IPCC AR5 & UNFCCC COP21

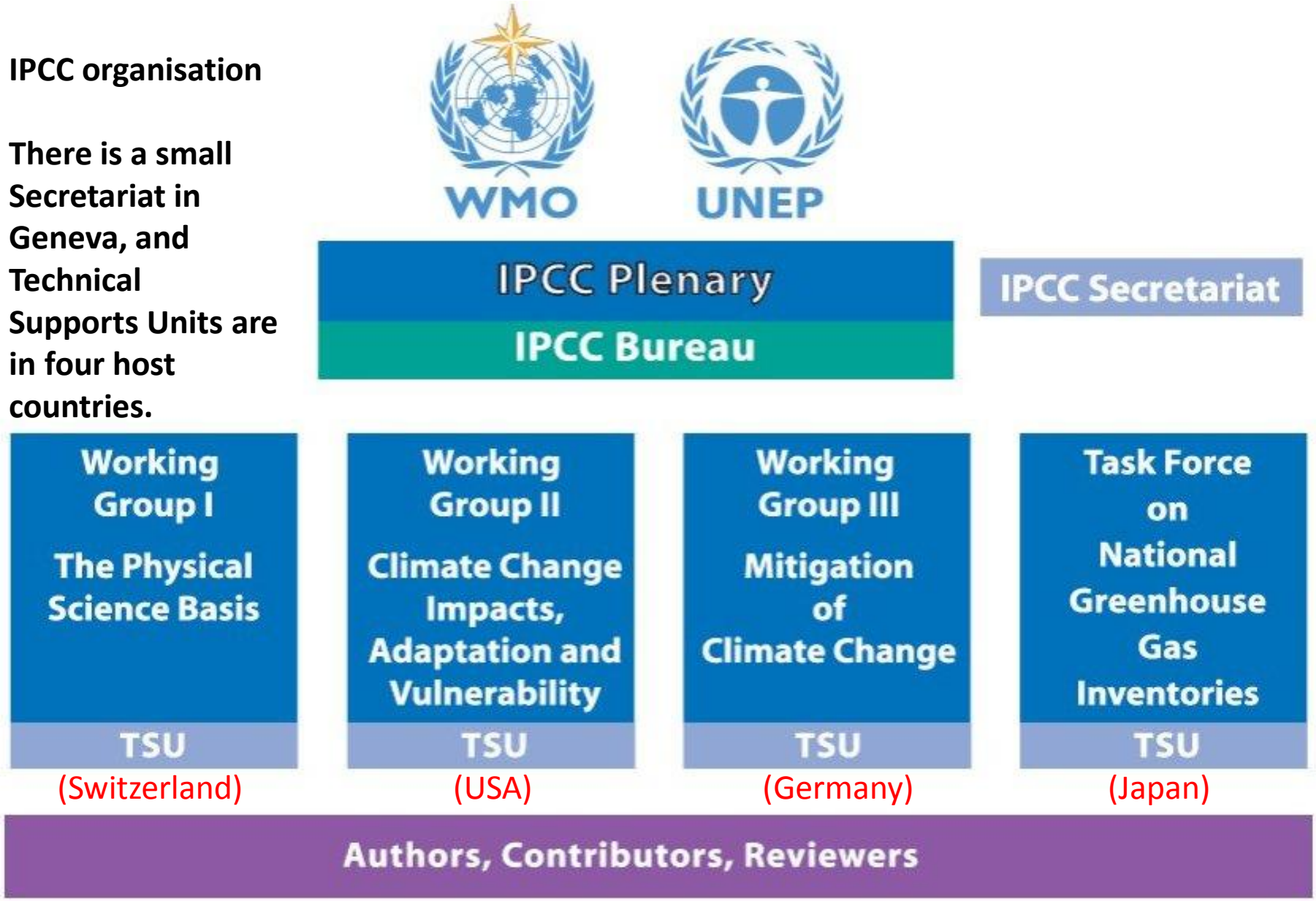
＜Personal Notes＞

28th July 2015

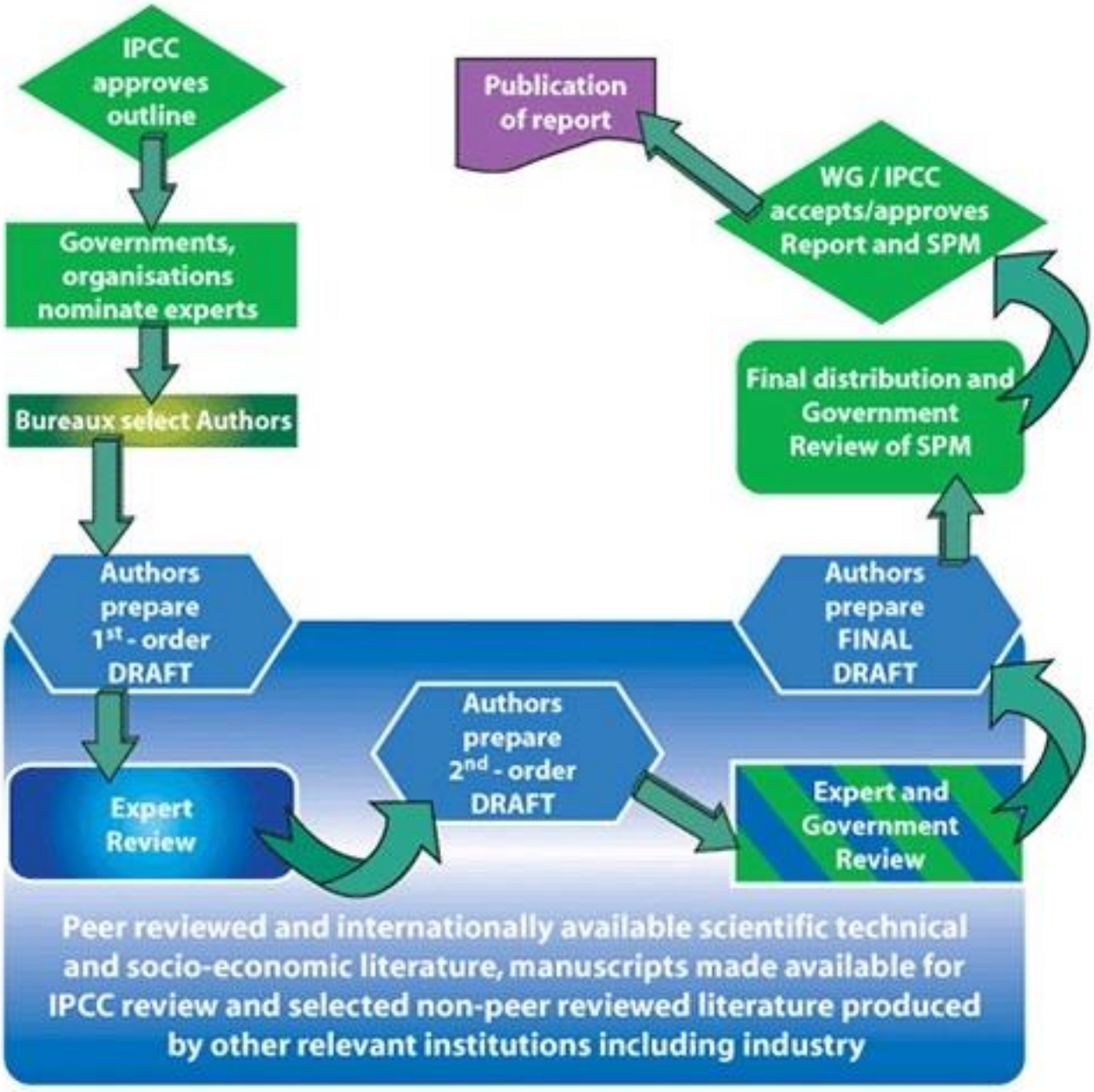
平石 尹彦
Taka Hiraishi
<hiraishi@iges.or.jp>

