



Global Habitability and Exxon

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James Hansen

In the early 1980s scientists and the fossil fuel industry came to understand the essential characteristics of the climate system and the implications for the energy industry. Governments decided that they preferred not to understand. The fossil fuel industry decided to go along with the gag.

Climate is characterized by a delayed response to forcings that drive climate change, compounded by amplifying feedbacks. The delayed response and its implications are analogous to the characteristics of the Covid-19 virus that make it capable of producing a pandemic.

With Covid-19, delays between infection, symptoms, and consequences are measured in days and weeks. With climate, relevant time scales are decades and centuries. This delay allows massive consequences to build up – unless there is early “anticipation.” Early actions can minimize consequences.

Earth’s climate history allowed early quantification of climate sensitivity. Amplifying feedbacks reign in the climate system, but they come into play slowly. The slowness of response is both a danger and a benefit. It provides us time to take actions before consequences are severe.

It turns out that allowable human-made forcing of the climate system, on the long run, is smaller than even most climate scientists had thought. The allowable CO₂ level is somewhere south of 350 ppm.

Most climate consequences so far are tiny. Sea level rise so far is slight, compared to what it will be if we take no actions. Most species are surviving, if not thriving. The actions needed to avoid these problems will also reverse the shifting of climate zones that is beginning to cause regional problems.

It is not plausible to reach CO₂ targets quickly, and it is very unhelpful to frighten young people into thinking that the problem is almost hopeless. That is false. The slow response of the system, in some sense, is our friend, as it gives us time to chart a successful path, if we understand the system.

More on that later. A draft of Chapter 23 of *Sophie’s Planet* is available [here](#). I opened a Twitter account @DrJamesEHansen, (<https://twitter.com/drjamesehansen>), but for now I am focused on finishing the book.