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 An Inconvenient Truth About Sea Level Rise

 In Al Gore’s book, “An Inconvenient Truth,” he makes many bold calculations and predictions on climate change and its effect on the earth, specifically with sea-level rise. His book and movie, which is also named “An Inconvenient Truth,” have been at the forefront of global warming debates since they were released in 2006. Over the past seven years, new data has been found that can help strengthen and deflate Gore’s argument. The more current data can help examine how successful his predictions of the future seem to be so far. Also, there is now proof of the effects of global climate change as evidenced by the documentary, “Sun Come Up,” which is about an island community that is displaced due to the rising sea levels. With all this new research, there are new projections and new concerns for the future.

 The beginning of Gore’s movie gives an explanation of how humans have put the earth in the current climate change situation. It describes how the earth is heated by solar radiation in the form of light waves from the sun, which pass through the atmosphere. Some of this radiation reflects back off the earth to space in infrared waves, and some of these infrared waves get reflected again back to warm the earth by a layer of atmosphere. Increased pollution and carbon dioxide levels in the atmosphere means more infrared waves being reflected back toward the earth, and results in global warming. Therefore, carbon dioxide levels have a direct relationship with temperature change, and right now carbon dioxide levels are rising significantly.[[1]](#footnote-1)

Gore restates global warming as a collision between earth and civilization. His first of three problems that got humans into this situation and could prevent us from getting out is population. For 10,000 generations up to 1945, the world population stayed under 2 billion. In 2005, the world population was 6.4 billion and is projected to be 9.1 billion in 2050. Gore points out that there is a major problem if the population goes from two billion to nine billion in one lifetime after being steady for 10,000 generations. The increased population means more pressure on earth. Gore’s second problem is technology. He gives many examples such as how wars used to involve bow and arrows, but now they include bombs that devastate the land. Also, shovels have now turned into giant digging machines that pump out carbon dioxide. The overwhelming majority of carbon emissions come from industrialized countries. The United States alone produces 30.3 percent of carbon emissions. The third issue is the nature of people and our lack of reaction to problems. Gore stresses that humans cannot afford to wait any longer to fix this crisis.[[2]](#footnote-2)

 Gore brings up many powerful statistics and predictions that critics would argue are inaccurate or misleading. He says that the ten hottest years on record happened in the last 14 years from 2005 with 2005 being the hottest ever. In his video, he brings up the huge heat wave in 2003 that killed 35,000 people in Europe alone, and predicts many more heat waves similar to this in the future due to the increased carbon dioxide levels. In the United States, Gore notes that many places have recently been measuring record-breaking high temperatures including 200 cities and towns in the west that had record highs in 2005. Also, the warmer ocean temperatures are causing stronger and more frequent storms. In 2004, the United States set a record for tornados in one year, Japan set a record for typhoons, and Brazil was hit by its first hurricane. In addition, while some species are dying because of climate change, diseases are increasing because there is less cold whether to kill them. Gore mentions these records and misfortunes as just the beginning of global warming, and points out that the worst is ahead of us if something does not change.[[3]](#footnote-3)

 The potentially most devastating effect of global warming is sea-level rise from melting glaciers. Gore points out that the Arctic ice caps have decreased forty percent in the last forty years. He projects that within fifty to seventy years, it could be gone. The melting process speeds up as the ice caps get smaller because the ice reflects off ninety percent of the sunlight, but the surrounding water absorbs ninety percent of the sunlight. Therefore, as the ice caps get smaller, a higher percentage of it is touching the warmer water making it melt faster. The melting of the Arctic ice caps is not a big issue for sea-level rise because it is sea-based as opposed to land-based, which would raise sea-level. Another example is the Larsen Ice Shelf, which disappeared in only thirty-five days. This ice shelf was sea-based, but it was holding back the land-based ice behind it. Once the Larsen Ice Shelf was gone, some of the land-based ice began to fall into the sea where it melted causing many pacific villages to relocate because of the sea-level rise.[[4]](#footnote-4)

 Gore states that the biggest problem lies with Greenland and western Antarctica. Both of these places contain a great deal of land-based ice. If they act similarly to the Larsen Ice Shelf or the Arctic ice caps, then that would cause catastrophic disaster across the world. For western Antarctica, the ocean runs underneath it and has a great influence on it. Since sunlight has a greater impact on water than ice, the melting process could happen very quickly. If western Antarctica melted, Gore projects the sea level to rise by twenty feet. Greenland, on the other hand, is considered even less stable, and Gore thinks it would also raise the sea level by twenty feet if it melted completely. There have been similar pools seen recently on Greenland as the Larsen Ice Shelf. These pools are tunneling down into the middle of the ice, which makes it more vulnerable to melting. Gore warns that if half of western Antarctica and half of Greenland melted, then the resulting twenty feet of sea-level rise would cause extreme flooding. He projects that in Calcutta, India alone, there would be sixty million people under water. In total, he believes there would be over 100 million refugees.[[5]](#footnote-5)

