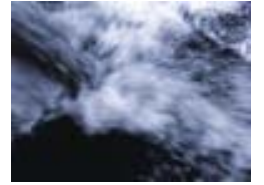




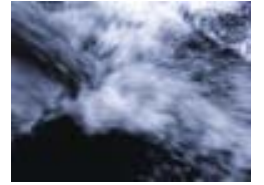
The Science of Climate Change and IPCC

Evolution of climate science



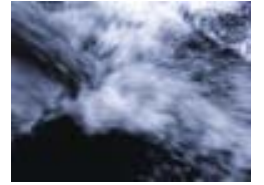
-
- 1979:** First World Climate Conference organized by WMO
 - 1988:** NASA scientist James Hansen tells U.S. Congress global warming "is already happening now"
 - **Creation of the Intergovernmental Panel on Climate Change (IPCC) by WMO & UNEP** to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts.
 - It reviews and assesses the most recent information produced worldwide relevant to the understanding of climate change. It does not conduct any research nor does it monitor climate related data or parameters.

IPCC report 1



- **First Assessment Report (1990) and supplementary report (1992)**
- **Forecasts:**
 - an effective doubling of CO₂ concentration between 1990 and 2025 to 2050
 - increase of global mean temperature over 1990 levels by 1.5°C to 4.5°C by 2100
 - sea-level rise of about 0.3—0.5 m by 2050 and about 1.0 m by 2100
- **Suggests:**
 - An immediate reduction in GHGs emissions by over 60% to stabilize their concentrations at 1990 levels by 2000

Impact on climate politics



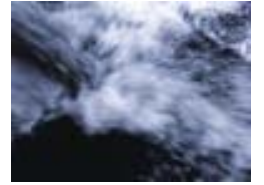
- **Proposes:**
 - Common but differentiated responsibilities
 - As major part of emissions originates in industrialized countries, they should cut emissions as they have the greatest scope for change
 - Give finance and technology to developing countries to cut emissions.
- **Impact on Climate Politics:** UNFCCC signed in 1992 to “protect the climate system for the benefit of present and future generations, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities”

IPCC report 2



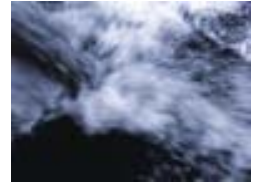
- **The Second Assessment Report (1995)**
- **Forecasts: Lower impacts of climate change**
 - The “best estimate” project an increase in global mean surface temperature relative to 1990 of about 2°C by 2100. This is one-third lower than the “best estimate” in FAR.
 - The “best estimate” project an increase in sea level of about 50 cm from the present to 2100. This estimate is approximately 25% lower than the “best estimate” in FAR.

Impact on climate politics



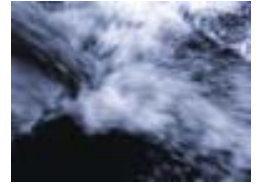
- Kyoto Protocol signed with insignificant emission reduction target. Developed countries, individually or jointly, pledge to reduce their emissions of the greenhouse gases by at least 5 per cent below 1990 levels in the commitment period 2008 to 2012.

IPCC report 3



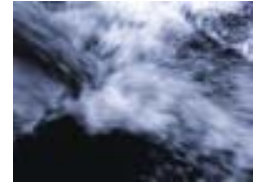
- **The Third Assessment Report (2001) widely known for projections and demand for adaptation**
- **Forecasts:**
 - Increase in globally averaged surface temperature of 1.4 to 5.8 °C over the period 1990 to 2100. Almost double the SAR
- **Impact on climate politics:** Too late. US walks out of the Kyoto Protocol

IPCC report 4



- **The Fourth Assessment Report (2007)** – says Warming of the climate system is unequivocal, and most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations. **Gets Nobel Prize**
-

