

THE DAY AFTER TOMORROW: AN ECOLOGICAL STUDY

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Human beings have always been interested in the fields of science and environment, whether to survive or for development. It is inevitable that humans used fire and other environmental tools as a necessary step to survive, followed by civilization, industrialization, and many more, from development to demolition. The population of human beings, a major factor that contributes to the changes in the environment, has been recorded in the writings of many philosophers of the ancient period, except they did not have the name for it, the word ecology. Ecology is a word that is said to be derived from the Greek word "okios," which means house or a place to live. It is defined as the scientific study of interactions between organisms and their environment. Many discoveries have been made about the tremendous effects of the various developments that mankind has exhibited on earth; we call them environmental issues. The question is: with all these discoveries and developments contributing to ecological demolitions, does it have a major impact that even half of the Homosapiens might get swapped away? Hopefully not, but practically especially in 21st century, the probability of this just gets higher and higher each year. The Day After Tomorrow is a movie that articulates the causes of environmental issues in a slightly exaggerated way, but its underlying scientific relationships are not pseudo-scientific. The climatic destruction and the human behaviors that triggers it are the important aspects that have to be studied, considering the series of crises that we as humankind are witnessing right now. In this paper, the study of human relations with environmental issues has been widely examined in context with the movie The Day After Tomorrow.

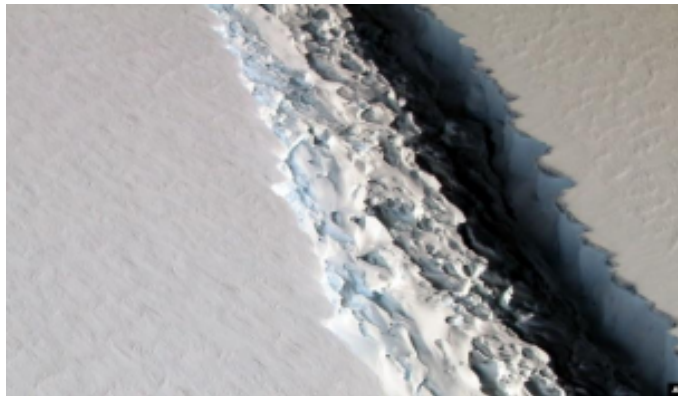
The Day After Tomorrow by Roland Emmerich is a fictional movie that was released in the United States on May 28, 2004. It is a science fiction that portrays the possible impacts of the climatic changes that might occur due to the rapid melting of polar ice, which is brought on by global warming.

IMPACTS HAPPENED IN THE MOVIE AND ITS SCIENTIFIC

BACK UP: Thermohaline Cycle:

To put it in a simpler way, it is a sort of mechanism of nature carrying warm water from the equator to the North Pole and to several parts of the world called the AMOC cycle, which is mainly driven by two important factors: temperature and salinity, which is the very name of this process, the thermohaline cycle. AMOC is part of the thermohaline cycle.

Ice break:



(Figure 1: Antarctica Larsen Ice Shelf Crack: This Nov. 10, 2016 aerial photo released by NASA, shows a rift in the Antarctic Peninsula's Larsen C ice shelf. (Photo Courtesy NASA) The movie starts with a few people working in an ice cap, which tends to break and leave the workers astonished. Though this film is mere science 'fiction, there are certain scientific aspects

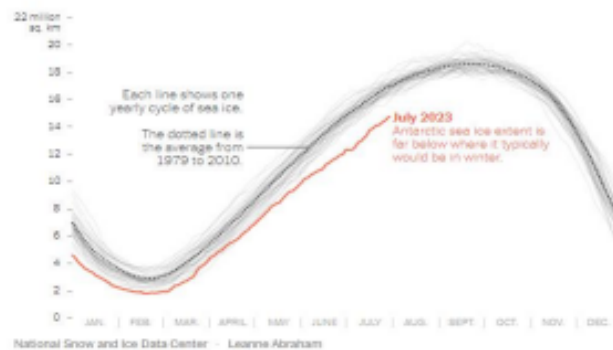
that leave us into thinking. The ice breakage that has been shown in the movie has happened in real life too (refer to Figure 1). However, there isn't much of an impact from this ice breakage, but one cannot assure that it might not happen in the future. So, this part of the movie, which is the starting scene, is so important that it sets the entire plot for the movie. After the ice break scene, there is a UN conference on global warming in New Delhi, where climatologist Jack Hall explains how the world could enter a new ice age because of global warming. The climatologist in the movie mentions quite a few human practices that have a threatening effect on the environment. However, the explanation of the climatologist's view of North Atlantic currents being disturbed gives an overview of the science behind the ice age modern humans are triggering. He states that the heat from the sun lying on the equator is carried north by the ocean, but global warming, which is melting the polarized caps, disturbs this flow, and eventually, when it shuts down, it causes major climatic changes. So, this cycle that the movie is talking about is called the AMOC cycle, which is part of the thermohaline cycle. The major factor that could contribute to the breakage of ice is an increase in greenhouse gases, which leads to global warming.

