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Global Warming: The Threat to the Planet

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Paleoclimate data show that the Earth's climate is remarkably sensitive to global forcings. Positive feedbacks predominate. This allows the entire planet to be whipsawed between climate states. One feedback, the 'albedo flip' property of water substance, provides a powerful trigger mechanism. A climate forcing that 'flips' the albedo of a sufficient portion of an ice sheet can spark a cataclysm. Ice sheet and ocean inertia provides only moderate delay to ice sheet disintegration and a burst of added global warming. Recent greenhouse gas (GHG) emissions place the Earth perilously close to dramatic climate change that could run out of our control, with great dangers for humans and other creatures. CO₂ is the largest human-made climate forcing, but CH₄, O₃, N₂O and black carbon (BC) are important. Only intense simultaneous efforts to slow CO₂ emissions and reduce non-CO₂ forcings can keep climate within or near the range of the past million years. Some forcings are especially effective at high latitudes, so concerted efforts to reduce their emissions could still "save the Arctic," while also having major benefits for human health, agricultural productivity, and the global environment.