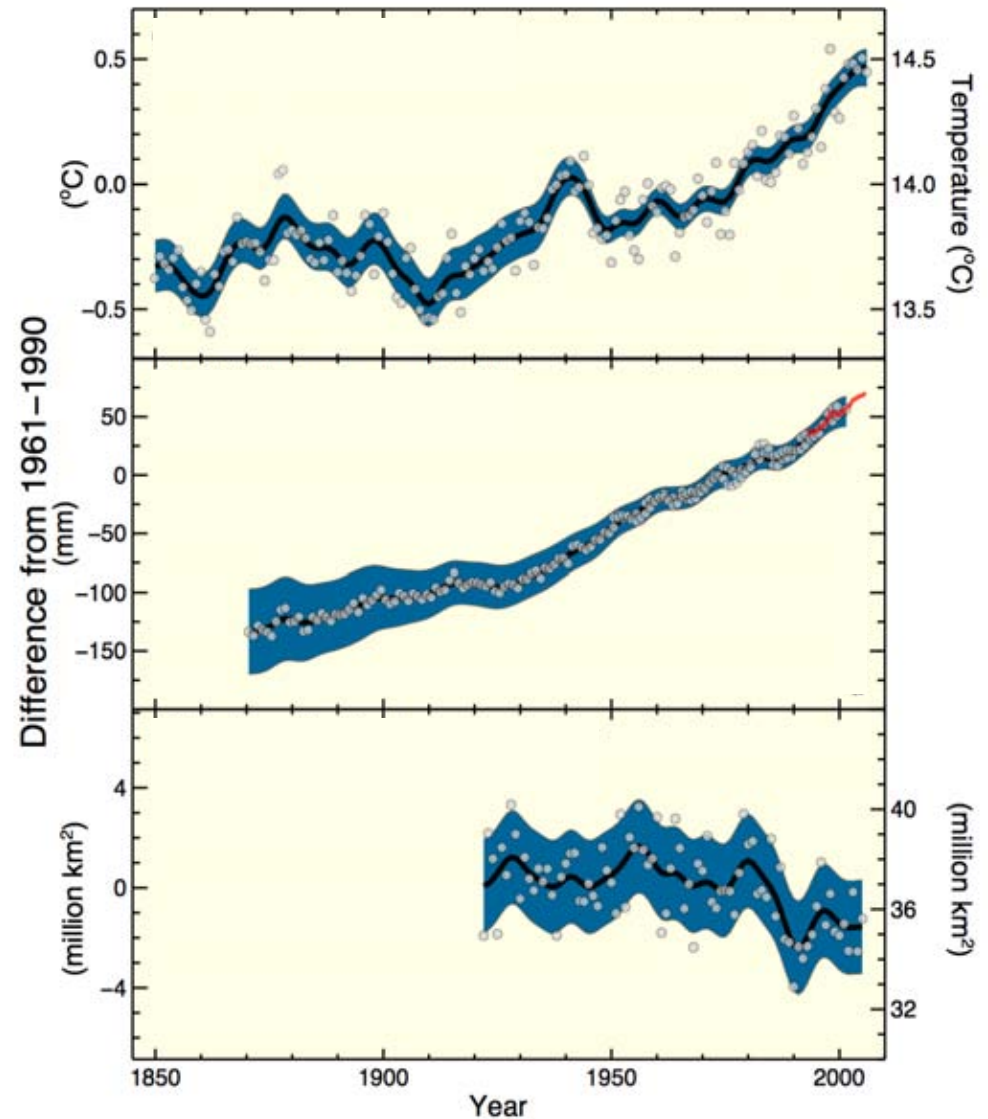
Observed changes



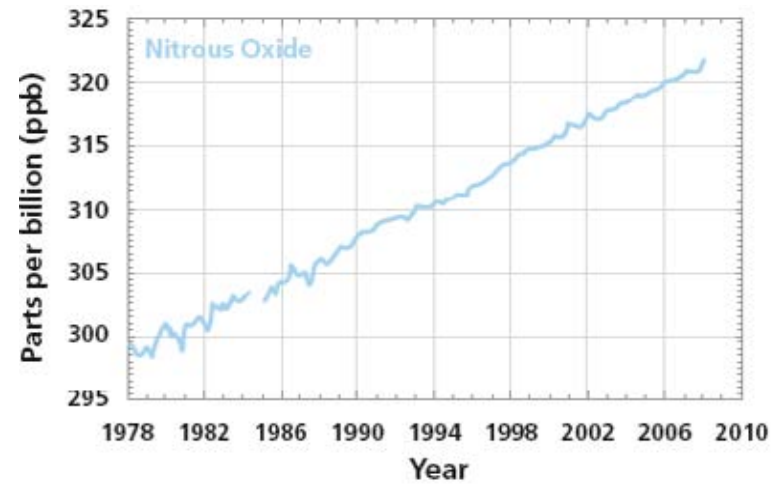
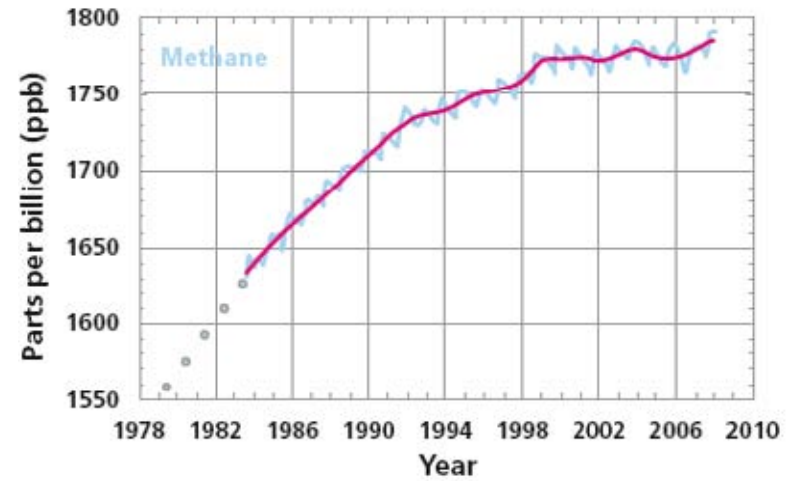
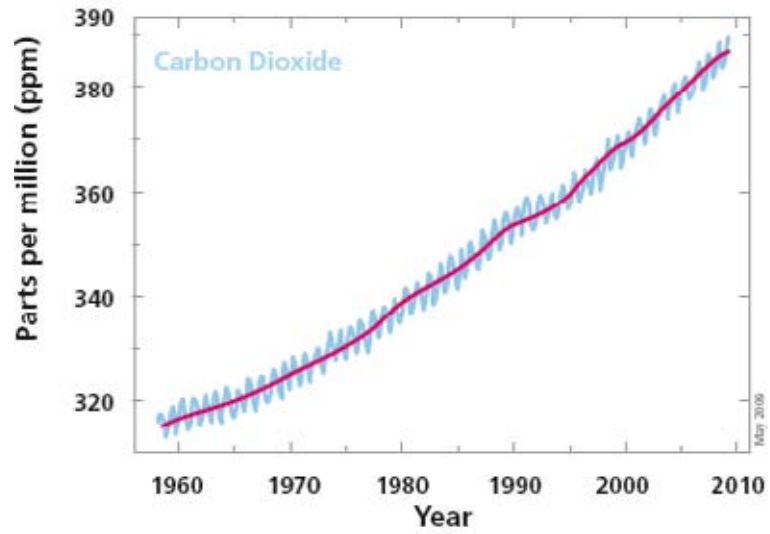
Global average temperature →

