

Climate Science and International Cooperation

<Personal notes for brain-storming>

26th January 2018

@GEOC

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Contents

- Climate Science - Intergovernmental Panel on Climate Change (IPCC)
- UNFCCC

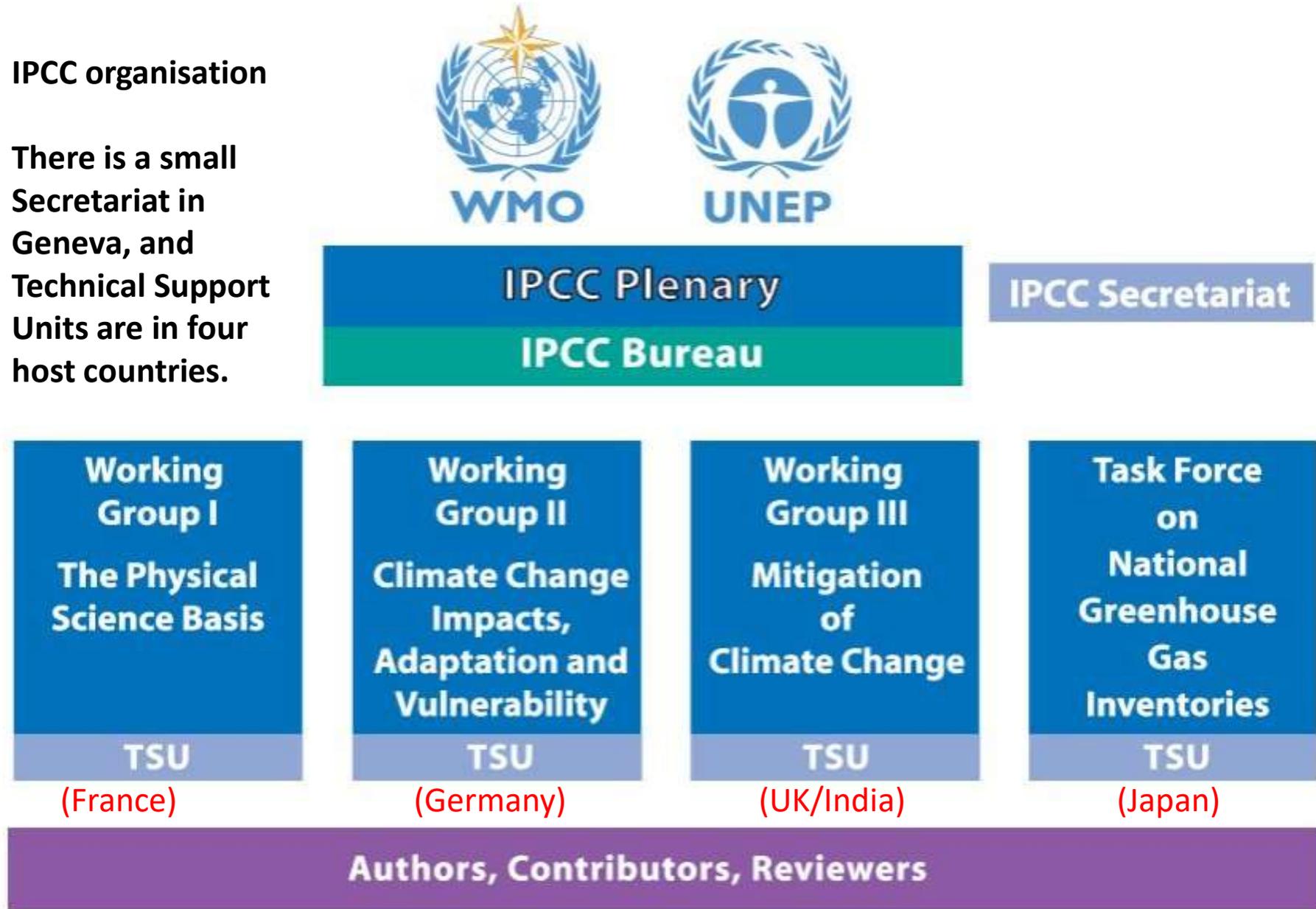
“IPCC” (Intergovernmental Panel on Climate Change)
<<http://www.ipcc.ch/>>

- Established by UNEP and WMO in 1988.
- Members are Governments Currently 195
- Reports have been prepared by;
 - Authors A few thousands
 - Other contributors More than 10,000 (?)
 - Secretariat
 - Central Secretariat in Geneva
 - Technical Support Units, and their supporting organisations (such as the IGES)

**IPCC carries out assessment of peer-reviewed literature,
IPCC does not carry out research nor recommend any policies.
“IPCC should be policy-relevant but not policy-prescriptive.”**

IPCC organisation

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



2015 IPCC Bureau Members



Working Group I The Physical Science Basis	Working Group II Impacts, Adaptation, and Vulnerability	Working Group III Mitigation of Climate Change	Task Force Bureau National Greenhouse Gas Inventories
Co-chairs	Co-chairs	Co-chairs	Co-chairs
Valérie Masson-Delmotte (France)	Hans-Otto Pörtner (Germany)	Jim Skea (United Kingdom)	Kiyoto Tanabe (Japan)
Panmao Zhai (China)	Debra Roberts (South Africa)	Priyadarshi R. Shukla (India)	Eduardo Csirko Buendía (Peru)

IPCC Bureau is composed of the following. a.+b.+c. are members of the Executive Committee (See Left)

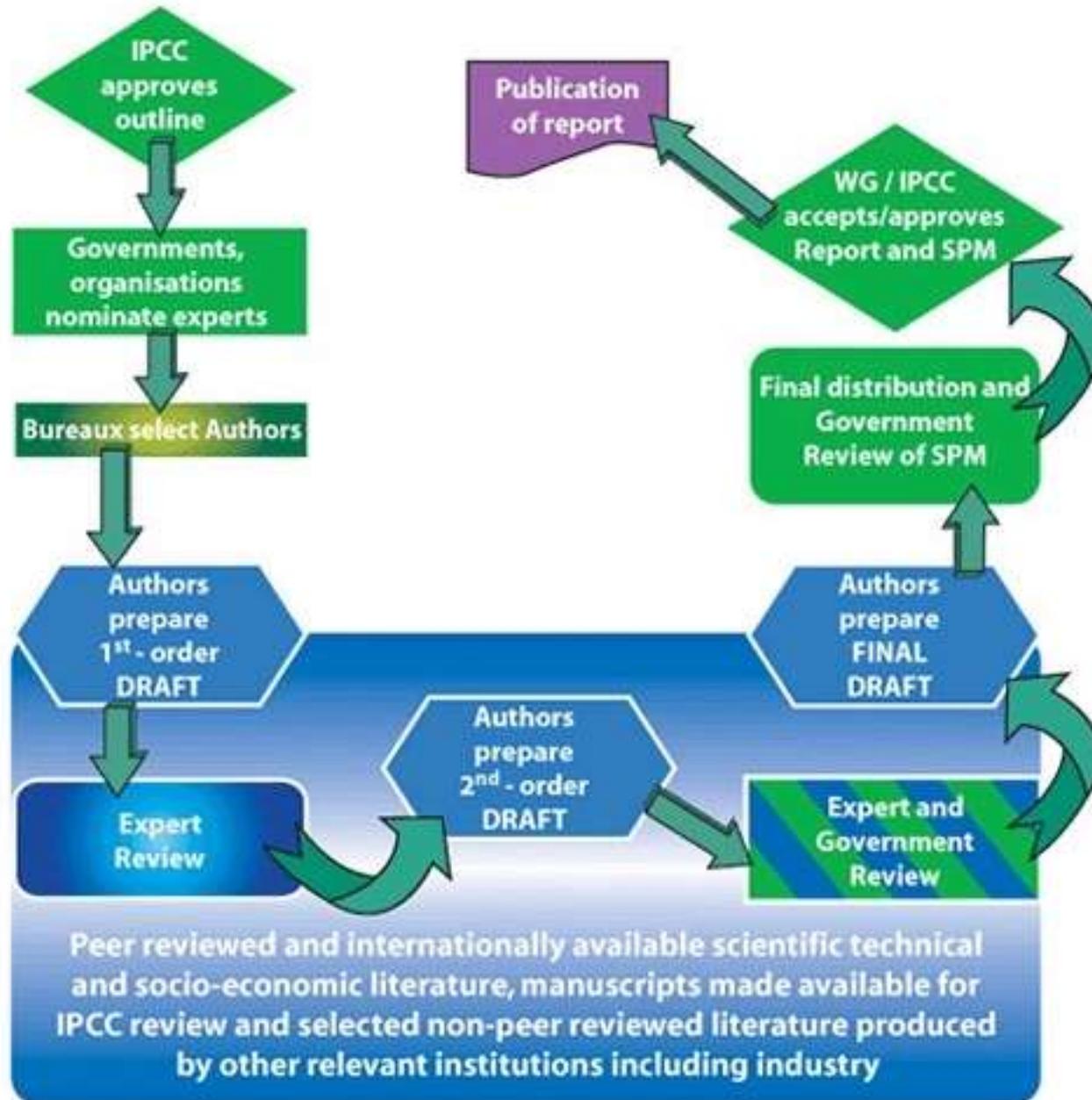
- a. Chair (1)
- b. IPCC Vice-chairs (3)
- c. WG & TFI Co-chairs (8)
- d. WG-Vice-chairs (22)
- e. TFB members (14)

Stepwise election is carried out for:
 (i) Chair, (ii) IPCC Vice-chairs, (iii) WG & TFI Co-chairs, (iv) WG Vice Chairs, (v) TFB members
 Rules exist on regional distribution.

