

IMPACTS OF GLOBAL WARMING: CAUSES AND SOLUTIONS

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ABSTRACT

Global warming is a zooming issue in the world. Global Warming stresses ecosystems through temperature rises, water shortages, increase fire threads, robot weed and best inventions. Intense storm damage and salt in ration just to name a few. Modern global warming is the result of an increase in magnitude of the so-called greenhouse effect. A warming of Earth's surface and lower atmosphere caused by the presence of water vapour, carbon dioxide, methane nitrous oxide and other greenhouse gases. Global warming, the phenomenon of increasing average air temperatures near the surface of earth over the past one to two centuries . Climate scientists have since the mid 20th century gather detailed observation of various weather phenomena such as temperature precipitation and storms and of related influences on climate such as ocean currents and the atmosphere chemical composition. Global warming has been continuing emissions of greenhouse gases in the world and become almost double in 2012 in comparison to 1970. The pace of CO₂ emissions increase is more acute than Methane and Nitrous emissions. To reduce the global greenhouse gases emissions, it now become necessary to avoid deforestation, increase nuclear power, increase bio-energy, increase solar and wind power, improve energy efficiency, reduce other greenhouse gases , and reduce energy related emissions. The present paper arranged keeping in view to highlights current status of greenhouse gases emissions, how will global warming change earth?, and effects of global warming in various angles.

KEY WORDS: Global warming, climate change, greenhouse gases emissions, causes, solutions etc.

INTRODUCTION

Global warming is not a new term for all of us as it reflects the world . Since pre-industrial times and most of the warming over the second half of the 20th century could be attributed to human activities. Global climate predictions based on modelling five greenhouse gas emissions scenarios that accounted for future emissions mitigations measures and uncertainties was projected in a report. Giving voice to a growing convection of most of the scientific community the Intergovernmental Panel on Climate Change (IPCC) was formed in 1988 by the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP). Due to human activities the climate has changed almost

every conceivable timescale since the beginning of geological time and that human activities since at least the beginning of the industrial revolution climate a lot. Global warming is not an issue that is new to us. For years scientists have warned the public about what the future will bring if current trends continue. Many experts have pointed fingers at suspected causes of the apparent rise in world mean temperature. This indicate that Earth's climate has changed over almost every conceivable timescale since the beginning of geological time and that human activities since at least the beginning of the industrial revolution have a growing influence over the pace and extent of present day climate change. Global warming is the term used to describe a gradual increase in the average temperature of the Earth's atmosphere and its oceans, a change that is believed to be permanently changing the Earth's climate. There is great debate among many people, and sometimes in the news, on whether global warming is real (some call it a hoax). But climate scientists looking at the data and facts agree the planet is warming. While many view the effects of global warming to be more substantial and more rapidly occurring than others do, the scientific consensus on climatic changes related to global warming is that the average temperature of the Earth has risen between 0.4 and 0.8 °C over the past 100 years. The increased volumes of carbon dioxide and other greenhouse gases released by the burning of fossil fuels, land clearing, agriculture, and other human activities, are believed to be the primary sources of the global warming that has occurred over the past 50 years. Scientists from the Intergovernmental Panel on Climate carrying out global warming research have recently predicted that average global temperatures could increase between 1.4 and 5.8 °C by the year 2100. Changes resulting from global warming may include rising sea levels due to the melting of the polar ice caps, as well as an increase in occurrence and severity of storms and other severe weather events.

Scientific understanding of global warming is increasing. The Intergovernmental Panel on Climate Change (IPCC) reported in 2014 that scientists were more than 95% certain that global warming is mostly being caused by human (anthropogenic) activities, mainly increasing concentrations of greenhouse gases such as methane and carbon dioxide (CO₂). Human activities have led to carbon dioxide concentrations above levels not seen in hundreds of thousands of years.