IPCC organisation

There is a small Secretariat in Geneva, and Technical Supports Units are in four host countries.



IPCC Writing and Review Process



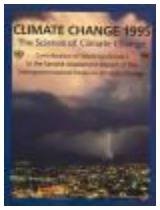
IPCC Reports are drafted (synthesising international literature) by selected authors, but go through two stages of international Peer Review Process. Thus, they represent a broad spectrum of international science

First Assessment Report (1990) (FAR)

2 years before the UNFCCC

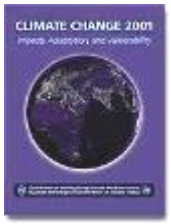
Second Assessment Report (1995) (SAR)

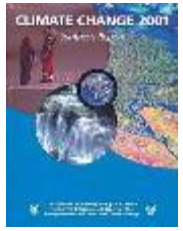
2 years before Kyoto Protocol




Third Assessment Report (2001) (TAR)

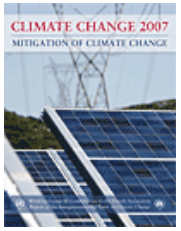
Made when Parties were considering Kyoto Potocol ratification





Fourth Assessment Report (2007) (AR4)

Made when Parties were negotiating post-2012 climate agreement.



WG-I WG-II WG-III Synthesis

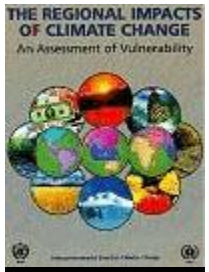
IPCC

2007 Nobel Peace Prize!

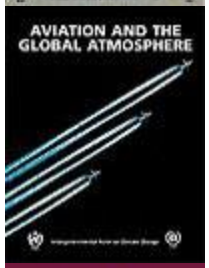
The Intergovernmental Panel on Climate Change and Albert Arnold (Al) Gore Jr. were awarded of **the Nobel Peace Prize** "for their efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change".

IPCC Special Reports

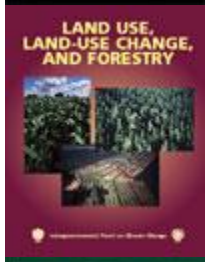
Regional Impacts (1997)



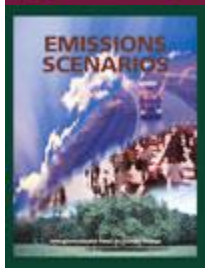
Aviation (1999)



LUCF (2000)

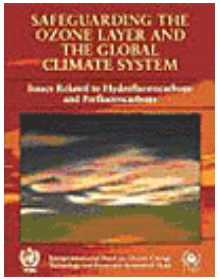


Emission Scenarios (2000)

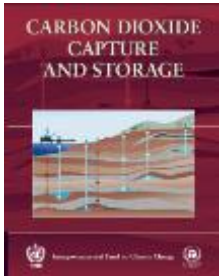


Technology Transfer (2000)

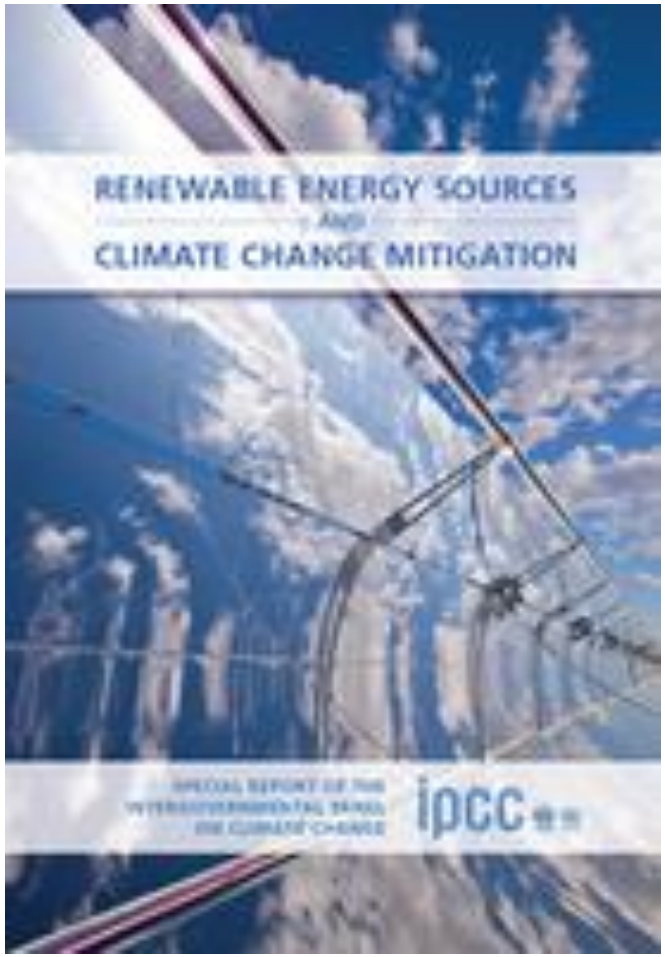
Ozone Layer (2005)



CO2 Capture and Storage (2005)



Recent Special Reports (1)

