

## Double Catastrophe: Intermittent Stratospheric Geoengineering Induced By Societal Collapse

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### Background: Global Catastrophic Risk Systems Analysis

Global catastrophic risks are risks of events that would significantly harm or even destroy humanity at the global scale, such as climate change, nuclear war, and pandemics. To date, most research on global catastrophes analyzes one risk at a time. A better approach uses systems analysis to capture the many important interactions between risks. *This paper analyzes a global catastrophe scenario involving climate change, geoengineering, and another catastrophe. We call the scenario “double catastrophe”.*

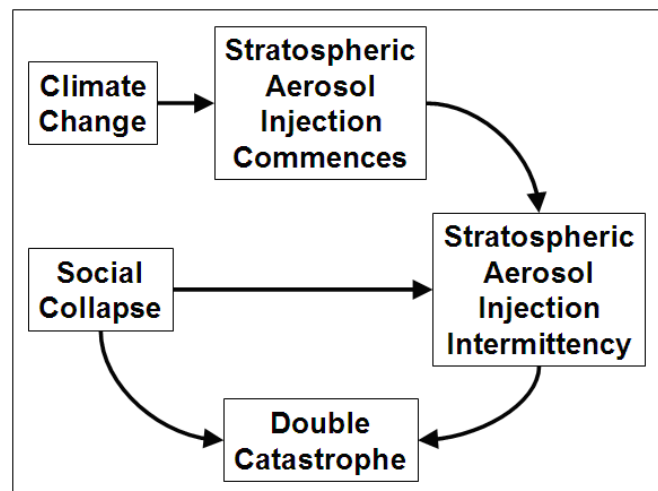
### Climate Change & Stratospheric Geoengineering

The rising temperatures of global climate change pose great risks to humanity and ecosystems. Climate change can be slowed by reducing emissions of greenhouse gases like carbon dioxide and methane. But humanity has been struggling to reduce emissions. One alternative is geoengineering, the intentional manipulation of Earth systems. The most promising geoengineering option may be *stratospheric geoengineering*, in which aerosol particles are put into the stratosphere. The particles block sunlight, lowering temperatures on Earth’s surface.

### Intermittency & Double Catastrophe

One problem with stratospheric geoengineering, known as *intermittency*, is that the particles must be continuously replaced in the stratosphere. If they’re not, then in a few years they fall out, and temperatures rapidly rise back to where they would have been without the geoengineering. The rapid temperature increase would be very damaging to society. Because of this, society is unlikely to let intermittency occur – unless some other catastrophe occurs, knocking out society’s ability to continue the geoengineering. Then, the rapid temperature increase hits a population already vulnerable from the initial catastrophe.

This *double catastrophe* could be a major global catastrophe.



### Implications For Decision Making

Because of how damaging global catastrophes would be to human civilization, decision making is often oriented towards minimizing the risk of global catastrophe. Stratospheric geoengineering can prevent global catastrophe from climate change alone, but it can also lead to global catastrophe from the double catastrophe scenario. *If global catastrophe is more likely from climate change alone, then society should decide to implement stratospheric geoengineering. Otherwise, society is better off without stratospheric geoengineering.* This assumes (among other things) that the goal should be minimizing global catastrophic risk and that stratospheric geoengineering is the best form of geoengineering.