Methane and other, often much more potent, greenhouse gases are also rising along with CO₂. Currently, about half of the carbon dioxide released from the burning of fossil fuels remains in the atmosphere. The rest is absorbed by vegetation and the oceans. Climate model projections summarized in the report indicated that during the 21st century the global surface temperature is likely to rise a further 0.3 to 1.7 °C (0.5 to 3.1 °F) for their lowest emissions scenario and 2.6 to 4.8 °C (4.7 to 8.6 °F) for the highest emissions scenario. These findings have been recognized by the national science academies of the major industrialized nations and are not disputed by any scientific body of national or international standing.

CURRENT TRENDS OF GREENHOUSE GAS EMISSIONS IN THE WORLD

Global greenhouse gases emissions are rising rapidly. In the year 1970, total greenhouse gas emissions were KT27660218.469 million, on account of 1.9 times increase in the year 2012, reach to KT 53526302.828 million, presented in the Table 1 as follows:

TABLE 1: CURRENT STATUS OF GREENHOUSE GAS EMISSIONS IN THE WORLD

(in millions)

Year	CO ₂ emissions (kiloton)	CO ₂ emissions (metric tons per capita)	Methane emissions (kiloton of CO ₂ equivalent)	Nitrous Oxide emissions (Thousand metric tons of CO ₂ equivalent)	Total greenhouse gas emissions (kt of CO ₂ equivalent)
1960	9385792.843	3.092	-	-	-
1965	11426753.368	3.436	-	-	-
1970	14789733.399	4.013	5305820	2225930.2	27660218.469
1975	16853249.641	4.145	5305270	2329578.7	28860202.767
1980	19438422.302	4.381	6011410	2732925.9	33480327.211
1985	19863328.593	4.103	6039460	2695397.3	33080640.786
1990	22352939.234	4.231	6668380	2953007.3	38232170.057
1995	23258105.181	4.076	6556730	2978718.7	39040328.229
2000	24667909	4.034	6480650	2920510	40563436.995
2005	29427675	4.518	7275910	2965813.4	47216058.671
2010	33505379	4.839	7185790	3084899.9	50911113.677
2011	34865836	4.976	7927060.645	3123551.397	52790526.996
2012	35463557	5.002	8014066.562	3153742.479	53526302.828
2013	35848592	4.996	-	-	-
2014	35688794	4.90	-	-	-
2015	35633093	4.83	-	-	-
2016	35755322	4.80	-	-	-

Source: World Bank, Emission Database for Global Atmospheric Research(EDGAR).

TABLE2: CO₂ EMISSIONS IN SELECTED ECONOMIES AND THE WORLD

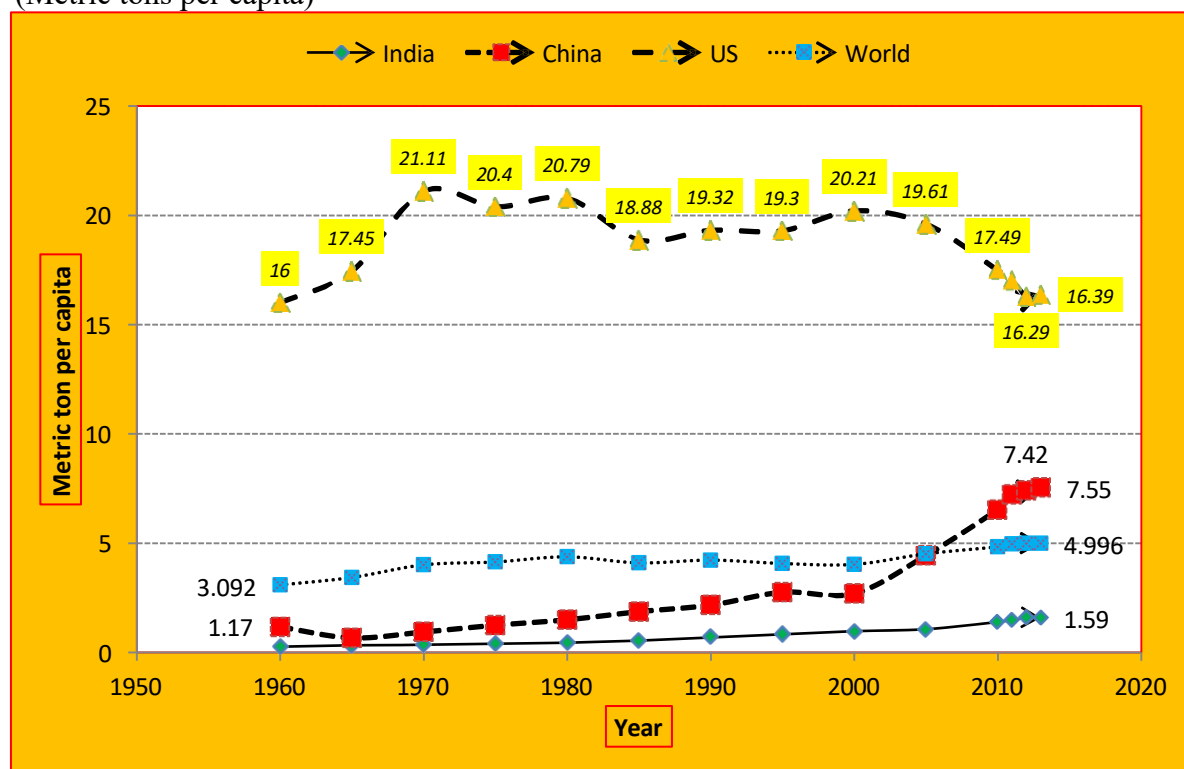
(metric tons per capita)

