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Our Sustainable Earth

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Recent evidence demonstrates that the earth has been warming monotonically since 1980. Transient to equilibrium temperatures takes centuries to develop, as oceans are slow to respond to atmospheric temperature changes. Atmospheric CO_2 concentrations, from ice core and observatory measurements, display consistent increases from historical averages, beginning about 1880, and can be associated with the industrial revolution. The climactic consequences of this human dominated increase in atmospheric CO_2 define a geologic epoch that has been termed the "Anthropocene." The issue is whether this is a short term, relatively minor change in global climate, or an extreme deviation that lasts for thousands of years. Eight "myths" that posit the former are examined in light of known data. The analysis strongly suggests the latter. In order to stabilize global temperatures, sharp reductions in CO_2 emissions are required, of the order of 80%. Two examples of economically sustainable CO_2 emission reduction demonstrate that technological innovation has the potential to maintain our standard of living while stabilizing global temperatures.