Note: Mr. Kiyoto Tanabe is my successor.

http://ipcc.ch/organization/organization_structure.shtml#

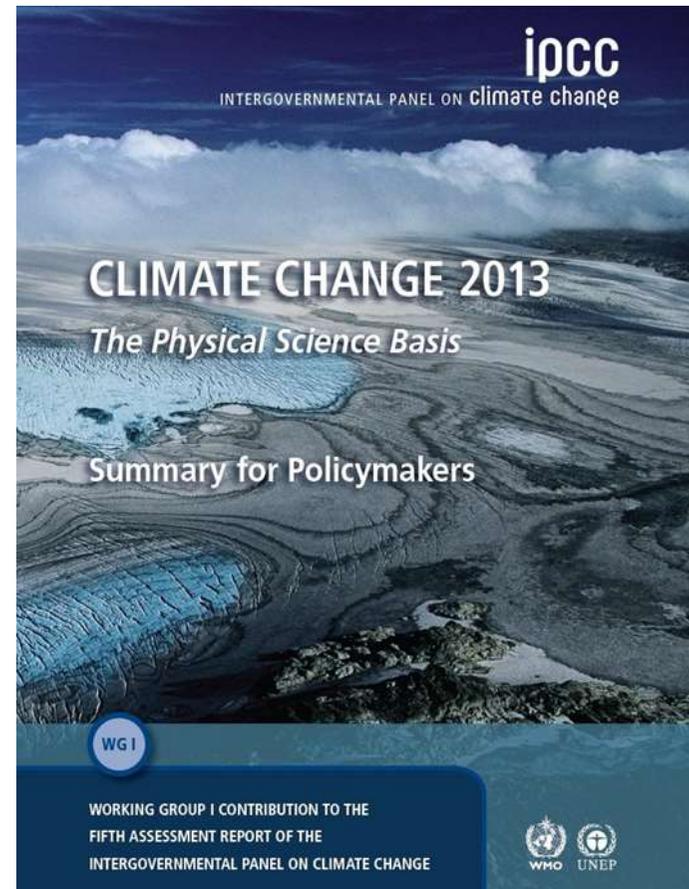
IPCC Writing and Review Process



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

Example WG-I AR5

Prepared by 259 authors.
54,677 comments received.
Approved by the Panel
in September 2013



SPM

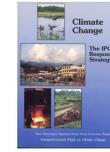
http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf

Full Report

http://www.climatechange2013.org/images/report/WG1AR5_ALL_FINAL.pdf

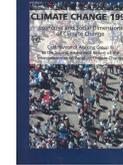
First Assessment Report (1990) (FAR)

第1次アセスメント報告書: 国連温暖化条約
の2年前。



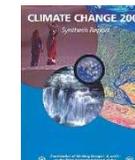
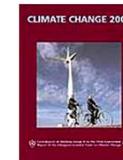
Second Assessment Report (1995) (SAR)

第2次アセスメント報告書: 京都議定書締
結の2年前。



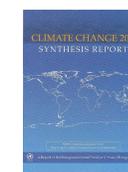
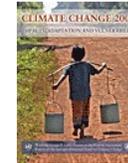
Third Assessment Report (2001) (TAR)

第3次アセスメント報告書: 各国が京都議
定書の批准を検討している時期に出され
た。



Fourth Assessment Report (2007) (AR4)

第4次アセスメント報告書: 2013年以降
の国際合意の検討の時期に出された。



Fifth Assessment Report (2013-14) (AR5)

第5次アセスメント報告書



WG-I

WG-II

WG-III

Synthesis Report
(統合報告書)

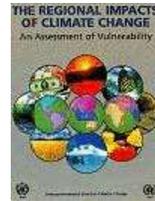
2007 Nobel Peace Prize!

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".

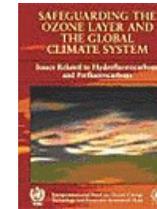


IPCC Special Reports

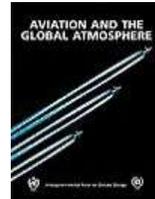
Regional Impacts
(1997)



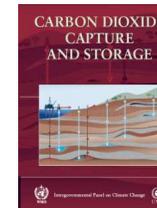
Ozone
Layer
(2005)



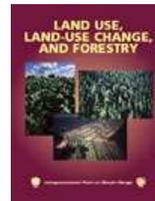
Aviation
(1999)



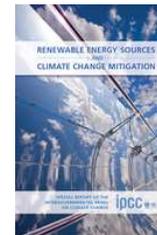
CO2
Capture
and Storage
(2005)



LUCF (2000)



Renewable
Energy
(May 2011)



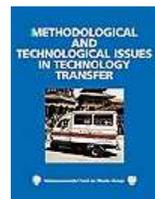
Emission Scenarios
(2000)



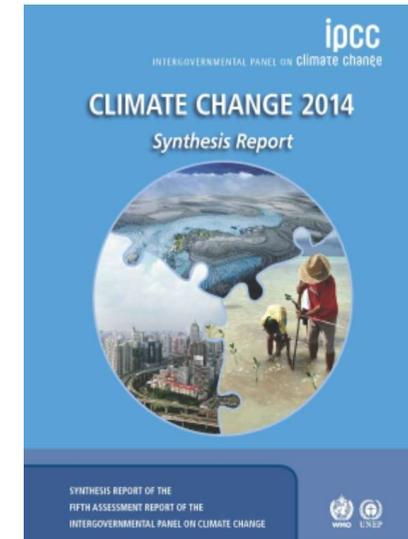
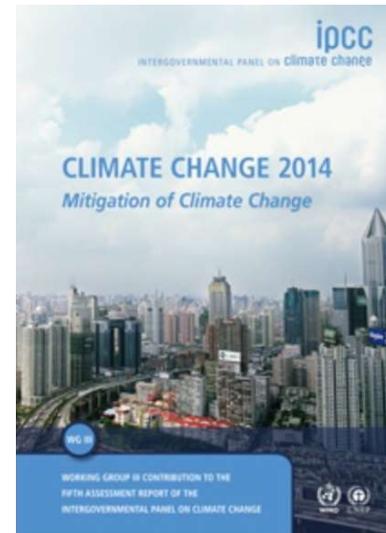
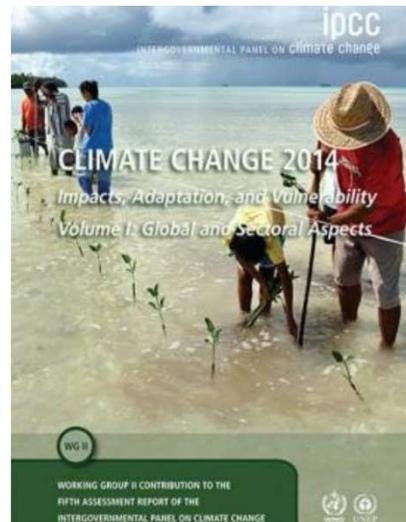
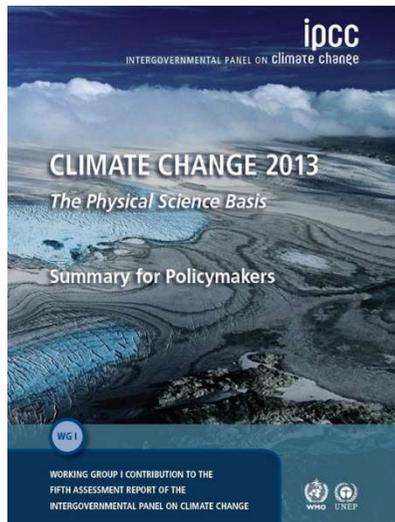
Extreme Events
and Disasters
(November
2011)



Technology
Transfer (2000)



IPCC 5th Assessment Report (AR5)



IPCC Panel Sessions approved Working Group AR5 Report 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.

