

Earth is in the Midst of Abrupt, Irreversible Climate Change

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ABSTRACT

Earth is in the midst of abrupt, irreversible climate change. This ongoing phenomenon poses a major existential risk to Homo sapiens, as well as all other species on Earth. In combination with the ongoing Mass Extinction Event and SARS-CoV-2, further acceleration of climate change seems likely to occur, thereby further exacerbating the existential risk we face.

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More than three years ago, Earth was at its highest global-average temperature with Homo sapiens present [1]. The dreaded 2 C above the 1750 baseline subsequently was crossed in March, 2020 [2]. Unfortunately, human extinction likely was triggered several years ago when the global-average temperature of Earth exceeded 1.5 C above the 1750 baseline: According to a comprehensive overview published by European Strategy and Policy Analysis System, an “increase of 1.5 degrees is the maximum the planet can tolerate; at worst, [such a rise in temperature above the 1750 baseline will cause] the extinction of humankind altogether” [3]. In other words, human extinction via “death by a thousand cuts” might be guaranteed with no further heating of Earth. Human actions continue to overheat Earth.

There is no known means to rapidly stabilize or cool the temperature of Earth. However, there are several means by which the planet can be quickly, additionally overheated [2]. Any one of these means could cause an abrupt loss of habitat for human animals on Earth. After all, wet-bulb temperatures lethal for humans already have been reported, despite climate-change models indicating that such an event would not occur until the middle of the current century [4]. In the wake of SARS-CoV-2, loss of aerosol masking as industrial activity declines has been described as a trigger for the rapid extinction of all life on Earth [2].

The reduction in industrial activity that resulted from the ongoing pandemic might have already reduced the aerosol masking effect sufficiently to trigger a 1 C spike in global-average temperature, as described by McPherson [2]. The outcome is not yet obvious as we approach summer in North America because the timing of the outbreak of the novel coronavirus was favorable for human habitat. Trees produced leaves in the Northern Hemisphere spring of 2020 as a result of carbohydrates stored the previous year. In addition, 2019 grain crops were harvested before SARS-CoV-2 emerged. Results of the recent and ongoing rise in temperature, which have

already been reported in China, India, Eurasia, and North America, will become obvious to most humans when many more trees die. Large-scale die-off of trees likely will approximately correspond with catastrophic crop failure, a phenomenon that poses yet another challenge to the persistence of industrial civilization.

The projected rate of climate change, based on the slow rate of temperature rise assumed by the Intergovernmental Panel on Climate Change (IPCC), outstrips the adaptive response of vertebrates by a factor of 10,000 times [5]. Mammals cannot evolve rapidly enough to escape the current extinction crisis [6]. Humans are classified as vertebrate mammals, indicating that we will not avoid the fate of extinction faced by an estimated 150-200 species of plants, insects, birds, and mammals each day [7].

Earth is already in the midst of abrupt, irreversible climate change [8]. The ongoing rate of temperature rise indicates that, as early as 2030, the climate of Earth will resemble that of the Pliocene [9]. The mid-Pliocene was more than 2 C warmer than contemporary Earth, and the rate of change expected by Burke et al. is occurring rapidly enough to ensure the increasing inability of vertebrates and mammals to “keep up.” The paper by Burke et al. relies upon the Representative Concentration Pathways of the Intergovernmental Panel on Climate Change (IPCC), thereby ignoring many self-reinforcing feedback loops and also the aerosol masking effect [9]. The observed and projected rates of rapid global-average temperature rise are unprecedented in planetary history [10]. In other words, Earth is already in the midst of abrupt climate change, and the pace of global-average temperature rise is expected to accelerate in the near future.

Adding to the existential threat we face, Earth is already in the midst of irreversible climate change. “Ocean warming, acidification and deoxygenation, ice sheet and glacier mass loss, and permafrost degradation are expected to be irreversible on timescales relevant to human societies and ecosystems” [11]. The conservative Intergovernmental Panel on Climate Change thus concluded that climate change is irreversible in September,

2019 [11]. This conclusion was subsequently supported by the research of McPherson [2].

In addition to abrupt, irreversible climate change, Earth is also in the midst of a Mass Extinction Event. This event does not lie in the distant future, nor is it now beginning. Rather, it is ongoing. It has been under way for at least a decade [7]. Consider, for example, the “Significance” section of a 2017 paper by Ceballos et al [12]. “The strong focus on species extinctions, a critical aspect of the contemporary pulse of biological extinction, leads to a common misimpression that Earth’s biota is not immediately threatened, just slowly entering an episode of major biodiversity loss. This view overlooks the current trends of population declines and extinctions. Using a sample of 27,600 terrestrial vertebrate species, and a more detailed analysis of 177 mammal species, we show the extremely high degree of population decay in vertebrates, even in common ‘species of low concern.’ Dwindling population sizes and range shrinkages amount to a massive anthropogenic erosion of biodiversity and of the ecosystem services essential to civilization. This ‘biological annihilation’ underlines the seriousness for humanity of Earth’s ongoing sixth mass extinction event.”

Abundant evidence indicates humans will join the annihilation of “all life on earth,” as reported by Strona and Bradshaw and affirmed by McPherson [2, 13]. The paper by Strona and Bradshaw includes the following explanatory line, which has obvious implications for *Homo sapiens* [13]. “In a simplified view, the idea of co-extinction reduces to the obvious conclusion that a consumer cannot survive without its resources.”

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