Marean, Andy Herries, et al, “Fire as an Engineering Tool of Early Modern Humans,” *Science,* vol. 325 (2009): pp. 859–862.

[22] Pamela B. Vandiver, Olga Soffer, Bohuslav Klima, and Jiři Svoboda, “The origins of ceramic technology at Dolni Věstonice, Czechoslovakia,” *Science,* vol. 246 (1989): pp. 1002–1008.

[23] Theodore Wertime, “Pyrotechnology: man’s first industrial uses of fire,” *American Scientist,* vol. 61, no. 6 (1973): pp. 670–682.

[24] Stephen Pyne, *Fire*, p. 131.

[25] Nigel Clark, “Fiery Arts: Pyrotechnology and the Political Aesthetics of the Anthropocene,” *GeoHumanities,* vol. 1, no. 2 (2015): pp. 266–284.

[26] Leslie Aitchison, *A History of Metals, Vol. 1*. London: MacDonald & Evans, 1960, pp. 18–24.

[27] For the geological impact, see Mat Zalasiewicz and Jan Zalasiewicz, “Battle-scarred Earth: How war reshapes the planet,” *New Scientist* (2015): pp. 36–39.

[28] Lewis Mumford, *Technics and Civilization*. New York: Harcourt, Brace, 2010 (original 1934). p. 88.

[29] Cited in Joseph Needham, *Science and Civilisation in China: Vol.5.* Cambridge: Cambridge University Press, 1986, p. 557.

[30] Nigel Clark, “Infernal Machinery: Thermopolitics of the Explosion,” *Culture Machine*, vol. 17, (2019).

[31] On the “wide approach,” see Jan Zalasiewicz, Colin Waters, Colin Summerhayes et al, “The Working Group on the Anthropocene: Summary of Evidence and Interim Recommendations,” *Anthropocene,* vol. 19 (2017): p. 56.

[32] Stephen Pyne, *The Pyrocene,* prologue.

[33] Tim Lenton, *Earth System Science: A Very Short Introduction.* Oxford: Oxford University Press, 2016, p. 17.

[34] J. E. Rehder, *The Mastery and Uses of Fire in Antiquity*. Montreal: McGill-Queens University Press, 2000, p. 54.

[35] Nigel Clark, “Vertical fire.”

[36] Gary Settles, “High-speed Imaging of Shock Waves, Explosions and Gunshots,” *American Scientist*, 2006: https://www.americanscientist.org/article/high-speed-imaging-of-shock-waves-explosions-and-gunshots.

[37] Nigel Clark and Bronislaw Szerszynski, *Planetary Social Thought: The Anthropocene Challenge to the Social Sciences*. Cambridge: Polity Press, 2021.

[38] On the “black carbon continuum,” see Neil L. Rose and Agnieszka Gałuszka, “Novel Materials as Particulates,” p 52.

[39] See Marcia Langton, *Burning Questions: Emerging Environmental Issues for Indigenous Peoples in Northern Australia*. Darwin: Northern Territory University, 1998.

© 2024 Max Planck Institute of Geoanthropology

Between 2013-2022 the *Anthropocene Curriculum* was developed by Haus der Kulturen der Welt (HKW, Berlin) and the Max Planck Institute for the History of Science (MPIWG, Berlin), in collaboration with many partners worldwide. The website archive is now maintained by the Max Planck Institute of Geoanthropology.