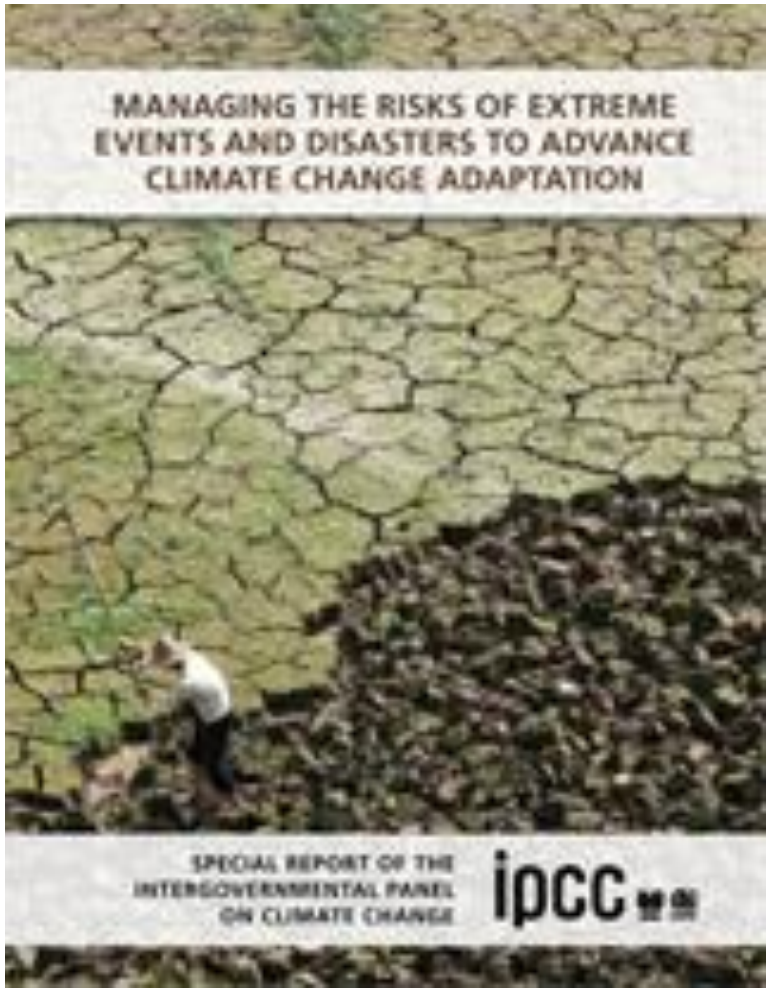


IPCC Special Report on Renewable Energy Sources and Climate Change Mitigation

(May 2011)

<http://srren.ipcc-wg3.de/report>

Recent Special Reports (2)

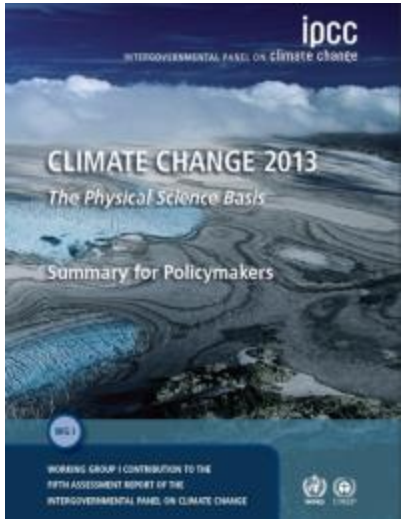


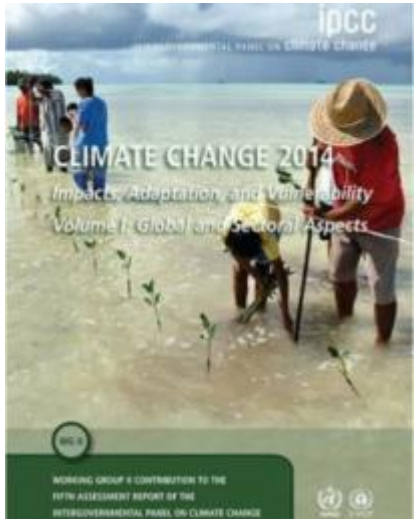
Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX)

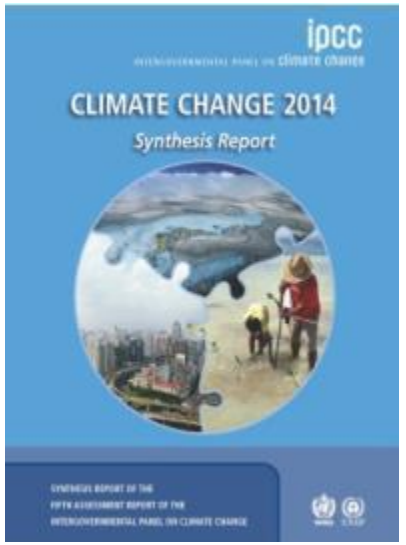
(November 2011)

<http://ipcc-wg2.gov/SREX/>

IPCC 5th Assessment Report (AR5)







IPCC Panel Sessions approved Working Group AR5 Repoert at:

WG-I <September 2013 in Stockholm>,
WG-II <March 2014 in Yokohama>, and
WG-III <April 2014 in Berlin>

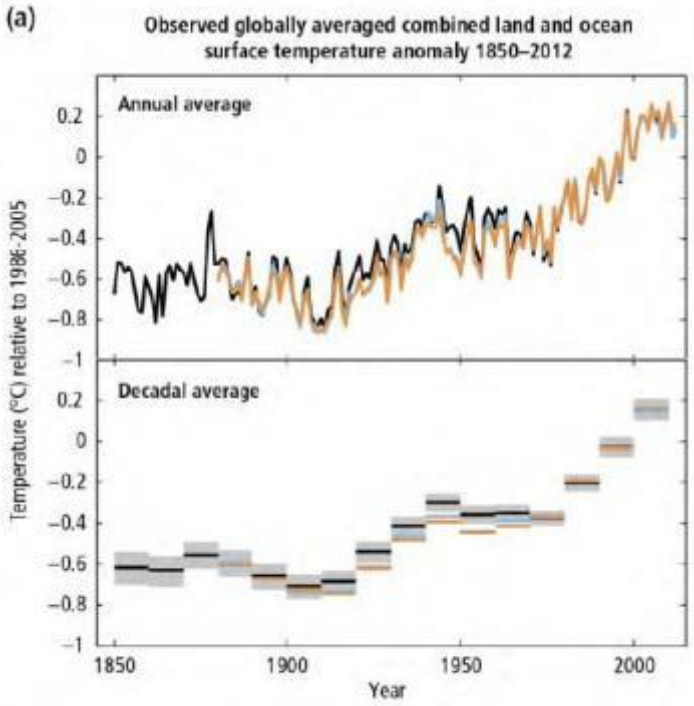
IPCC approved AR5 Synthesis Report in October 2014 in Copenhagen.