It is said that greenhouse gases are the most significant ones that have driven climate change since the mid-20th century. Global greenhouse gas Emissions such as emission of greenhouse gases since 1990 to 2015 from human activities have been increased by 43 percent. Three-fourths of total emissions are contributed by emissions of carbon dioxide, which

increased by 51 percent over this period. The majority of the world's emissions result from transportation, electricity generation, and other forms of energy production and use. Atmospheric concentrations of greenhouse gases, such as the concentration of carbon dioxide, have increased in the atmosphere since the start of the industrial era.

Temperature drop:

Followed by the ice break, the movie brings out another possible impact: a temperature drop. However, this temperature drop will be considered an error. These sudden drops in temperature will occur in more than three places, triggering a series of climatic disasters like hurricanes, earthquakes, tsunamis, and finally the Ice Age. Temperature drops could be influenced by a lot of things. One such reason is the formation of sea ice. The formation of sea ice is very important because of its ability to trap warmth in the sea. The reduction in the formation of sea ice because of global warming would ultimately have an effect on the amount of warmth that the ocean might trap. To prove this theory, we can talk about the senses that were taken in July 2023, where a significant amount of sea ice has been reduced comparatively. Refer to Figure 2.



Sea ice is generally said to be a protective layer for glaciers. The

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reduction in sea ice will result in the depletion of glaciers, which will in turn release a large amount of fresh water into the ocean, provoking an ice age.

Ice Age:

Numerous theories have been proposed about the Ice Age that humans are going to enter. One of the theories is the destruction of the thermohaline cycle, which aligns with the theory that this movie has proposed, the thermohaline cycle. Disruption in the cycle will result in the stagnation of the warm water in the equator and cold water in the poles, this will ultimately drives the ice covers of the poles to extend vastly leaving the earth in a cold atmosphere and gradually setting it on Ice Age. Studies have been made on the previous Ice Age that homosapiens entered into 100,000 years ago. It is said that there is a lot of evidence stating that the ice age that happened years ago completely slowed down this cycle, and this has been explained in a news article released in the New York Times. Further in the article Steven Goldstein, a geochemist at LDEO says "Our discovery of such a major breakdown in the ocean circulation system was a big surprise. It allowed the ice sheets to grow when they should have melted, triggering the first 100,000-year cycle". So, there is a possibility that this cycle might slow down or even shut down, which might result in a new ice age. After all, nature is surely unpredictable. Conclusion:

In conclusion, this movie plays a major role in stating the facts involved with global warming and its possible impacts. One important and most interesting detail that has been portrayed in the final scenes of the movie—to say it in other ways, it would be the heart of the movie where the astronauts from outer space would be looking at earth and one of the astronauts says “I have never seen air so clear”, It surely sets a remarkable stand on the entire

concept of the movie. All of these earthquakes and cyclones and this ice age are what humans have to encounter to have a pollution-free atmosphere. then we leave no choice for the earth. A solid thought that spoke about humans' behavior towards the earth is something that has

to be said in a way humans remember. And the movie, *The Day After Tomorrow*, played its part perfectly.

Works cited

- Odum Eugene P. *Fundamentals of Ecology*. 3d ed. Saunders 1971
- Hajat, Shakoor. "The Day After Tomorrow." *BMJ : British Medical Journal* vol. 328,7451 (2004): 1323.
- Environmental Protection Agency. "Greenhouse Gases." Last updated on July 26, 2023 <https://www.epa.gov/climate-indicators/greenhouse-gases>.
- "Antarctic Sea Ice Reaches Record Low" from The New York Times, published on August 2, 2023 <https://www.nytimes.com/2023/08/02/climate/antarctic-sea-ice-record-low.html> National Science Foundation. "Ice Cores Reveal Warming on Antarctic Peninsula." National Science Foundation, 10 March 2014,
 - https://www.nsf.gov/news/news_summ.jsp?cntn_id=131830#:~:text=The%20researcher%20reconstructed%20the%20past,on%20their%20way%20to%20Antarctica