Year	India	China	US	World
1960	0.268	1.17	16	3.092
1965	0.333	0.67	17.45	3.436
1970	0.352	0.94	21.11	4.013
1975	0.406	1.25	20.40	4.145
1980	0.45	1.50	20.79	4.381
1985	0.546	1.87	18.88	4.103
1990	0.711	2.17	19.32	4.231
1995	0.845	2.76	19.30	4.076
2000	0.979	2.70	20.21	4.034
2005	1.068	4.44	19.61	4.518
2010	1.397	6.55	17.49	4.839
2011	1.48	7.24	17.02	4.976
2012	1.597	7.42	16.29	5.002

2013	1.59	7.55	16.39	4.996
2014	1.80	7.59	16.54	4.90
2015	1.85	7.47	15.98	4.83
2016	1.92	7.45	15.56	4.80

Source: Same as Table1.

FIGURE1: CO₂ EMISSIONS IN SELECTED ECONOMIES AND THE WORLD
(Metric tons per capita)



Source: Author's elaborations based on World Bank database.

Table1 and Figure1 reflecting the picture pertains to emission of greenhouse gases at global level and data are sourced from World Bank database. It is clear that in 1970, CO₂ emissions, Methane emissions and Nitrous Oxide emissions (Thousand metric tons of CO₂ equivalent) were kiloton 14789733.399 million, kiloton 5305820 millions, and 2225930.2 million, respectively. In the year 2012, corresponding gases increased to 2.4 times, 1.5 times, and 1.4 times, consecutively. It is worth mentioning here that total greenhouse gases emission in kt of CO₂ equivalent are composed of CO₂ totals excluding short- cycle biomass burning (such as agricultural waste burning and Savannah burning) but including other biomass burning(such as forest fires, post -burn decay, peat fires, and decay of drained peat lands) all anthropogenic CH₄ sources, N₂O sources and F-gases(HFCs, PFCs and SF₆)

Impact of change in climate and global warming reflected likely all over the world but is possibility to greater effects on developing economies. Its impacts could be seen as higher temperatures, changes in precipitation patterns, rising sea levels, and weather related disasters more regular. Future climate change and associated impacts will differ from region to region around the globe. Anticipated effects include warming global temperature, rising sea levels, changing precipitation, and expansion of deserts in the subtropics. Warming is

expected to be greater over land than over the oceans and greatest in the Arctic, with the continuing retreat of glaciers, permafrost and sea ice. Other likely changes include more frequent extreme weather events including heat waves, droughts, heavy rainfall with floods and heavy snowfall; ocean acidification; and species extinctions due to shifting temperature regimes. Effects significant to humans include the threat to food security from decreasing crop yields and the abandonment of populated areas due to rising sea levels. Because the climate system has a large "inertia" and greenhouse gases will stay in the atmosphere for a long time, many of these effects will not only exist for decades or centuries, but will persist for tens of thousands of years.