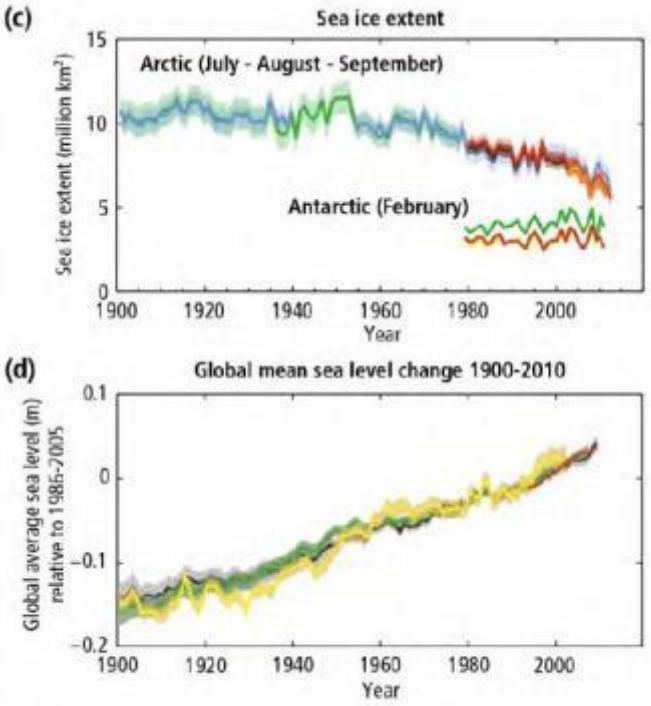
<http://www.ipcc.ch/>

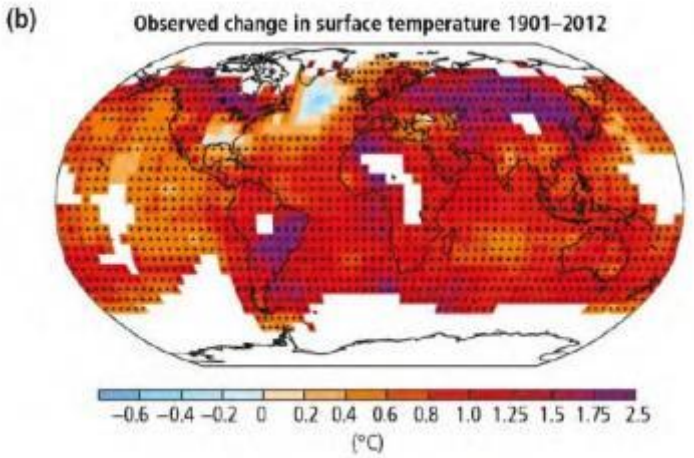
Overall Summary

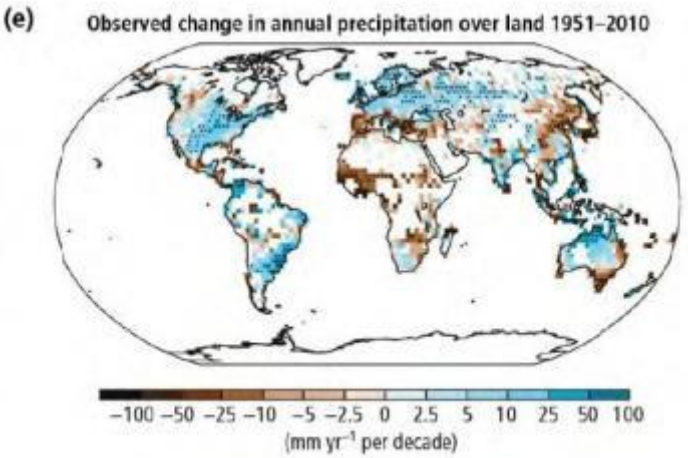
- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.
- Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems. Limiting climate change would require substantial and sustained reductions in greenhouse gas emissions which, together with adaptation, can limit climate change risks.
- Adaptation and mitigation are complementary strategies for reducing and managing the risks of climate change. Substantial emissions reductions over the next few decades can reduce climate risks in the 21st century and beyond, increase prospects for effective adaptation, reduce the costs and challenges of mitigation in the longer term, and contribute to climate-resilient pathways for sustainable development.
- Many adaptation and mitigation options can help address climate change, but no single option is sufficient by itself. Effective implementation depends on policies and cooperation at all scales, and can be enhanced through integrated responses that link adaptation and mitigation with other societal objectives.