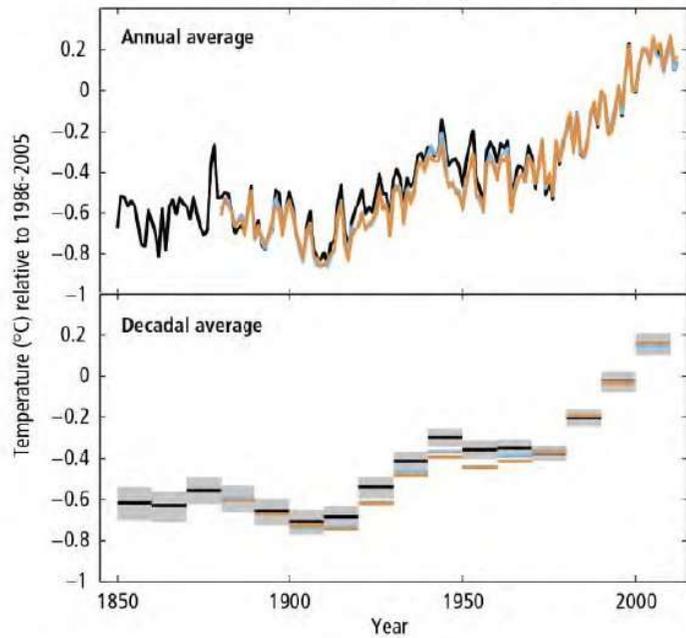
<<http://www.ipcc.ch/>>

Overall Summary

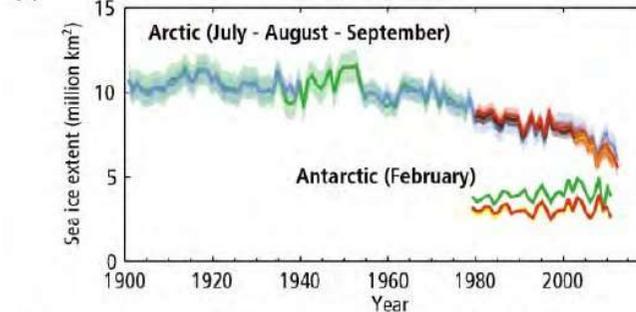
- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.
- Continued emission of greenhouse gases will cause further warming and long-lasting changes 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

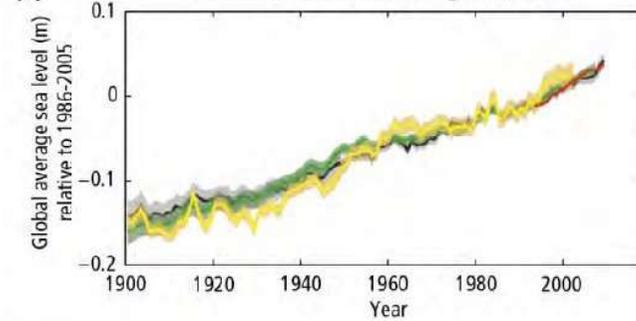
(a) Observed globally averaged combined land and ocean surface temperature anomaly 1850–2012



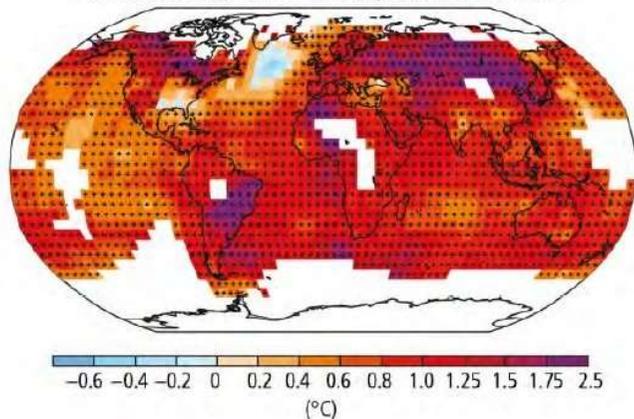
(c) Sea ice extent



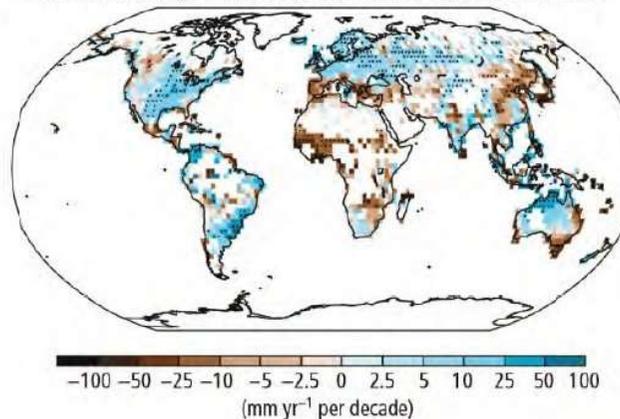
(d) Global mean sea level change 1900-2010



(b) Observed change in surface temperature 1901–2012



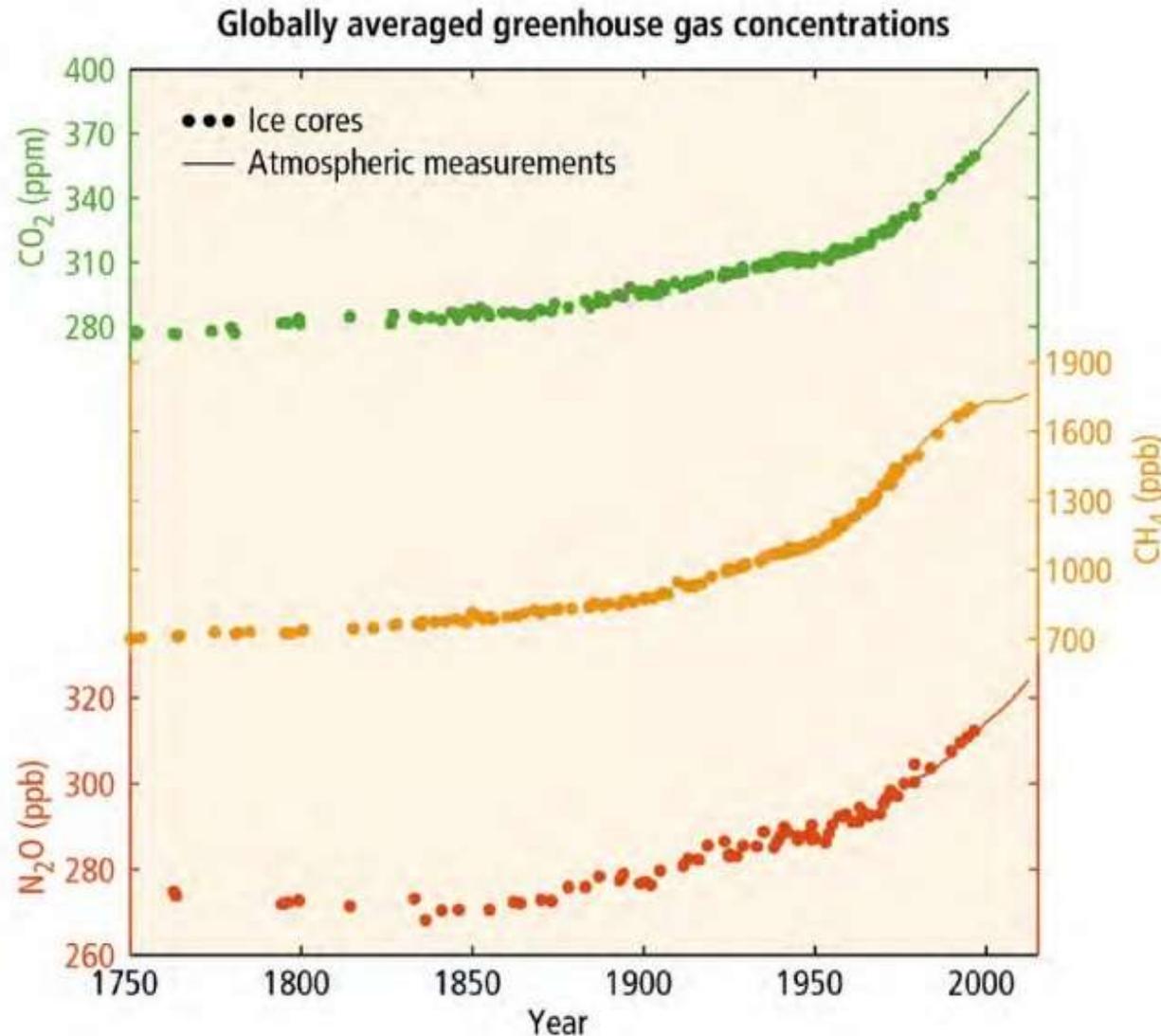
(e) Observed change in annual precipitation over land 1951–2010



- 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.