Global average sea level →

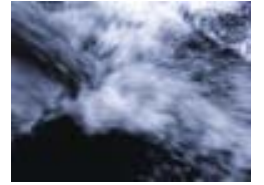
Northern hemisphere snow cover →



Observed changes

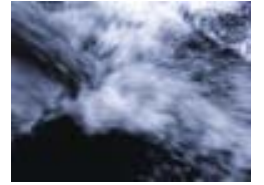


Impact on climate politics



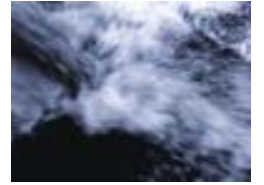
- Formula for stabilizing temperature increase within 2⁰C
 - Developed countries to reduce emissions by 25-40% by 2020 compared with 1990 levels.
 - Developing countries to deviate 15-30% from business-as-usual
- Bali Action Plan (2007) to get an ambitious climate deal in Copenhagen
- No deal at Copenhagen (2009)
- Agreement at Cancun (2010) but too little, too late. Gigatonne gap. World will not do much till 2020 under this agreement.
- Adhoc working group on Durban Platform (2011) to negotiate a new deal for 2020 onwards

IPCC report 5



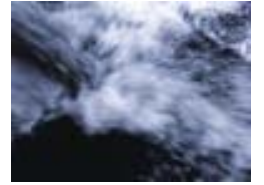
- **To be released in phases**
- WG I: The Physical Science Basis – mid September 2013; summary for policymakers is being released Sept 27 at Stockholm
- WG II: Impacts, Adaptation and Vulnerability – mid March 2014
- WG III: Mitigation of Climate Change – early April 2014
- AR5 Synthesis Report – October 2014

IPCC report 5



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IPCC report 5: WG I Leaked



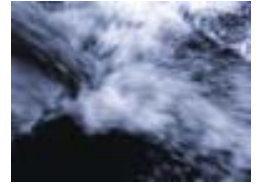
- AR5 concludes that it is now extremely likely, or at least 95% certain, that human activities have caused more than half of the observed temperature increase from 1951 to 2010. Certainty has increased from very likely, or at least 90% certain, since AR4
- Warming has been particularly marked since the 1970s. Each of the last three decades has been significantly warmer than all preceding decades since 1850.

WG I Leaked: AR 4 vs. AR 5



- Global sea level is expected to rise more by 2100 than previously projected.
- There is less confidence that global average rainfall has increased in the past, but greater confidence that it will in the future.
- There is no change to the conclusion that heavy rainfall events have increased in the past, but greater confidence they'll increase in the future.
- There is no change to earlier conclusions about trends in flooding, past or future.

WG I Leaked: AR 4 vs. AR 5



- There is less confidence in the earlier conclusion that global drought has increased, or that any change is detectable since 1950.
- There is less confidence that hurricane activity has increased in the pasts