Observed Changes





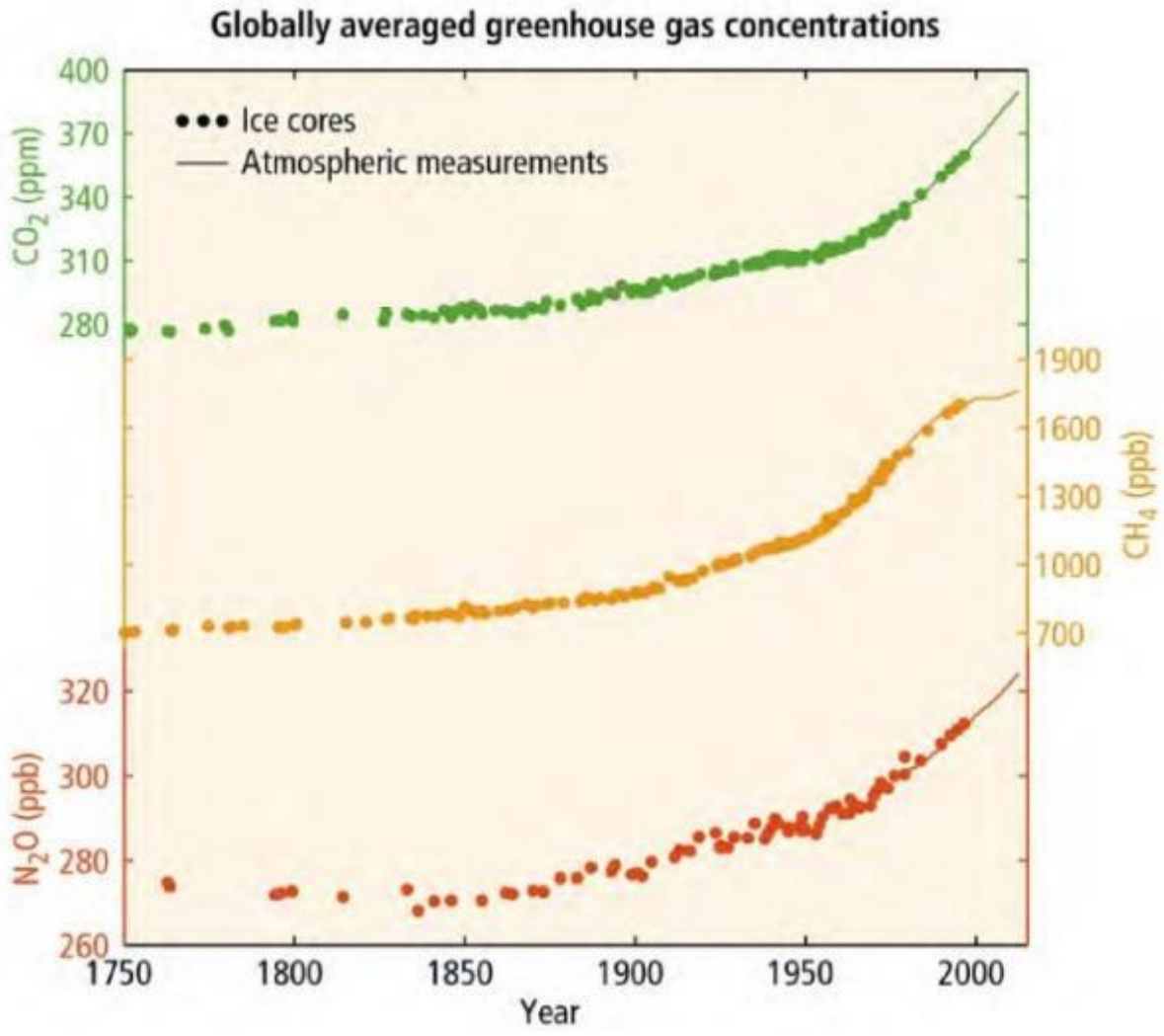




- **Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen.**

The total increase between the average of the 1850–1900 period and the 2003–2012 period is 0.78 [0.72 to 0.85], based on the single longest dataset available.