Possible societal responses to global warming include mitigation by emissions reduction, adaptation to its effects, building systems resilient to its effects, and possible future climate engineering. Most countries are parties to the United Nations Framework Convention on Climate Change (UNFCCC), whose ultimate objective is to prevent dangerous anthropogenic climate change. Parties to the UNFCCC have agreed that deep cuts in emissions are required and that global warming should be limited to well below 2.0 °C (3.6 °F) relative to pre-industrial levels, with efforts made to limit warming to 1.5 °C (2.7 °F).

IMPACTS OF GLOBAL WARMING ON EARTH:-

The impact of increased surface temperatures is significant in itself. But global warming will have additional, far-reaching effects on the planet. Warming modifies rainfall patterns, amplifies coastal erosion, lengthens the growing season in some regions, melts ice caps and glaciers, and alters the ranges of some infectious diseases. Some of these changes are already occurring.

IMPACT OF GLOBAL WARMING ON CHANGING WEATHER :-

For most places, global warming will result in more frequent hot days and fewer cool days, with the greatest warming occurring over land. Longer, more intense heat waves will become more common. Storms, floods, and droughts will generally be more severe as precipitation patterns change. Hurricanes may increase in intensity due to warmer ocean surface temperatures. It is impossible to pin any single unusual weather event on global warming, but emerging evidence suggests that global warming is already influencing the weather. Heat waves, droughts, and intense rain events have increased in frequency during the last 50 years, and human-induced global warming more likely than not contributed to the trend.

RISING SEA LEVELS

The weather isn't the only thing global warming will impact: rising sea levels will erode coasts and cause more frequent coastal flooding. Some island nations will disappear. The problem is serious because up to 10 percent of the world's population lives in vulnerable areas less than 10 meters (about 30 feet) above sea level. Between 1870 and 2000, the sea level increased by 1.7 millimetres per year on average, for a total sea level rise of 221 millimetres (0.7 feet or 8.7 inches). And the rate of sea level rise is accelerating. Since 1993,

NASA satellites have shown that sea levels are rising more quickly, about 3 millimetres per year, for a total sea level rise of 48 millimetres (0.16 feet or 1.89 inches) between 1993 and 2009.

The Intergovernmental Panel on Climate Change (IPCC) estimates that sea levels will rise between 0.18 and 0.59 meters (0.59 to 1.9 feet) by 2099 as warming sea water expands, and mountain and polar glaciers melt. These sea level change predictions may be underestimates, however, because they do not account for any increases in the rate at which the world's major ice sheets are melting. As temperatures rise, ice will melt more quickly. Satellite measurements reveal that the Greenland and West Antarctic ice sheets are shedding about 125 billion tons of ice per year—enough to raise sea levels by 0.35 millimeters (0.01 inches) per year. If the melting accelerates, the increase in sea level could be significantly higher.

IMPACT OF GLOBAL WARMING ON FLORA AND FAUNA :-

More importantly, perhaps, global warming is already putting pressure on ecosystems, the plants and animals that co-exist in a particular climate zone, both on land and in the ocean. Warmer temperatures have already shifted the growing season in many parts of the globe. The growing season in parts of the Northern Hemisphere became two weeks longer in the second half of the 20th century. Spring is coming earlier in both hemispheres. This change in the growing season affects the broader ecosystem. Migrating animals have to start seeking food sources earlier. The shift in seasons may already be causing the lifecycles of pollinators, like bees, to be out of synch with flowering plants and trees. This mismatch can limit the ability of both pollinators and plants to survive and reproduce, which would reduce food availability throughout the food chain.

