

Preface March 22, 2024

Its official – 2023 experienced the warmest climate on record, World Meteorological Organization,

<https://wmo.int/news/media-centre/climate-change-indicators-reached-record-levels-2023-wmo#:~:text=The%20WMO%20report%20confirmed%20that,across%20all%20major%20indicators...>

Key messages

- State of Global Climate report confirms 2023 as hottest year on record by clear margin (February 2024 was the hottest February on record.)
- Records broken for ocean heat, sea level rise, Antarctic sea ice loss and glacier retreat
- Extreme weather undermines socio-economic development
- Renewable energy transition provides hope
- Cost of climate inaction is higher than cost of climate action

The block buster movie, 'Oppenheimer', was recently named best picture, Oscars 2024. It is the story of the development of the atomic bomb that was eventually dropped on the Japanese cities, Nagasaki and Hiroshima. After witnessing the successful testing of the atomic bomb J. Robert Oppenheimer, the director of the Los Alamos Laboratory, which developed the atomic bomb for the United States, quotes the Hindu God, Krishna, from the Bhagavad Gita "Now I am become death, the destroyer of worlds.", <https://www.wired.com/story/manhattan-project-robert-oppenheimer/>. Atomic bomb development continued with the development of fusion technology and much more powerful bombs. The ensuing cold war and race to develop the capacity to deliver the bombs suggested that Earth might soon experience the apocalyptic outcome of global nuclear war.

The unabated emission of greenhouse gases into Earth's atmosphere is causing the equivalent of 'a slow-motion explosion resulting in the sixth extinction of life on Earth' similar to the consequences of global nuclear war. The most devastating consequences of nuclear war would be experienced in a matter of hours and days and continue for decades, centuries or millennia as would be the effect of the devastating climate changes associated with global warming. Similar to the development of the atomic bomb, humans are busy creating the 'climate change bomb'; and, humans have the ability to stop its development. But will they?

Action to stop global warming must take place at the nation level. International agencies act in advisory capacities to national governments – providing direction – trying to identify doable constructive actions. Hopefully, populations educated as to the effects of global warming would advocate for policies and actions to limit its causes. Education is strategic. Knowledge is essential. Individuals who are not making an effort to understand the science of climate change

are putting their destiny and the destiny of future generations in the hands of others who may not have the ability to understand the science or have their best interests at heart - climate change deniers for example. Action at the nation level requires an educated electorate (population). Knowledgeable, responsible leadership is essential.

There are challenges. The science of climate change is a diverse, very large, and complex topic. It is in fact the study of every aspect of Earth's environment including human activities. As such the study of the science of climate change is intimidating and requires significant personal commitment.

This Guide is intended to provide an understandable roadmap to the study of the science of climate change. The Guide is directed to anyone interested in learning about the science of climate change regardless of their education or age. To the extent possible everyday language is used in the hope that most of the potentially intimidating aspects of the learning process have been avoided and the essential elements of the science have been retained and communicated.

The Guide provides a basic understanding of all of the processes and factors which determine Earth's climate and how this knowledge can be used to predict, accommodate and avoid the effects of climate change. References are made to web sites of many of the most reputable organizations world wide (learned societies, government agencies, educational institutions, and numerous other not-for-profit organizations) as well as to their news letters and reports, and to reputable journal and conference publications. Emphasis has been placed on information published for free on the internet because of its accessibility as compared to refereed texts published in journals which may be challenging to read and can often be difficult and expensive to access. Books, if available, might also be expensive. The Guide can be used as a supportive reference when reviewing less scientifically thorough educational material published by many organizations which inform/ educate all age groups, pre-school to centenarians. There are no references to social media sites. The Guide may be accessed without cost to anyone who has access to the internet and so is a resource to anyone on the planet. With the information provided in the Guide aspiring scholars can delve as deep as they wish into any of the subjects they find of interest.

The Guide continues to be reviewed, edited and added to.

Regards,

David Manz
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