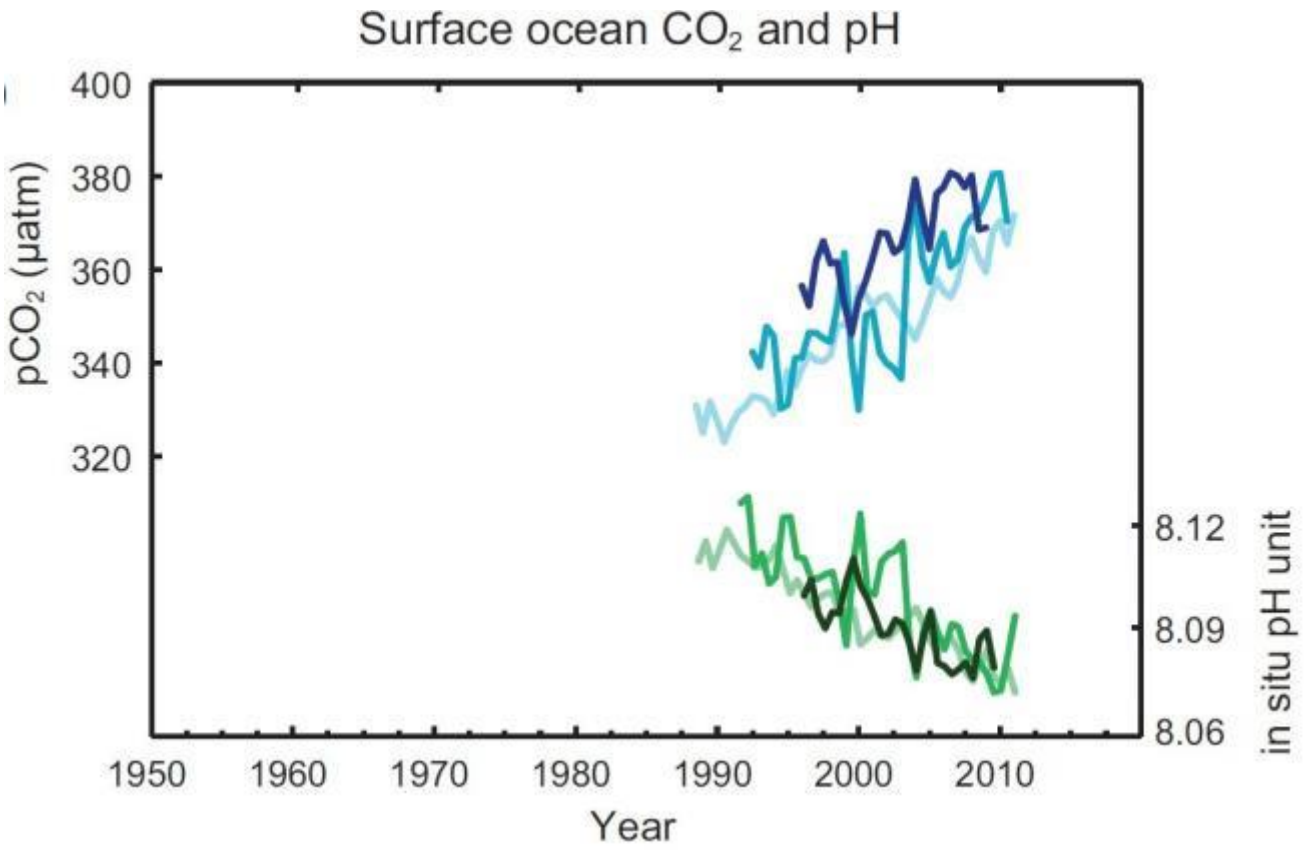
Atmospheric GHG Concentrations



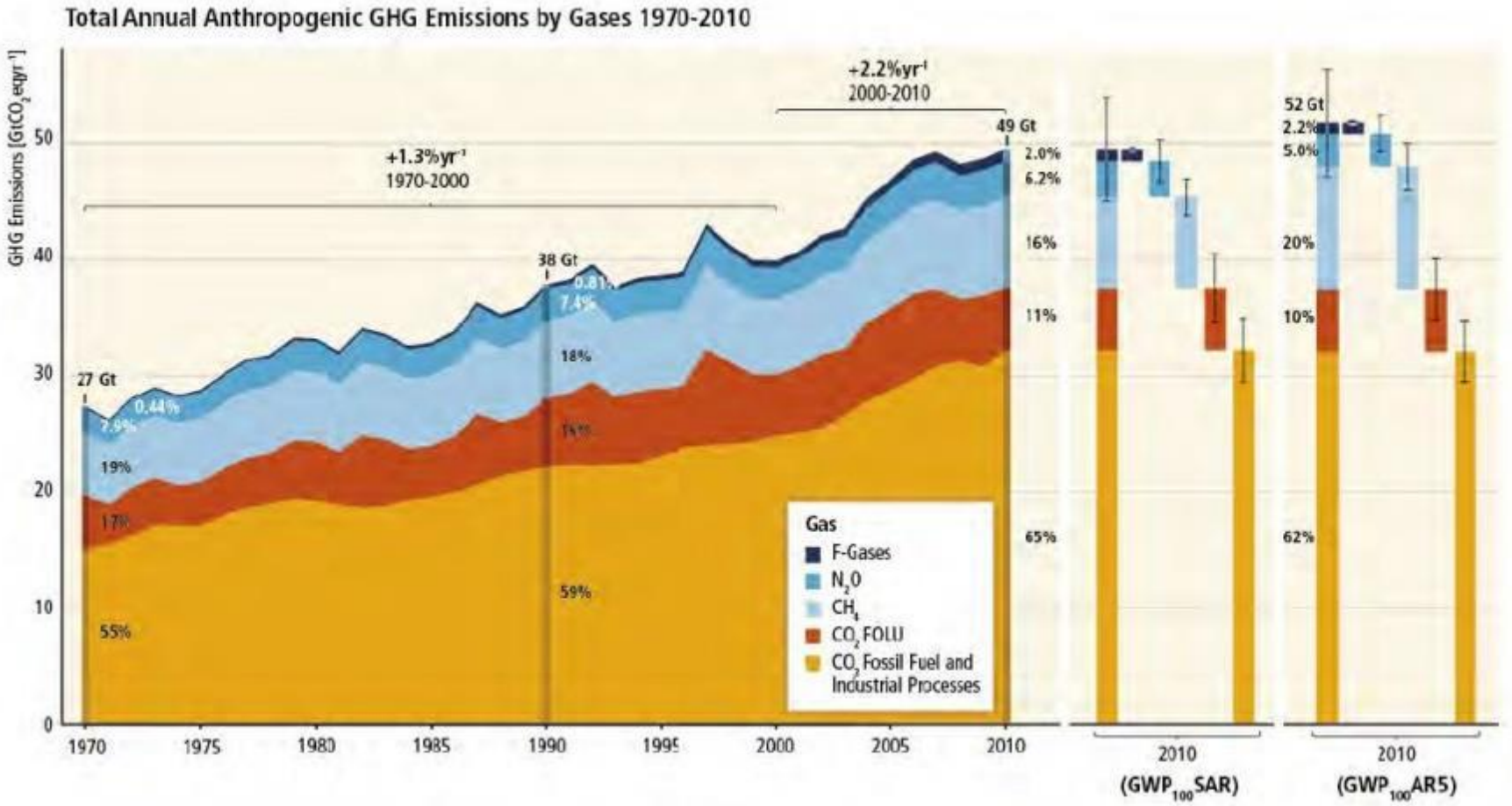
The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use change emissions.

Ocean Acidification

- **The ocean has absorbed about 30% of the emitted anthropogenic carbon dioxide, causing ocean acidification, and the pH of ocean surface water has decreased by 0.1.**



Emissions of GHGs



Anthropogenic greenhouse gas emissions in 2010 have reached 49 ± 4.5 GtCO2 eq/yr. The ocean has absorbed about 30% of the emitted anthropogenic CO2, causing ocean acidification. About half of the anthropogenic CO2 emissions between 1750 and 2011 have occurred in the last 40 years

Drivers of Climate Change

Total radiative forcing is positive, and has led to an uptake of energy by the climate system. The largest contribution to total radiative forcing is caused by the increase in the atmospheric concentration of CO2 since 1750.