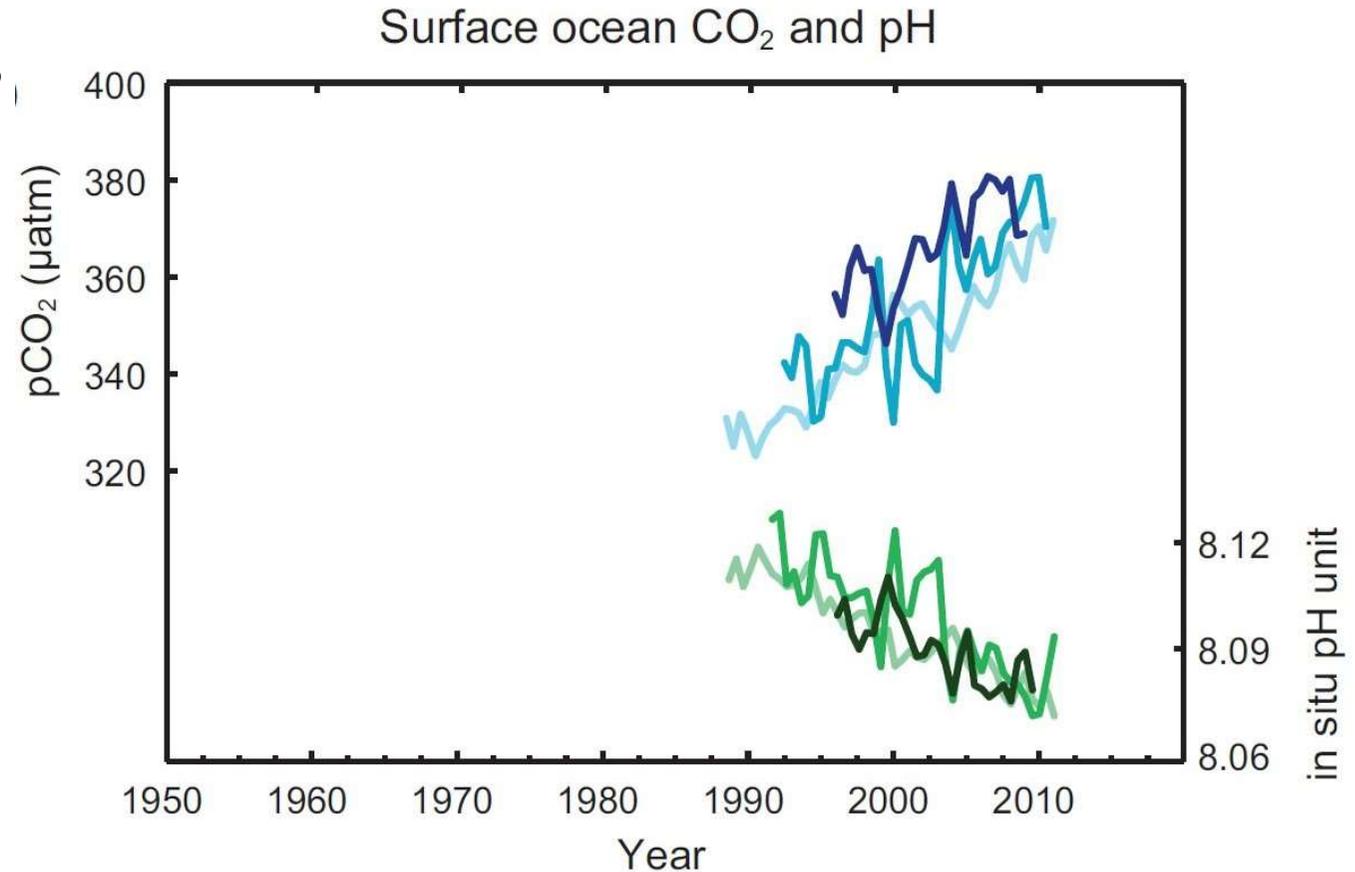
Atmospheric GHG Concentrations

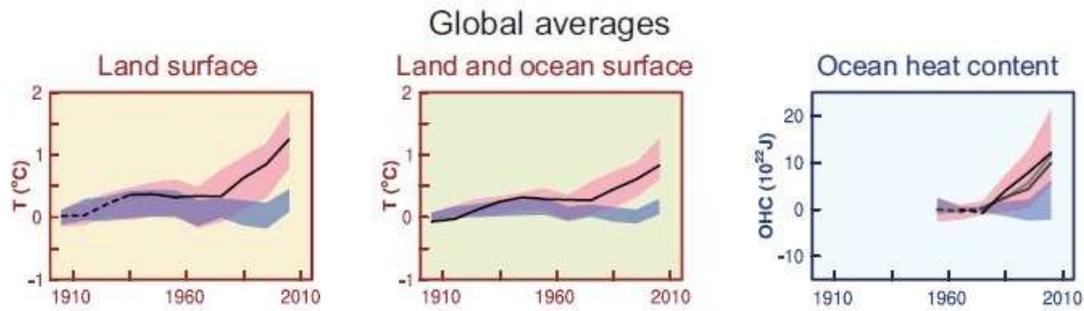
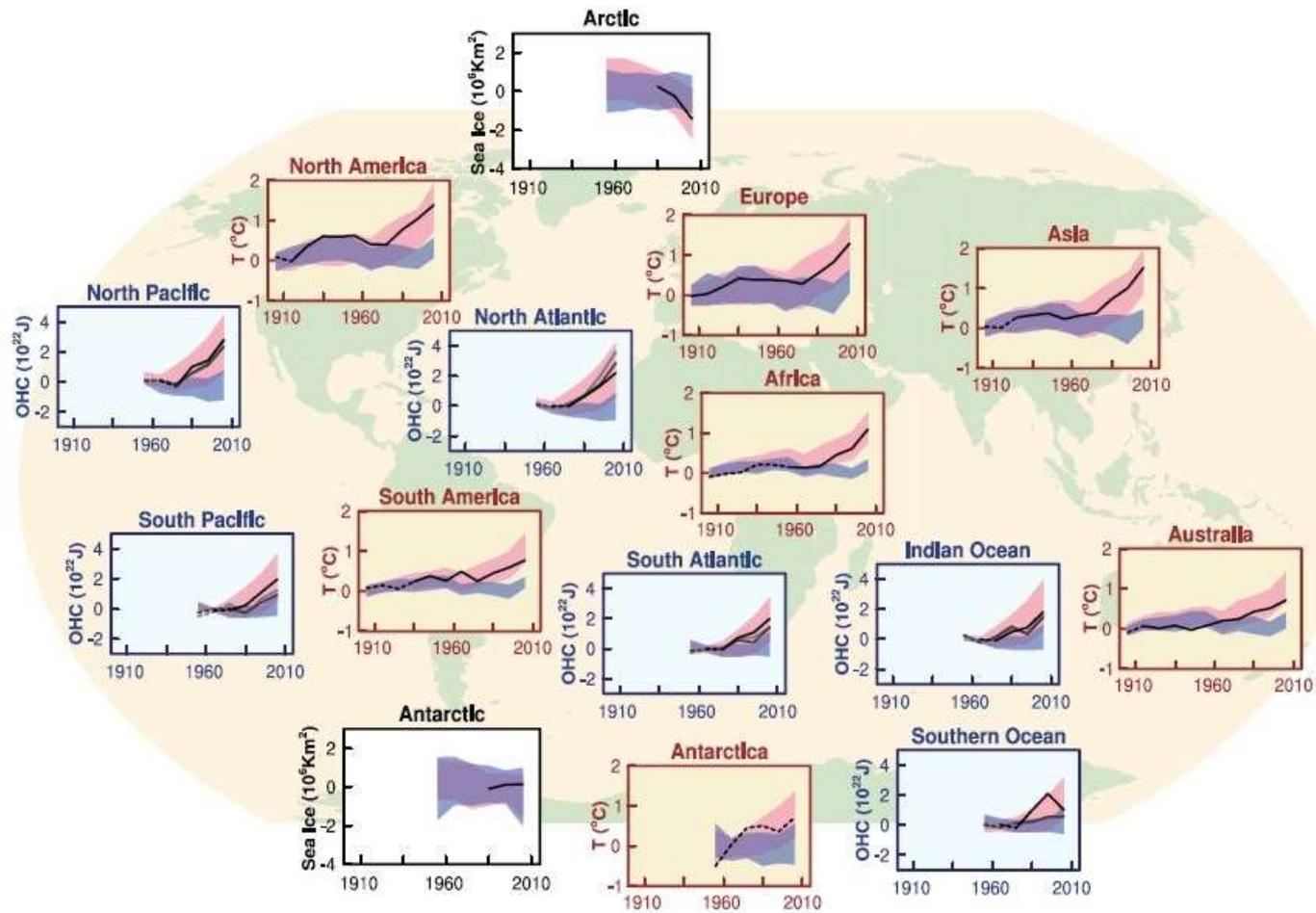


The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use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