Warmer temperatures also extend the growing season. This means that plants need more water to keep growing throughout the season or they will dry out, increasing the risk of failed crops and wildfires. Once the growing season ends, shorter, milder winters fail to kill dormant insects, increasing the risk of large, damaging infestations in subsequent seasons. In some ecosystems, maximum daily temperatures might climb beyond the tolerance of indigenous plant or animal. To survive the extreme temperatures, both marine and land-based plants and animals have started to migrate towards the poles. Those species, and in some cases, entire ecosystems, that cannot quickly migrate or adapt, face extinction. The IPCC estimates that 20-30 percent of plant and animal species will be at risk of extinction if temperatures climb more than 1.5° to 2.5°C.

IMPACTS OF GLOBAL WARMING ON HUMAN BEINGS:-

The changes to weather and ecosystems will also affect people more directly. Hardest hit will be those living in low-lying coastal areas, and residents of poorer countries who do not have the resources to adapt to changes in temperature extremes and water resources. As tropical temperature zones expand, the reach of some infectious diseases, such as malaria, will change. More intense rains and hurricanes and rising sea levels will lead to more severe flooding and potential loss of property and life. Hotter summers and more frequent fires will lead to more cases of heat stroke and deaths, and to higher levels of near-surface ozone and

smoke, which would cause more ‘code red’ air quality days. Intense droughts can lead to an increase in malnutrition. On a longer time scale, fresh water will become scarcer, especially during the summer, as mountain glaciers disappear, particularly in Asia and parts of North America.

On the flip side, there could be —winners in a few places. For example, as long as the rise in global average temperature stays below 3 degrees Celsius, some models predict that global food production could increase because of the longer growing season at mid- to high-latitudes, provided adequate water resources are available. The same small change in temperature, however, would reduce food production at lower latitudes, where many countries already face food shortages. On balance, most research suggests that the negative impacts of a changing climate far outweigh the positive impacts. Current civilization—agriculture and population distribution—has developed based on the current climate. The more the climate changes, and the more rapidly it changes, the greater the cost of adaptation.

Ultimately, global warming will impact life on Earth in many ways, but the extent of the change is largely up to us. Scientists have shown that human emissions of greenhouse gases are pushing global temperatures up, and many aspects of climate are responding to the warming in the way that scientists predicted they would. This offers hope. Since people are causing global warming, people can mitigate global warming, if they act in time. Greenhouse gases are long-lived, so the planet will continue to warm and changes will continue to happen far into the future, but the degree to which global warming changes life on Earth depends on our decisions now.

Solutions to Overcome the Problems of Global Warming:-

Given below are some solutions to tackle the problem of global warming:-

Limited use of private vehicles:-

Likely solution to reduce harmful emissions is to cut the usage of private vehicles on road. No doubt many people have started to use bicycles and public transport but apart from that many people do not use public transport for their convenience. This has not been met with much success as many people refuse to cut down their practice of using cars.

Awareness campaign:-

Awareness campaigns can be started using placards, posters and logos which can create awareness among the people for using public transport. They are a very useful way to demonstrate that global warming is not good for the planet; we all should work to tackle this problem.

Using recycled goods:-

Using recycled goods is also a good way to reduce global warming. People should use rechargeable batteries instead of disposable ones. Quality products should be those that have a long life. We can use our waste materials again in recycled form.

Local market shopping:-

Local market shopping should be encouraged among people. Shopping should be done from local markets which reduce transportation even small individual efforts like lowering the thermostats inventor and using compact fluorescent slams instead of in can they sent lamps can it to address the issue of global warming.

Reforestation schemes:-

Some skins like reforestation schemes must be started to grow a large number of trees. Deforestation should be stopped and afforestation practice should be e followed by humankind. Forest degradation and deforestation must be discouraged at Government level. Reforestation can help up to some level to control this hazardous problem of global warming.

Using nuclear power :-

Using nuclear power is also a possible solution as this power results in fewer emissions but this method should be used with care as it can lead to severe accidents therefore the major hurdle is to overcome the security propagation waste disposal and high cost of nuclear power if this method has to be made practical. Using nuclear power will be e a best practice to reduce global warming on earth.