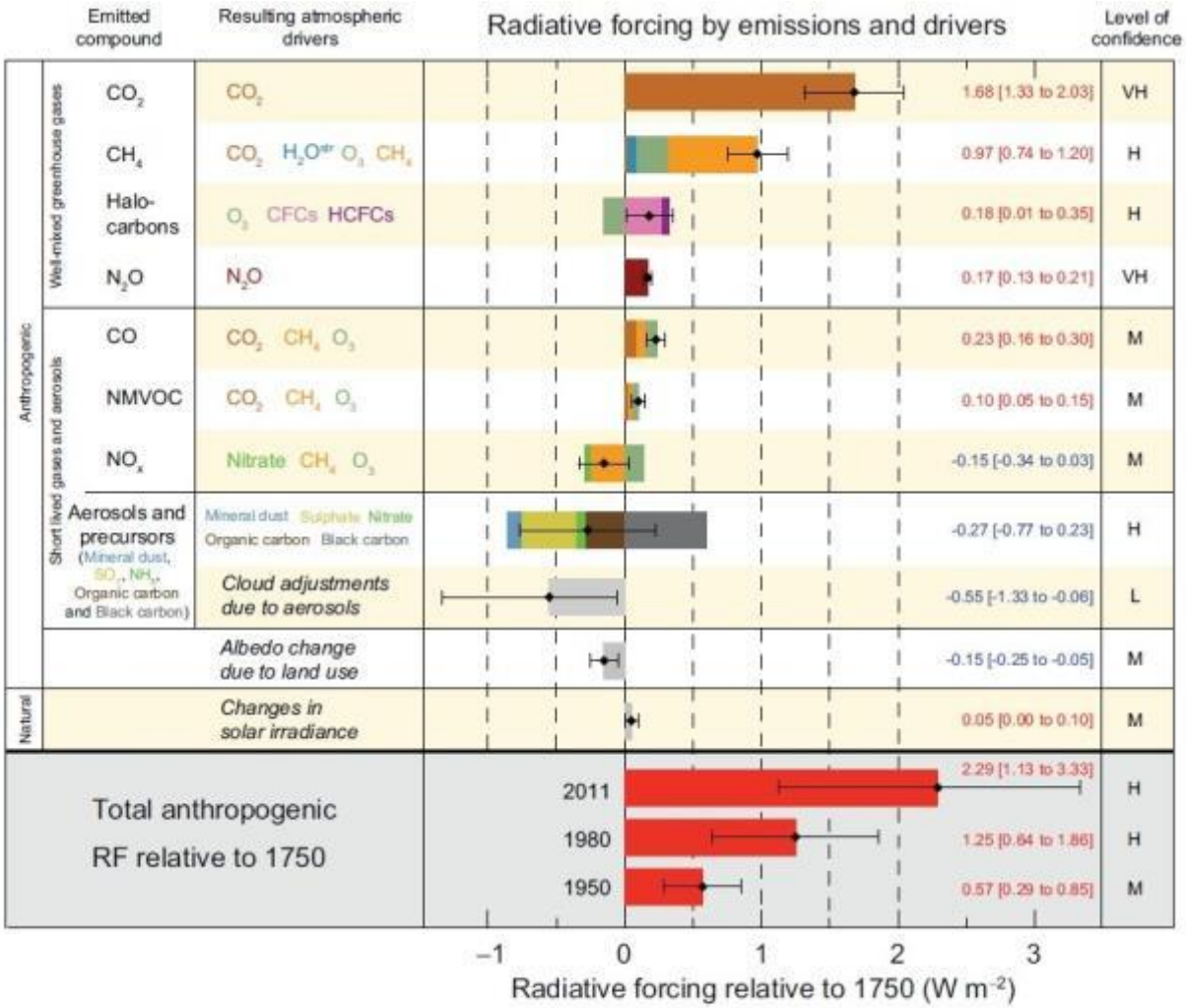
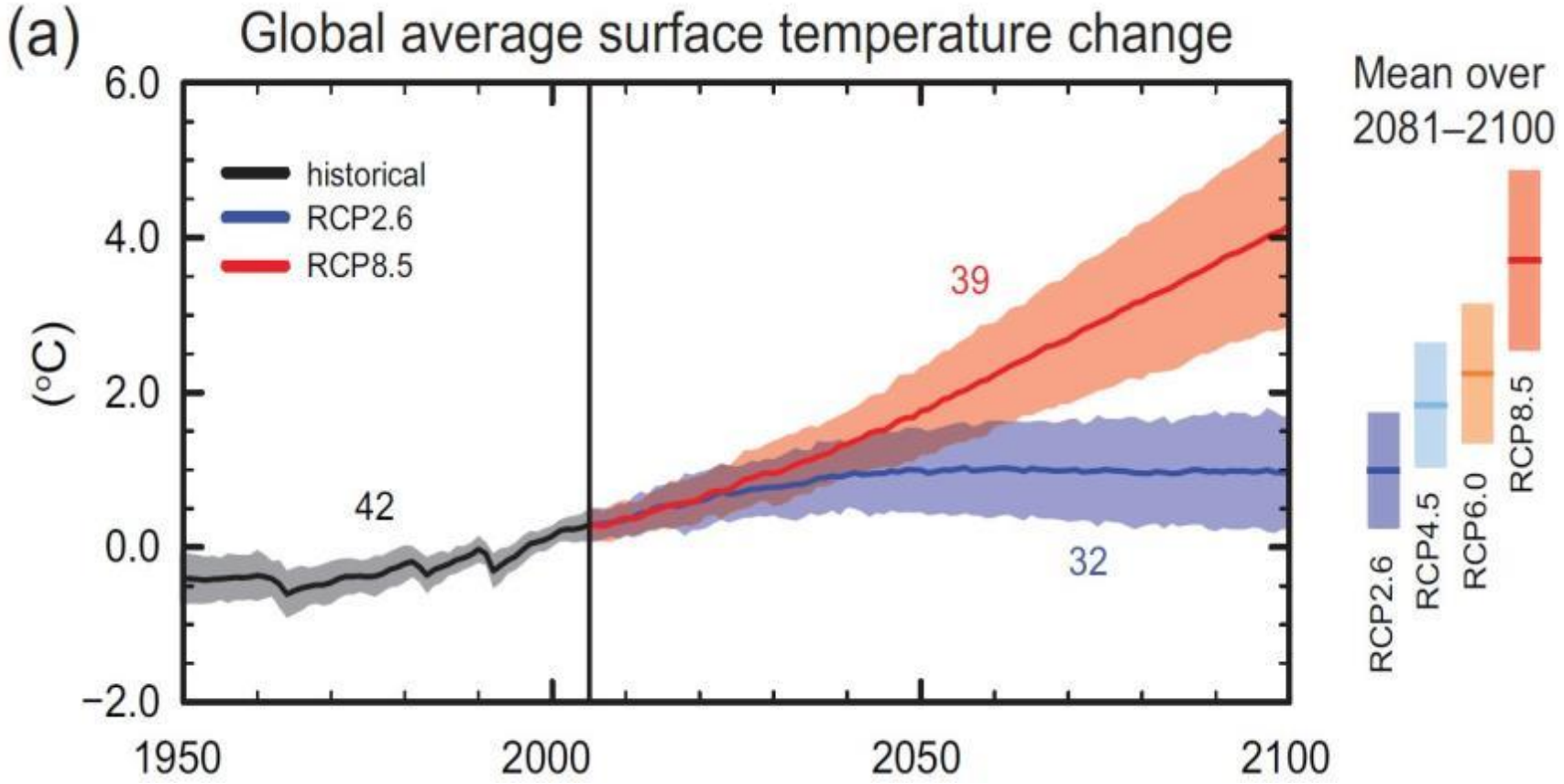


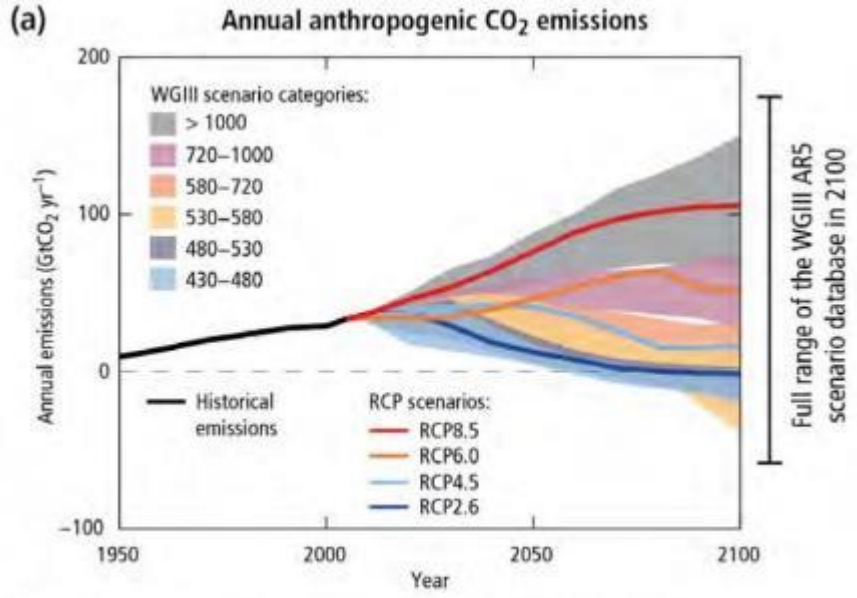
Figure SPM.5 | Radiative forcing estimates in 2011 relative to 1750 and aggregated uncertainties for the main drivers of climate change. Values are global average radiative forcing (RF[14]), partitioned according to the emitted compounds or processes that result in a combination of drivers. The best estimates of the net radiative forcing are shown as black diamonds with corresponding uncertainty intervals; the numerical values are provided on the right of the figure, together with the confidence level in the net forcing (VH – *very high*, H – *high*, M – *medium*, L – *low*, VL – *very low*). Albedo forcing due to black carbon on snow and ice is included in the black carbon aerosol bar. Small forcings due to contrails (0.05 W m^{-2}, including contrail induced cirrus), and HFCs, PFCs and SF_6 (total 0.03 W m^{-2}) are not shown. Concentration-based RFs for gases can be obtained by summing the like-coloured bars. Volcanic