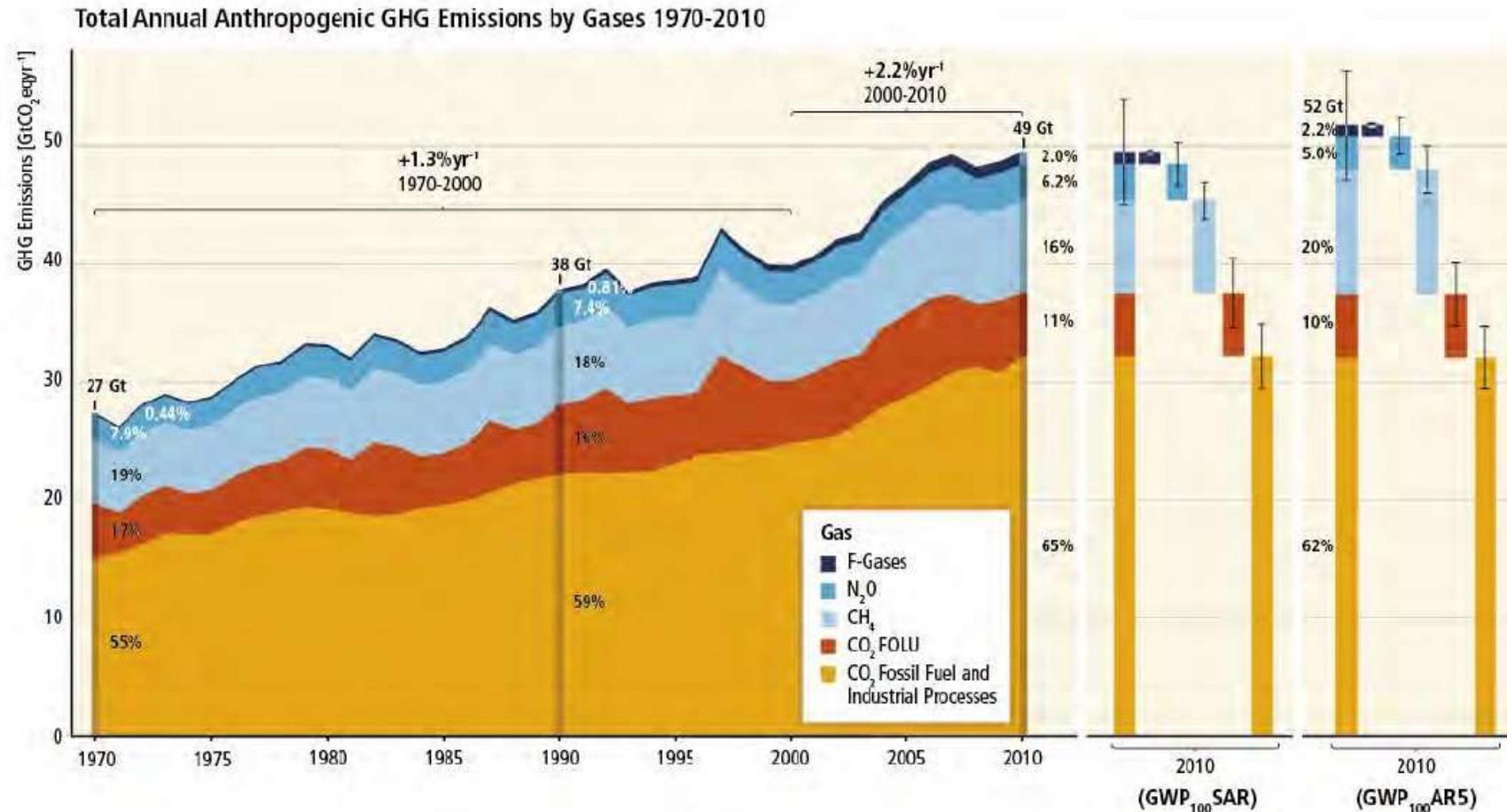


≡ Observations

■ Models using only natural forcings

■ Models using both natural and anthropogenic forcings

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.

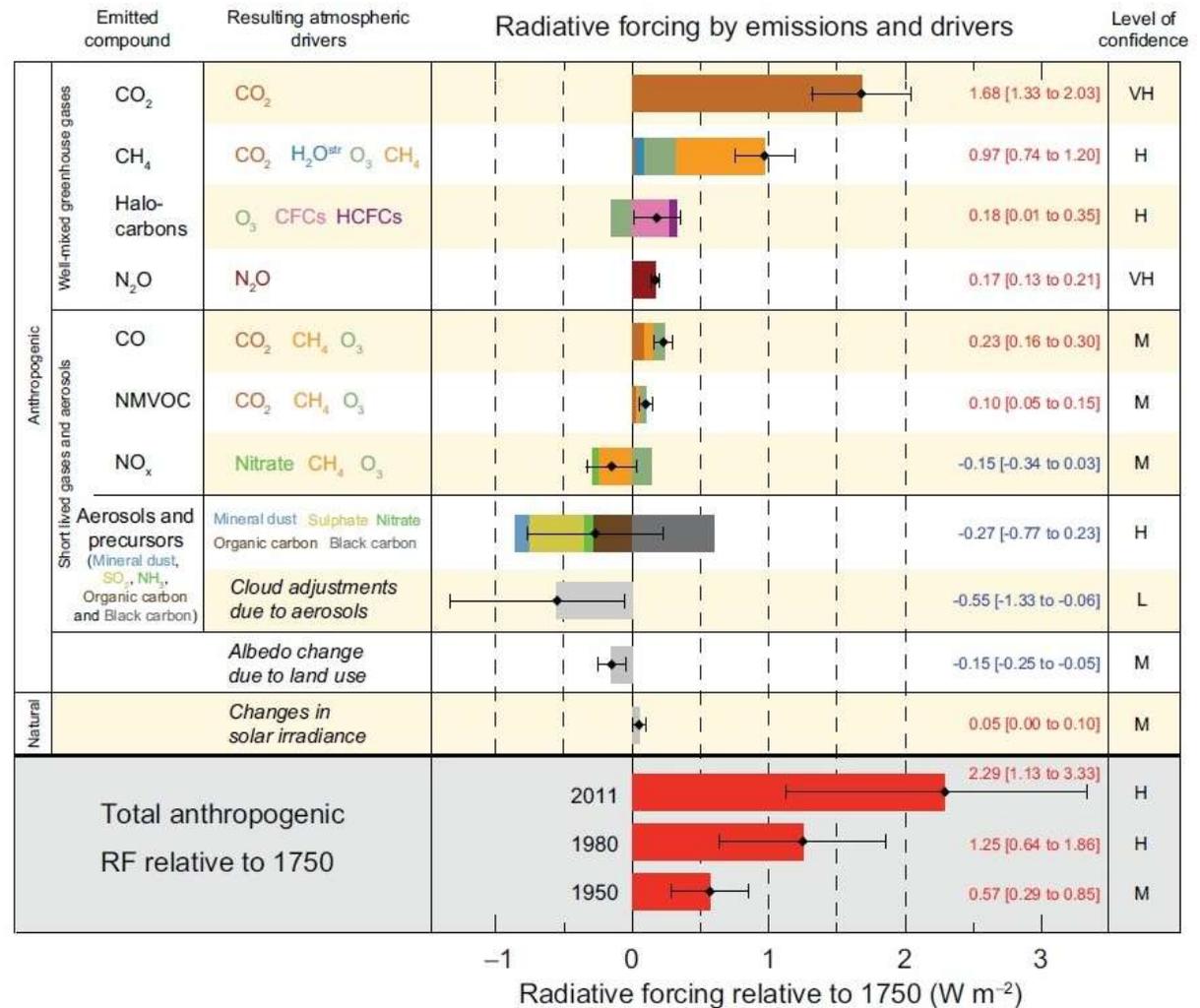
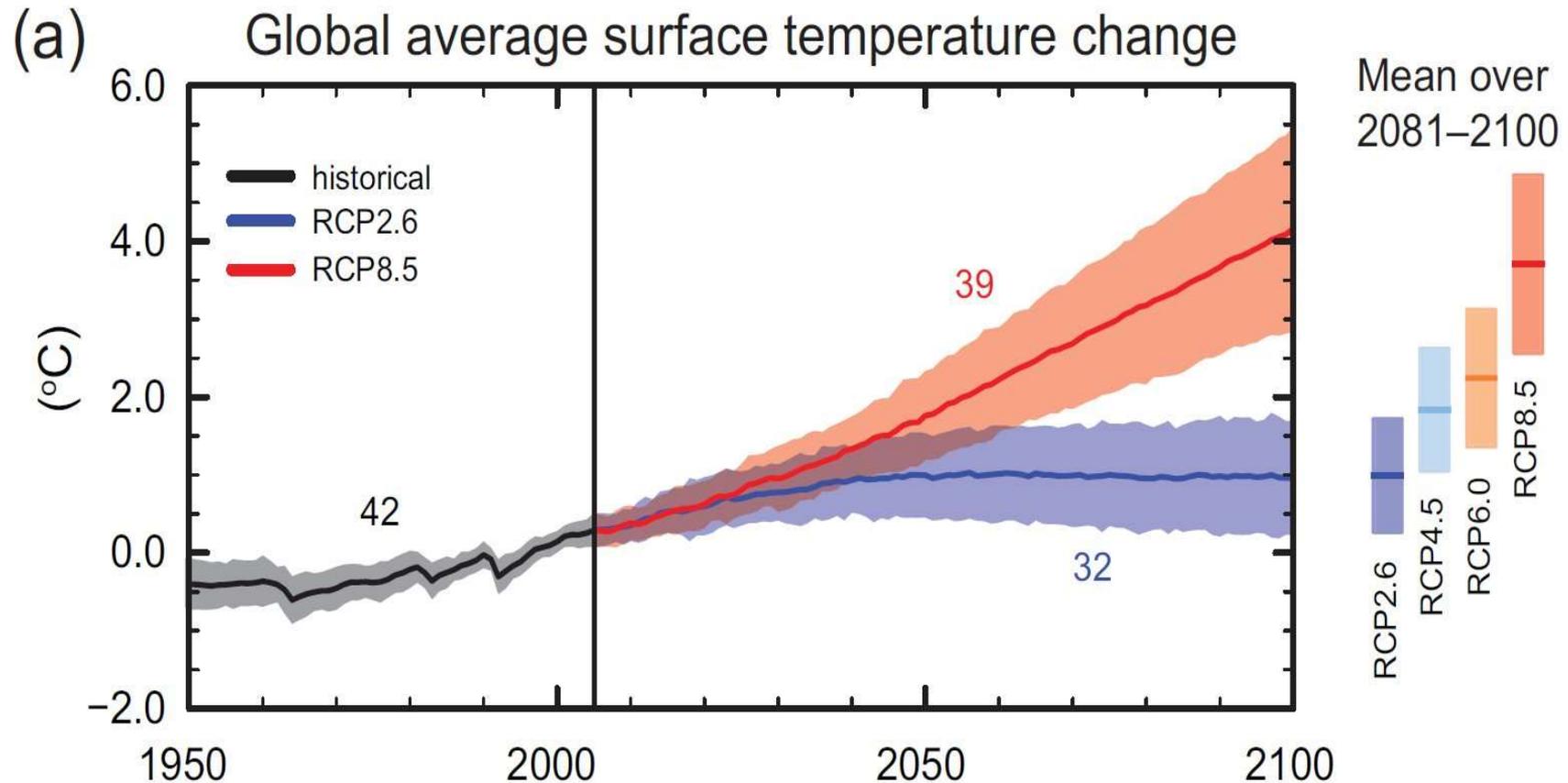