 “An Inconvenient Truth” is one of the most heavily debated piece of works on climate change because of its projections and accusations on global warming. Gore believes the vast majority of critics of “An Inconvenient Truth” and global warming as a whole are because of political agendas. Of 928 peer-reviewed scientific articles on climate change, Gore found that zero believed that humans were not the cause of global warming. Of 636 articles published in the popular press, Gore found that fifty-three percent of them doubted the cause of global climate change. Gore believes the cause of this is that many politicians are trying to place doubt on the scientific truths of climate change so that they do not need to act now.[[6]](#footnote-6)

 One expert on the politics surrounding global climate change is James Hoggan. Hoggan was trained by Gore to educate the public about climate change as part of The Climate Project. His book, “Climate Cover-Up: The Crusade to Deny Global Warming,” won the Green Book Festival Award as the book that contributes the greatest to understanding, respect for, and positive action on changing worldwide environment. In Hoggan’s book, he traces back to the route of the politics surrounding climate change. In the 1980’s, all political parties seemed to be together on climate change. George H.W. Bush created the Intergovernmental Panel on Climate Change (IPCC) in 1988, and he signed into law the National Energy Policy Act to lower carbon dioxide generation. Hoggan notes that something has changed since 1988, which is causing many people to stop caring about climate change. He refers to the same statistic as Gore in that fifty-three percent of the popular media’s coverage on climate change is indecisive on the cause of global climate change, while 928 of 928 peer-reviewed scientific articles on climate change agreed that humans were the cause. The reason for the indecisiveness in the popular media, Hoggan states, is that many of the “experts” quoted in the articles are not qualified. The deniers of global warming are often political ideologues, self-appointed experts, or people with scientific background that are giving their opinion outside their field.[[7]](#footnote-7)

 In his book, Hoggan talks a great deal about Frank Luntz, a Republican pollster and “spin doctor,” and his 2002 “Straight Talk” Memo, which was part of the Bush White House preparation for the elections. The memo advises Republican candidates to distract and deflect the public’s attention on climate change. Part of the opening statement of the memo says, “The environment is probably the single issue on which Republicans in general – and President Bush in particular – are most vulnerable… You need to continue to make the lack of scientific certainty a primary issue in the debate.” Luntz wanted the Republicans to focus on making people too confused about climate change to make any decisions based on it such as electing a certain candidate. He also put great emphasis on word choice when Republicans were talking about the environment. In one place in the memo, he points out, “Climate Change is less frightening than global warming.”[[8]](#footnote-8)

 In addition to politicians trying to spin climate change in their favor, major companies that produce much of the carbon dioxide talked about as the reason for global warming are also doing everything they can to create a cloud of doubt surrounding global warming research. One example Hoggan gives of this is the Western Fuels and National Coal Association joining together to create the Edison Electric Institute (ICE) in 1991. The job of ICE was to protect business by spreading the campaign that the earth was not getting warmer. One quote from the campaign is, “Some say the Earth is warming. Some also said the Earth was flat.”[[9]](#footnote-9)

 On the other hand, Patrick Michaels book, “Climate of Extremes: Global Warming Science They Don’t Want You to Know,” looks at climate change from the opposite perspective. Michaels has written numerous other books and papers on climate change, and he was also a president of the American Association of State Climatologists. In Michaels’ book, he doubts data found by many experts that claim global warming is a major issue. In particular, Michaels questions the data found by NASA scientist James Hansen, who he believes is by far the most quoted person in the world on climate change in Greenland including being referenced in Al Gore’s “An Inconvenient Truth.” Hansen says that according to his mid-range estimates for carbon dioxide changes, a sea level rise of 20 feet by 2100 would be within his estimate’s confidence limits. Michaels points out that based on a warming of 4.9 degrees Farenheit, the IPCC’s assessment projects a sea-level rise of between 8.5 and 18.5 inches for the twenty-first century. Michaels believes the warming is more likely to be 3.2 degrees Farenheit, which would mean a sea level rise of only about 5.7 inches during that time. One major reason for current data disagreement, according to Michaels, is that tide gauges measure sea level relative to a point on land, which can move vertically at rates that are comparable to sea level rise. When this factor is taken into account, global sea level rise is calculated to currently be 1.31 plus or minus 0.30 mm per year. However, the United Nations has recently calculated sea level rise for recent years to be 3.1 mm per year. Both sides of the climate change argument have compelling reasons for why the other side is wrong, which is why it is difficult for the much of the public to have a strong opinion on the subject.[[10]](#footnote-10)

