

## Global climate change and the rise/fall of human civilization: a review

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We review the relationship between global climate and rise/fall of civilization for the last 10,000 years of human beings, and discuss the validity of the currently popular 'horror of global warming'. The human history has advanced in a stepwise manner through 5 major revolutions; i.e., Revolution 1 at 10,000 years ago by Invention of Agriculture and Farming, Revolution 2 at 5,000 years ago by Invention of Urban Life, Revolution 3 at 2,500 years ago by Invention of Religion, Revolution 4 by Invention of Industry at 300 years ago, and Revolution 5 by Invention of Information Technology in the 21st century. All these steps except for the last were related to ancient climate changes, in particular global warming and cooling.

These observations indicate that global warming has likely provided basis for growth of human civilization by sufficient amounts of food. Global warming essentially made the world population increase, and created new cultures and more complex social structure. On the other hands, global cooling reduced the amount of food, increased desert areas in central Asia, and caused the global-scale migration of human being. The global cooling was likely a prime cause of major wars, pandemic diseases, thus made the world society unstable intermittently. This may have been related also to the appearance of major religions.

In future, the world climate will change both to warming and cooling as before according to the natural rhythm. The temperature change of 0.5-0.7 degree C during the last 100 years appears quite normal with respect to the past records that often show 7 degree C change within 50 years. For the next global cooling, we must consider about and prepare a great amount of fossil fuel required for our survival.