Figure SPM.5 | Radiative forcing estimates in 2011 relative to 1750 and aggregated uncertainties for the main drivers of climate change. Values are global average radiative forcing (RF¹⁴), partitioned according to the emitted compounds or processes that result in a combination of drivers. The best estimates 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 SF₆ (total 0.03 W m⁻²) are not shown. Concentration-based RFs for gases can be obtained by summing the like-coloured bars. Volcanic

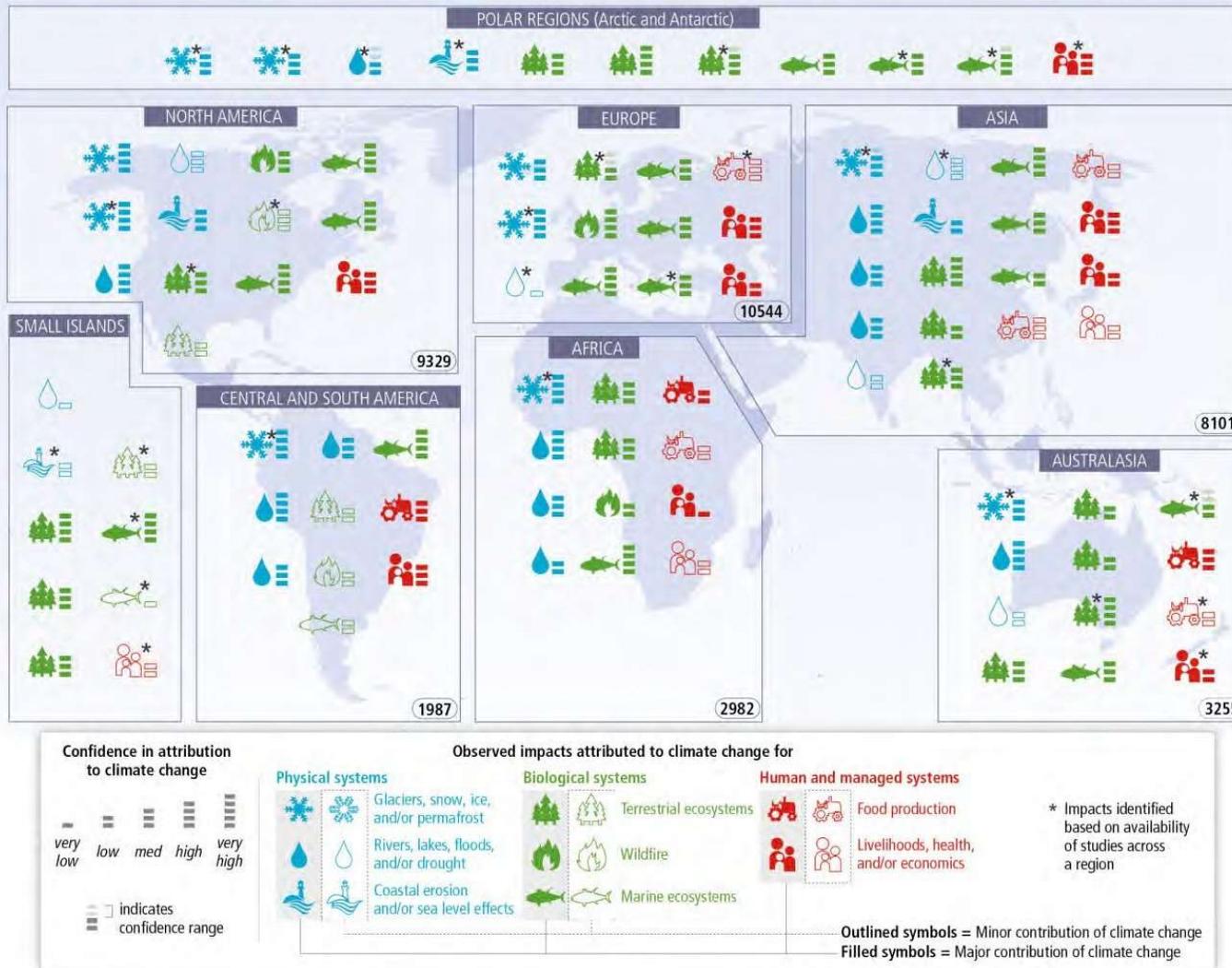
Climate Projections



- 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>**.

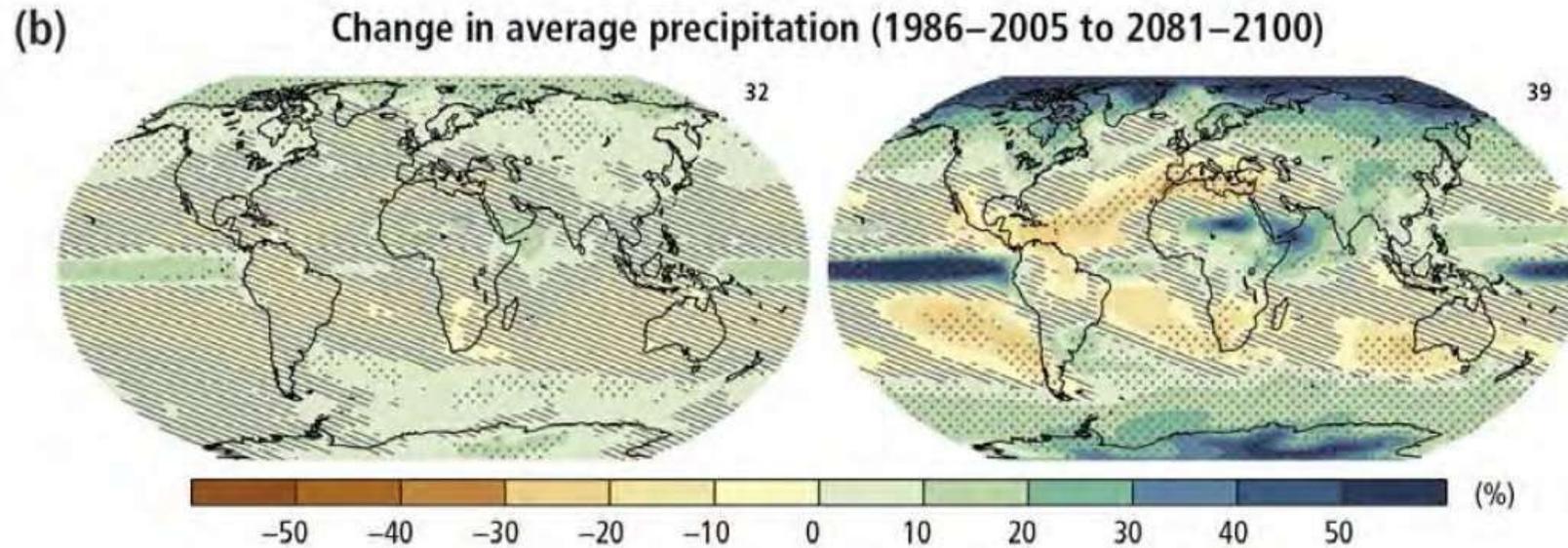
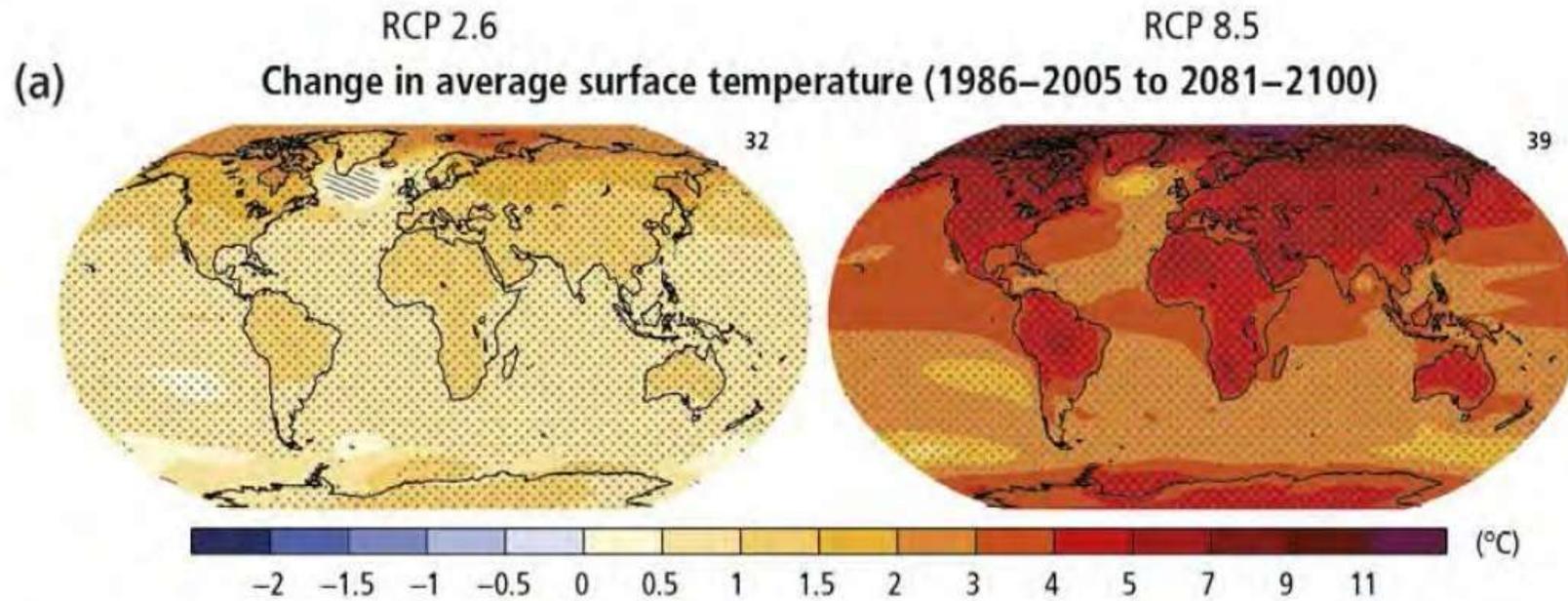
Climate Impacts