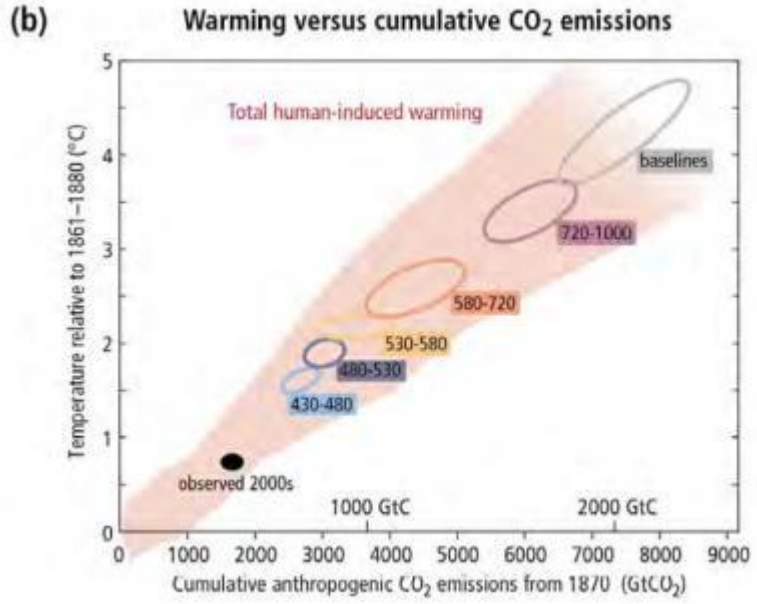
Climate Projections



- Future temperature change projections are based on RCPs (Representative Concentration Pathways). Projections at 2100 (relative to 1986-2005) range between RCP 2.6 <0.3-1.7> and RCP 8.5 <2.6-4.8>.

Climate Mitigation





- **Cumulative emissions of CO2 largely determine global mean surface warming by the late 21st century and beyond.**
- **Limiting total human-induced warming to less than 2° C relative to the period 1861-1880 with a probability of >66% would require cumulative CO2 emissions from all anthropogenic sources since 1870 to remain below about 2900 GtCO2 (with a range of 2550-3150 GtCO2 depending on non-CO2 drivers). About 1900 GtCO2 had already been emitted by 2011.**

International Climate Actions

UNFCCC
&
Kyoto Protocol

United Nations Framework Convention on Climate Change (UNFCCC)

- UNFCCC text was agreed upon in New York in May 1992, and opened for signature at UNCED in June 1992.
- The Convention entered into force on 21 March 1994.
- Currently, there are 194 Parties (193 States and 1 regional economic integration organization (EU)).
- It is a "framework" agreement, which sets forth the fundamental principles, and provides bases for concrete actions, such as the Kyoto Protocol.
- It contains many fundamental provisions, such as "ultimate objectives" and "common but differentiated responsibilities".

Kyoto Protocol & First Commitment Period (2008-2012)

- Adopted on 11th December 1997 at COP 3 in Kyoto.
- KP Annex B provides "Quantified emission limitation or reduction commitment" for Annex B Parties, which aims at their overall emissions by at least 5 per cent below 1990 levels in the commitment period, 2008 to 2012.
- To take effect, it required ratification by more than 55 UNFCCC Parties, and more than 55% of CO2 emissions (of 1990) by UNFCCC Annex-I Parties
- The Protocol provides for "Kyoto Mechanisms", which contain Emission Trading, Joint Implementation and Clean Development Mechanism). They are meant to (i) stimulate sustainable development through technology transfer and investment, (ii) help countries with Kyoto commitments to meet their targets by reducing emissions or removing carbon from the atmosphere in other countries in a cost-effective way and (iii) encourage the private sector and developing countries to contribute to emission reduction efforts.

Bali Action Plan (Decision 1/CP.13)

1. *Decides* to launch a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision at its fifteenth session, by addressing, inter alia:

   (b) (i) Measurable, reportable and verifiable nationally appropriate mitigation commitments or actions, including quantified emission limitation and reduction objectives, by all developed country Parties, while ensuring the comparability of efforts among them, taking into account differences in their national circumstances;

   (ii) Nationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner

   (iii) Policy approaches and positive incentives on issues relating to reducing emissions from deforestation and forest degradation in developing countries; the role of conservation, sustainable management of forests and enhancement of forest carbon stocks in developing countries;

   (iv) (Cooperative sectoral approaches and sector-specific actions,)

   (v) (Consequences)

   (c) (adaptation)

   (d) (Technology transfer)

   – …..

Ad Hoc Working Group on the Durban Platform for Enhanced Action

(COP17/CMP7, Dec. 2011)

- Parties are to develop **a protocol**, **another legal instrument** **or** **an agreed outcome with legal force under UNFCCC applicablele to all Parties**, and covering areas including, inter alia, on mitigation, adaptation, finance, technology development and transfer, transparency of action, and support and capacity-building, drawing upon submissions (by 28th February 2012), though an AWG-DPEA. It initiated its work from first half of 2012. It shall complete its work as early as possible **but no later than 2015**.
- *Further decided that the process shall raise the level of ambition and shall be informed, inter alia, by the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, the outcomes of the 2013?2015 review and the work of the subsidiary bodies;*

Outcome from COP18/CMP8 (2012, Doha)

- In Doha, Qatar, on 8 December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted.
- The second commitment period under the Kyoto Protocol began on 1 January 2013 and end on 31 December 2020.
- Adopted I: Annex B Table, II: Gases (NF_3 Added), III: KP Amendments.
- A total of 144 instruments of acceptance are required for the entry into force of the amendment. As of 28 May 2015, 32 countries have ratified the Doha Amendment.

Outcome from COP19/CMP9 (2013, Warsaw)

- Discussions towards “2020 Agreement” continued, showing difficulties. Ambition level and gigatonne gap continues to be problematic.
- Finance, Loss and Damage were the most difficult negotiation issues, and will continue to be so.
- REDD+ decisions were adopted, but some technical issues were not finalised to enable CP-2 ratification.

Outcome from COP20, Lima

- COP20 (December 2015 in Lima) adopted, among others, “Lima Call for Climate Action”,
  - This is the decision on **INDC (intended nationally determined contribution** towards achieving the objective of the Convention as set out in its Article 2.), in which;
  - Parties are requested to submit INDC well-in-advance of COP21 (November 2015 in Paris), if possible in the first Quarter of 2015. INDCs submitted by 1 October 2015 will be contained in the Synthesis report by 1 November.
  - Elements of INDCs are contained in the Annex, but INDC is very much of voluntary nature.

Towards COP21/CMP11

- INDCs: As of 27th July 2015, 21 Parties have submitted INDCs. http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx

- COP21 will be held in Paris on 30th November – 11th December 2015.