CONCLUSIONS

Global warming is a big hazard and appropriate measures must be taken to tackle this serious problem. This problem is not only causing trouble to the human race but also to flora and fauna. Melting of polar ice caps will lead to floods which can cause destruction everywhere. Rise of sea level will devastate agricultural and fishing activities. Reforestation schemes should be taken in consideration. Use of recycled goods should be practiced among people living on earth. Awareness camping should be started using placards, posters and logos. To sum up, the pace of CO₂ emissions increase is more acute than Methane and Nitrous emissions. To reduce the global greenhouse gases emissions, it now become necessary to avoid deforestation, increase nuclear power, increase bio-energy, increase solar and wind power, improve energy efficiency, reduce other greenhouse gases , and reduce energy related emissions.

REFERENCES

1. Anthes, R.A., Corell, R.W., Holland, G., Hurrell, J.W., MacCracken, M.C., & Trenberth, K. (2010, February 12). Hurricanes and Global Warming—Potential Linkages and Consequences. *Bulletin of the American Meteorological Society*, 87: 623-628. Accessed April 15, 2010.
2. Marc L., —Greenhouse gas emissions: causes and sources, 10 February 2015, <http://www.livescience.com/37821-greenhouse-gases.html>, Accessed 23 May 2015.
3. Balachandran, N., Rind, D., Lonergan, P., & Shindell, D. (1999). Effects of solar cycle variability on the lower stratosphere and the troposphere. *Journal of Geophysical Research*, 104(D22), 27, 321-327, 339.

4. Bender, M. A., Knutson, T. R., Tuleya, R. E., Sirutis, J. J., Vecchi, G. A., Garner, S. T., and Held, I. M. (2010). Modeled Impact of Anthropogenic Warming on the Frequency of Intense Atlantic Hurricanes. *Science*, 327(5964), 454-458.
5. Bonan, G. B. (2008). Forests and Climate Change: Forcings, Feedbacks, and the Climate Benefits of Forests. *Science*, 320(5882), 1444-1449.
6. —Impacts of Global Warming, <http://www.climatehotmap.org/global-warming-effects/health.html>, Accessed 29 May 2015.
7. Clement, A.C., Burgman, R., Norris, J.R. (2009, July 24) Observational and model evidence for positive low-level cloud feedback. *Science*, 325 (5939), 460-464.
8. Dessler, A., Zhang, Z., Yang, P. (2008, October 23). Water-vapor climate feedback inferred from climate fluctuations, 2003-2008. *Geophysical Research Letters*, 35, L20704.
9. Cvitanovic, C., Fulton, C. J., Wilson, S. K., Van Kerkhoff, L., Cripps, I. L., and Muthiga, N. (2014). —Utility of primary scientific literature to environmental managers : an international case study on coral-dominated marine protected areas, *Ocean Coast. Manage.* 102, 72-78. doi:10.1016/j.ocecoaman.2014.09.003.
10. Foucal, P., Frölich, C., Spruit, H., and Wigley, T. (2006). Variations in solar luminosity and their effect on the Earth's climate. *Nature*, 443, 161-166.
11. Hansen, J., Sato, M., Ruedy, R., Kharecha, P., Lacis, A., Miller, R., Nazarenko, L., et al. (2007). Climate simulations for 1880–2003 with GISS model E. *Climate Dynamics*, 29(7), 661-696.
12. Hansen, J., Nazarenko, L., Ruedy, R., Sato, M., Willis, J., Del Genio, A., Koch, D., Lacis, A., Lo, K., Menon, S., Novakov, T., Perlwitz, J., Russell, G., Schmidt, G.A., and Tausnev, N. (2005, June 3). Earth's energy imbalance: confirmation and implications. *Science*, 308, 1431-1435.
13. Intergovernmental Panel on Climate Change. (2007). Climate Change 2007: The Physical Science Basis Summary for Policymakers. A Report of Working Group 1 to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
14. Intergovernmental Panel on Climate Change. (2007). Climate Change 2007: Climate Change Impacts, Adaptation and Vulnerability Summary for Policymakers. A Report of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change.
15. Joint Science Academies. (2005). Joint Science Academies' Statement: Global Response to Climate Change. June 2005.
16. Jouzel, J., Masson-Delmotte, V., Cattani, O., Dreyfus, G., Falourd, S., Hoffmann, G., Minster, B., et al. (2007). Orbital and Millennial Antarctic Climate Variability over the Past 800,000 Years. *Science*, 317(5839), 793-796.
17. Shi, J., Visschers, V. H. M., Siegrist, M., and Arvai, J. (2016), —Knowledge as a driver of public perception about climate change reassessed. *Nat. Clim. Change* 6, 759762.doi:10.1038/nclimate2997
18. Lau, K. M., and H. T. Wu. (2007). Detecting trends in tropical rainfall characteristics, 1979-2003. *International Journal of Climatology*, 27.
19. Lean, J. L., & Rind, D. H. (2009). How will Earth's surface temperature change in future decades? *Geophysical Research Letters*, 36, L15708.