Widespread impacts attributed to climate change based on the available scientific literature since the AR4

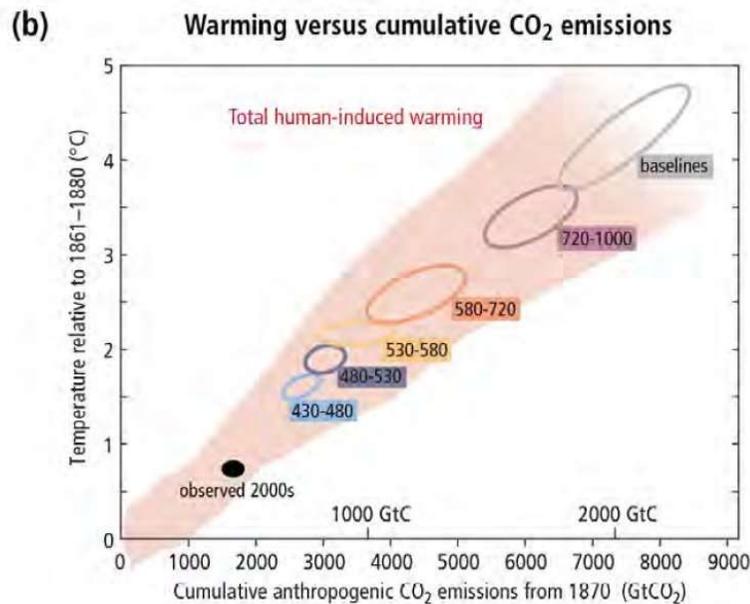
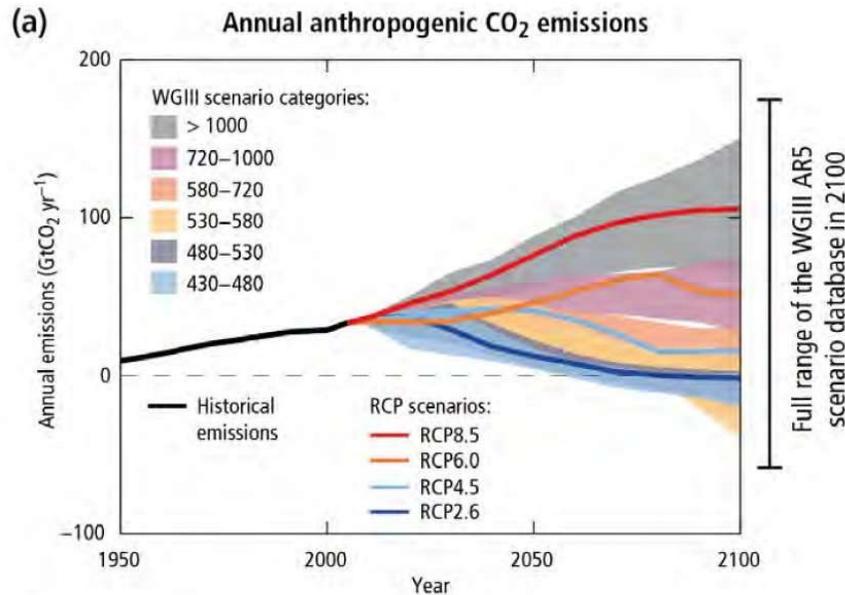


- It is generally considered that the long-term climate changes are yet to occur, but there have been many scientific literature reporting on impacts, including extreme climatic events since 1950s.)

Future Projections



Climate Mitigation – “Carbon Budget”



- 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.

Key Risks in Asia

Asia	
Snow & Ice, Rivers & Lakes, Floods & Drought	<ul style="list-style-type: none"> Permafrost degradation in Siberia, Central Asia, and Tibetan Plateau (<i>high confidence</i>, major contribution from climate change) Shrinking mountain glaciers across most of Asia (<i>medium confidence</i>, major contribution from climate change) Changed water availability in many Chinese rivers, beyond changes due to land use (<i>low confidence</i>, minor contribution from climate change) Increased flow in several rivers due to shrinking glaciers (<i>high confidence</i>, major contribution from climate change) Earlier timing of maximum spring flood in Russian rivers (<i>medium confidence</i>, major contribution from climate change) Reduced soil moisture in north-central and northeast China (1950–2006) (<i>medium confidence</i>, major contribution from climate change) Surface water degradation in parts of Asia, beyond changes due to land use (<i>medium confidence</i>, minor contribution from climate change) <p>[24.3, 24.4, 28.2, Tables 18-5, 18-6, and SM24-4, Box 3-1; WGI AR5 4.3, 10.5]</p>
Terrestrial Ecosystems	<ul style="list-style-type: none"> Changes in plant phenology and growth in many parts of Asia (earlier greening), particularly in the north and east (<i>medium confidence</i>, major contribution from climate change) Distribution shifts of many plant and animal species upwards in elevation or polewards, particularly in the north of Asia (<i>medium confidence</i>, major contribution from climate change) Invasion of Siberian larch forests by pine and spruce during recent decades (<i>low confidence</i>, major contribution from climate change) Advance of shrubs into the Siberian tundra (<i>high confidence</i>, major contribution from climate change) <p>[4.3, 24.4, 28.2, Table 18-7, Figure 4-4]</p>
Coastal Erosion & Marine Ecosystems	<ul style="list-style-type: none"> Decline in coral reefs in tropical Asian waters, beyond decline due to human impacts (<i>high confidence</i>, major contribution from climate change) Northward range extension of corals in the East China Sea and western Pacific, and of a predatory fish in the Sea of Japan (<i>medium confidence</i>, major contribution from climate change) Shift from sardines to anchovies in the western North Pacific, beyond fluctuations due to fisheries (<i>low confidence</i>, major contribution from climate change) Increased coastal erosion in Arctic Asia (<i>low confidence</i>, major contribution from climate change) <p>[6.3, 24.4, 30.5, Tables 6-2 and 18-8]</p>
Food Production & Livelihoods	<ul style="list-style-type: none"> Impacts on livelihoods of indigenous groups in Arctic Russia, beyond economic and sociopolitical changes (<i>low confidence</i>, major contribution from climate change) Negative impacts on aggregate wheat yields in South Asia, beyond increase due to improved technology (<i>medium confidence</i>, minor contribution from climate change) Negative impacts on aggregate wheat and maize yields in China, beyond increase due to improved technology (<i>low confidence</i>, minor contribution from climate change) Increases in a water-borne disease in Israel (<i>low confidence</i>, minor contribution from climate change) <p>[7.2, 13.2, 18.4, 28.2, Tables 18-4 and 18-9, Figure 7-2]</p>

Adaptation & Mitigation

- **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.**
- **Effective adaptation and mitigation responses will depend on policies and measures across multiple scales: international, regional, national and sub-national. Policies across all scales supporting technology development, diffusion and transfer, as well as finance for responses to climate change, can complement and enhance the effectiveness of policies that directly promote adaptation and mitigation.**

