

Global Warming and Climate Change

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Sea level rise



- ▶ Global sea level rose about 17 centimeters (6.7 inches) in the last century. The rate in the last decade, however, is nearly double that of the last century.

Global temperature rise



- ▶ All three major global surface temperature reconstructions show that Earth has warmed since 1880.
- ▶ Most of the warming occurred in the past 35 years, with 15 of the 16 warmest years on record occurring since 2001.
- ▶ The year 2015 was the first time the global average temperatures were 1 degree Celsius or more above the 1880–1899 average.

Warming oceans



- ▶ The oceans have absorbed much of this increased heat, with the top 700 meters (about 2,300 feet) of ocean showing warming of 0.302 degrees Fahrenheit since 1969.

Shrinking ice sheets



- ▶ The Greenland and Antarctic ice sheets have decreased in mass. Data from NASA's Gravity Recovery and Climate Experiment show Greenland lost 150 to 250 cubic kilometers (36 to 60 cubic miles) of ice per year between 2002 and 2006, while Antarctica lost about 152 cubic kilometers (36 cubic miles) of ice between 2002 and 2005.

Declining Arctic sea ice



- ▶ Both the extent and thickness of Arctic sea ice has declined rapidly over the last several decades.

Glacial retreat



- ▶ Glaciers are retreating almost everywhere around the world — including in the Alps, Himalayas, Andes, Rockies, Alaska and Africa.

Extreme events



- ▶ The number of record high temperature events in the United States has been increasing, while the number of record low temperature events has been decreasing, since 1950. The U.S. has also witnessed increasing numbers of intense rainfall events.

Ocean acidification



- ▶ Since the beginning of the Industrial Revolution, the acidity of surface ocean waters has increased by about 30 percent. This increase is the result of humans emitting more carbon dioxide into the atmosphere and hence more being absorbed into the oceans.
- ▶ The amount of carbon dioxide absorbed by the upper layer of the oceans is increasing by about 2 billion tons per year.

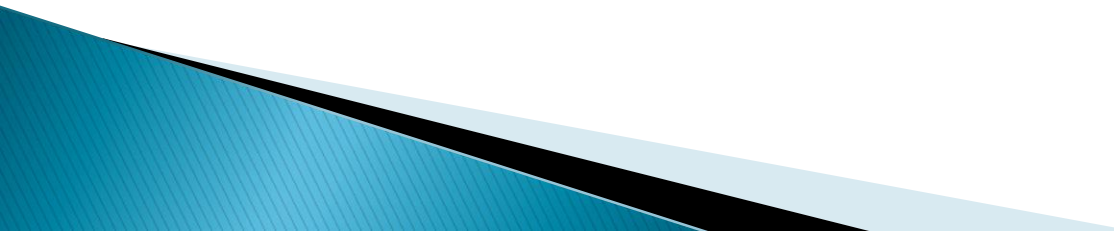
Decreased snow cover



- ▶ Satellite observations reveal that the amount of spring snow cover in the Northern Hemisphere has decreased over the past five decades and that the snow is melting earlier.

Impact of Climate Change

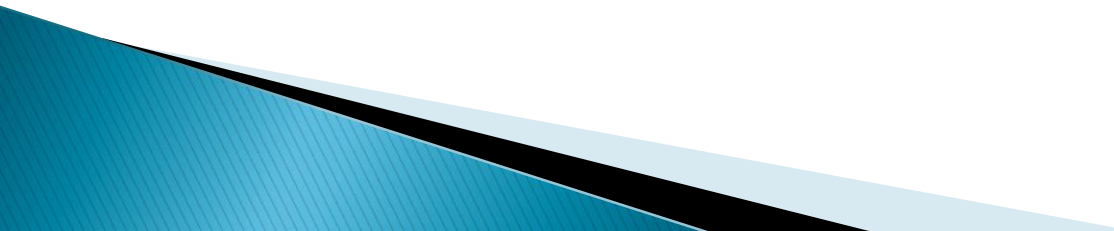
Impact on

- ▶ Bio-Diversity
 - ▶ Agriculture
 - ▶ Health (WHO's Study)
 - ▶ Human Population
 - ▶ Migration
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Debates: Acceptance vs Denial

- ▶ US Administration
 - ▶ European Position
 - ▶ China's Position
 - ▶ India's Position
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International Accords

- ▶ Montreal Protocol (1987) on Depletion of Ozone Layer
 - ▶ UNFCCC (1992) on Carbon Emissions
 - ▶ Kyoto Protocol (1997) on Green House Gases
 - ▶ Paris Agreement (2016) on Climate Change
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Action to Prevent Climate Crisis

- ▶ Stop/Reduce Using Fossil Fuel
 - ▶ Use of Renewable Energy: Solar, Wind
 - ▶ Reorient Industry and Business
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Climate Change : Examples from India

- ▶ Highly susceptible to Climate Change
- ▶ Examples:
 - ▶ Kerala Flood, August 2018
 - ▶ Odisha Cyclone, May 2019
 - ▶ Assam: Floods and Drought
 - ▶ Majuli riverine island in Assam: Continuous shifts in rainfall as well as temperatures of the island resulting in migration and loss of livelihood
 - ▶ Other Cases:

Acknowledgements

- ▶ Climate Change Details come from <https://climate.nasa.gov/evidence/> – This information is in the public domain.
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Funeral of trees



A picture with a very serious message

Further Resources