20. Lean, J. L., & Rind, D. H. (2008). How natural and anthropogenic influences alter global and regional surface temperatures: 1889 to 2006. *Geophysical Research Letters*, 35(18).
21. Luthcke, S.B., Zwally, H.J., Abdalati, W., Rowlands, D.D., Ray, R.D., Nerem, R.S., Lemoine, F.G., McCarthy, J.J., and Chinn, D.S. (2006). Recent Greenland ice mass loss by drainage system from satellite gravity observations. *Science*, 314, 1286-1289.
22. Mann, M. E., Zhang, Z., Hughes, M. K., Bradley, R. S., Miller, S. K., Rutherford, S., & Ni, F. (2008). Proxy-based reconstructions of hemispheric and global surface temperature variations over the past two millennia. *Proceedings of the National Academy of Sciences*, 105(36), 13252-13257.
23. Manvendra K. Dubey, Petr Chylek, Charlie S. Zender, & Chris K. Folland. (2010, February 12). Global Warming and the Next Ice Age. *Bulletin of the American Meteorological Society*, 89 (12), 1905-1909.
24. McGranahan, G., D. Balk and B. Anderson. (2007). The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones. *Environment & Urbanization*, 19 (1), 17-37.
25. Haunschild et al., (2016) R. Haunschild , L. Bornmann, W. Marx, —Climate change research in view of bibliometrics, PLoS One, 11(7)2016, Article e0160393.
26. Oren, R., Ellsworth, D. S., Johnsen, K. H., Phillips, N., Ewers, B. E., Maier, C., Schafer, K. V., et al. (2001). Soil fertility limits carbon sequestration by forest ecosystems in a CO₂-enriched atmosphere. *Nature*, 411(6836), 469-472.
27. Ramanathan, V., & Feng, Y. (2008). On avoiding dangerous anthropogenic interference with the climate system: Formidable challenges ahead. *Proceedings of the National Academy of Sciences*, 105(38), 14245-14250.
28. Rind, D., Lean, J.L., Lerner, J., Lonergan, P., and Leboissetier, A. (2008). Exploring the stratospheric/tropospheric response to solar forcing. *Journal of Geophysical Research*, 113, D24103.
29. Robock, A., Marquardt, A., Kravitz, B., & Stenchikov, G. (2009). Benefits, risks, and costs of stratospheric geoengineering. *Geophysical Research Letters*, 36, L19703.
30. Sabine, C. L. (2004). The Oceanic Sink for Anthropogenic CO₂. *Science*, 305(5682), 367-371.
31. Schimel, D. (2007). Carbon cycle conundrums. *Proceedings of the National Academy of Sciences*, 104(47), 18353-18354.
32. Seager, R., Ting, M., Held, I., Kushnir, Y., Lu, J., Vecchi, G., Huang, H., et al. (2007). Model Projections of an Imminent Transition to a More Arid Climate in Southwestern North America. *Science*, 316(5828), 1181-1184.
33. Shepherd, A., and Wingham, D. (2007). Recent sea-level contributions of the Antarctic and Greenland Ice Sheets. *Science*, 315, 1529-1532.
34. Soden, B. J. and Held, I.M. (2006, July). An assessment of climate feedbacks in coupled ocean-atmosphere models. *Journal of Climate*, 19: 3354-3360.