 In 2009, Edmond Mathez released a book with up to date data on climate change called, “Climate Change: The Science of Global Warming and Our Energy Future,” which gives many new statistics that parallel Gore’s data from 2005. Mathez has written forty-eight books and peer-reviewed articles, most of which are on climate change. His first warning in “Climate Change: The Science of Global Warming and Our Energy Future” on sea level rise is connected with the ice cover in the Arctic Ocean. Normally in the twentieth century, the ice cover would only get as low as six million square kilometers, but in 2007, the ice cover reached a record low of 4.1 square kilometers. Even more alarming, according to Mathez, is that the ice that remains in the Arctic is much younger and thinner ice than in the past. Therefore, the ice will most likely melt even faster. Similarly to Gore, Mathez projects the Arctic to be ice-free within several decades. Mathez also warns that this new melted ice could slow thermohaline circulation, which removes carbon dioxide from the atmosphere. In addition, polar bears were declared a threatened species by the United States in 2008, and the ice in the Arctic is their habitat. Although, the melting of the Arctic does not significantly change sea level because it is sea based, Mathez looks at the ice in the Arctic as an example for what can happen to the land-based ice of Greenland and Antarctica just as Gore does. Eighty percent of the fresh water in the world is in the ice of Antarctica and Greenland, and Mathez believes that the ice there has similar sensitivity to the ice caps of the Arctic.[[11]](#footnote-11)

 According to Mathez, the sea level rise per century for the past 3,000 years was one to two centimeters. The current pace for this century is fifteen to twenty centimeters, and the pace is accelerating. The IPCC’s current projections are that the sea level will rise between twenty and sixty centimeters by 2100. This is well under the twenty-foot rise that Gore presented in “An Inconvenient Truth.” However, the number’s projected by the IPCC would still be devastating. Mathez uses the coast of China as an example, and he believes that only a .5 meter sea level rise would have a significant effect on all things below ten meters. This range is home to 144 million people and eleven percent of China’s country. Mathez’s current projections are closer to Gore’s from 2005. He predicts that if carbon dioxide levels grow by one percent per year, then sea level could rise four to six meters (13 to 20 feet) by 2130.[[12]](#footnote-12)

 The repurcussions of sea level rise caused by global warming are being seen right now. In the South Pacific Ocean, the Carteret islanders are being forced to abandon their homes due to the rising sea level, and are joining other communities on small islands as the first environmental refugees. The rising water and larger waves caused by climate change have the Carteret islands on pace to be inhabitable by 2015. The documentary, “Sun Come Up,” follows some of the Carteret islanders and the challenges that come with relocating such as leaving behind their history and trying to find a new home. After seeing how difficult it is for a few people to find a new home, it is frightening to imagine what the world could be like if even some of the more reserved projections for sea level rise come to fruition. The world would have too many refugees and not enough space for them.[[13]](#footnote-13)

 The projections for sea level rise by 2100 range from about ten inches to over twenty-five feet. With the data collected over the last seven years, it is still difficult to prove how accurate some of Gore’s projections are. Many experts still see Gore’s presentation of the effects of a twenty-foot sea level rise by 2100 as very plausible. The reason for the continued discrepancy in projections is that experts do not know the rate that greenhouse gas levels will continue to increase and exactly how strongly the climate will respond in the future[[14]](#footnote-14). According to the Organization for Economic Co-operation and Development, a relatively modest sea level rise of 1.6 feet in Mumbai, India would expose 1,598 billion dollars in assets and endanger about 11.5 million people.[[15]](#footnote-15) This proves that even if Gore’s projections are wrong, which there is little proof that they are, minor sea level rise can have catastrophic consequences.

1. Al Gore, *An Inconvenient Truth* (Emmaus, PA: Rodale Press, 2006). [↑](#footnote-ref-1)
2. Ibid [↑](#footnote-ref-2)
3. Ibid [↑](#footnote-ref-3)
4. Ibid [↑](#footnote-ref-4)
5. Ibid [↑](#footnote-ref-5)
6. Ibid [↑](#footnote-ref-6)
7. James Hoggan, Climate Cover-Up: The Crusade to Deny Global Warming (Vancouver: Greystone Books, 2009), 21. [↑](#footnote-ref-7)
8. Ibid, 64. [↑](#footnote-ref-8)
9. Ibid, 32. [↑](#footnote-ref-9)
10. Patrick Michaels, Climate of Extremes: Global Warming Science They Don’t Want You to Know (Washington, D.C.: Cato Institute, 2009), 101. [↑](#footnote-ref-10)
11. Edmond A. Mathez, *Climate Change: The Science of Global Warming and Our Energy Future* (New York: Columbia University Press, 2009), 156. [↑](#footnote-ref-11)
12. Ibid, 169. [↑](#footnote-ref-12)
13. *Sun Come Up*, directed by Jennifer Redfearn (New York, NY: New Day Films, 2010), DVD. [↑](#footnote-ref-13)
14. Future Climate Change, United States Environmental Protection Agency. Last modified April 22, 2013. http://www.epa.gov/climatechange/science/future.html [↑](#footnote-ref-14)
15. The 20 Cities That Are Most Exposed To Rising Sea Levels, Business Insider. Released May 6, 2011. http://www.businessinsider.com/cities-rising-sea-level-2011-5?op=1 [↑](#footnote-ref-15)