Mitigation

- **There are multiple mitigation pathways that are *likely* to limit warming to below 2° C relative to pre-industrial levels. These pathways would require substantial emissions reductions over the next few decades and near zero emissions of CO₂ and other long-lived GHGs by the end of the century.**
- **Implementing such reductions poses substantial technological, economic, social, and institutional challenges, which increase with delays in additional mitigation and if key technologies are not available.**
- **Mitigation options are available in every major sector. Mitigation can be more cost-effective if using an integrated approach that combines measures to reduce energy use and the GHG intensity of end-use sectors, decarbonize energy supply, reduce net emissions and enhance carbon sinks in land-based sectors.**
- **Climate change is a threat to sustainable development. Nonetheless, there are many opportunities to link mitigation, adaptation and the pursuit of other societal objectives through integrated responses.**

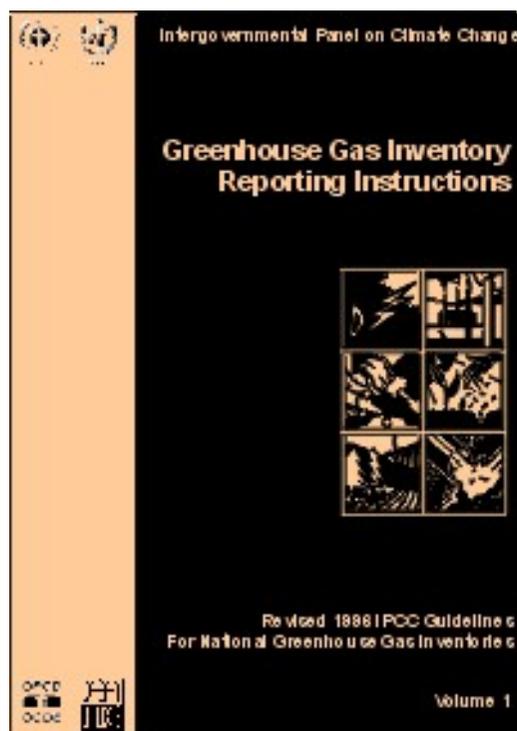
IPCC GHG Inventories Programme

IPCC - NGGIP Products

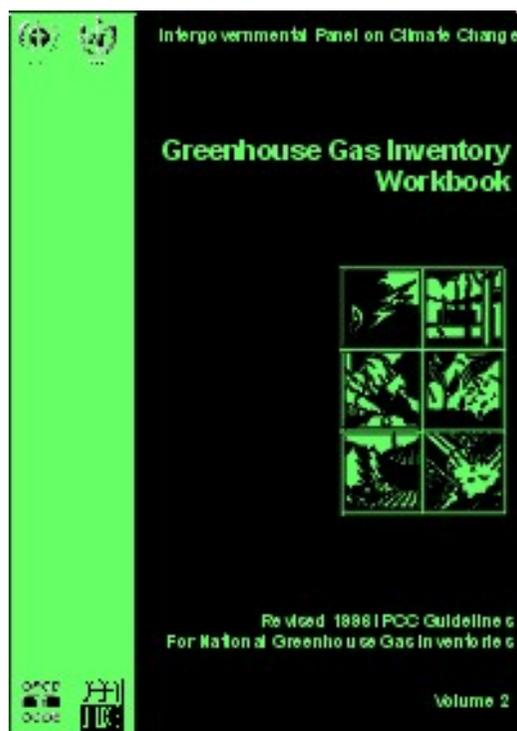
“1995” and “Revised 1996” IPCC Guidelines for National Greenhouse Gas Inventories

<<http://www.ipcc-nggip.iges.or.jp/public/gl/invs1.htm>>

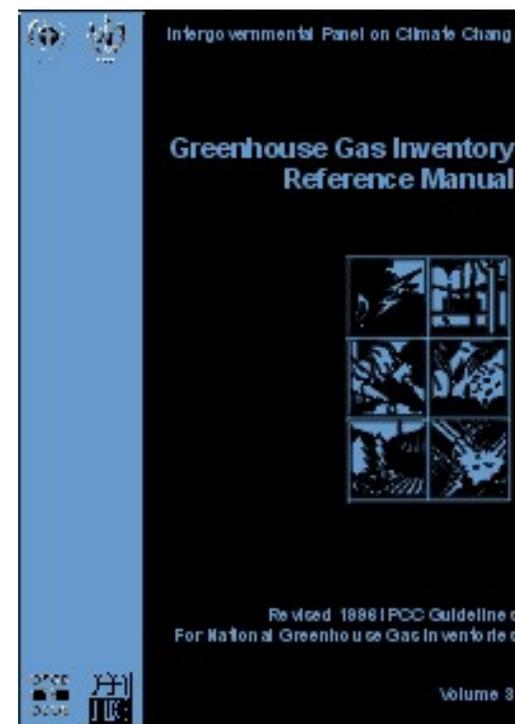
(cf. COP Decisions [4/CP.1](#), [9/CP.2](#), [2/CP.3](#) & [17/CP.8](#))



Volume 1
Reporting
Instructions



Volume 2
Workbook
+
IPCC Software

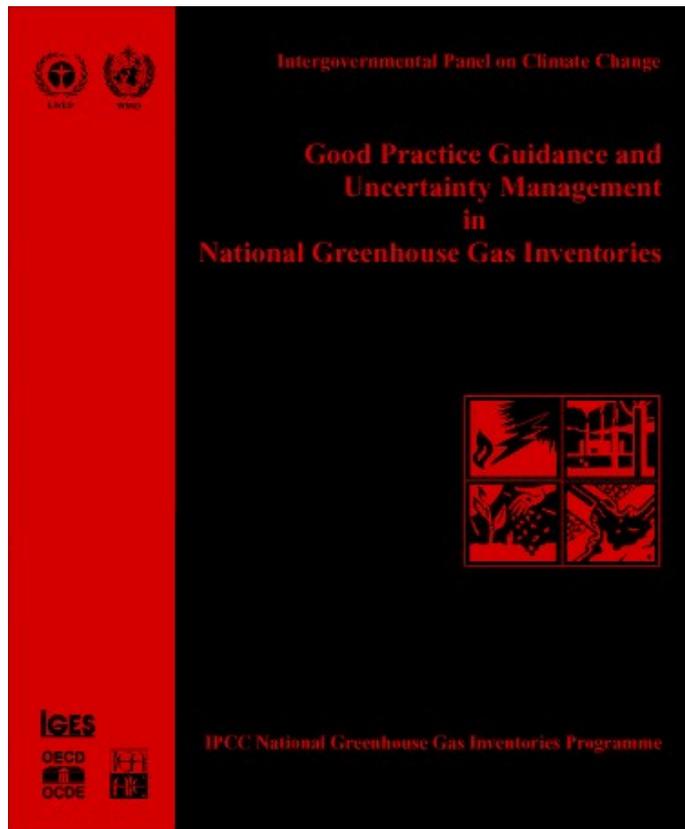


Volume 3
Reference
Manual

IPCC NGGIP Products

IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories “GPG-2000”

<<http://www.ipcc-nggip.iges.or.jp/public/gp/english/>> (All UN language versions)



Complements the Revised
1996 IPCC Guidelines

published in 2000

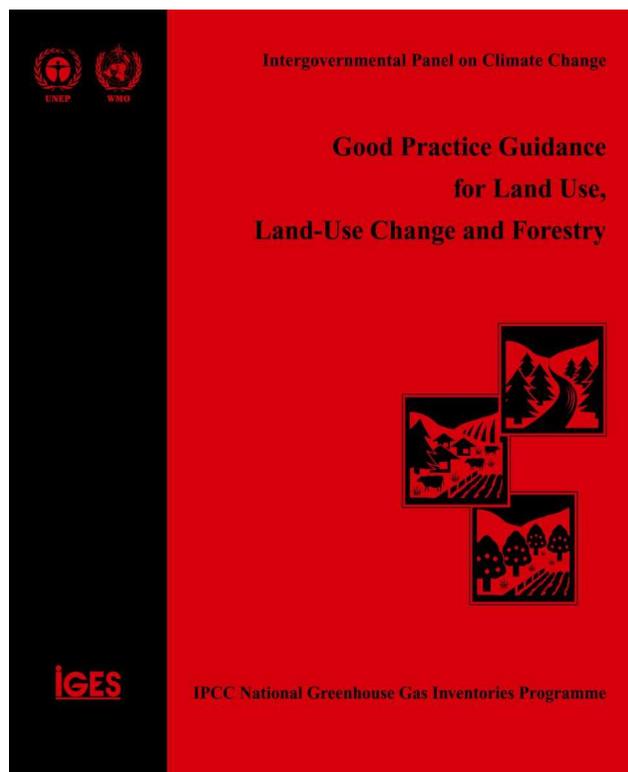
**Use by Annex-I Parties required by
"FCCC/SBSTA/2006/9 and 20/CMP.1.**

**For Non-Annex-I Parties, Dec.17/CP.8
encourages its use.**

IPCC NGGIP Products
IPCC Good Practice Guidance for
Land use, Land-Use Change and Forestry, 2003

<<http://www.ipcc-nggip.iges.or.jp/public/gpglulucf/gpglulucf.htm>>

**Use by Annex I Parties required by
FCCC/SBSTA/2006/9 and Decision 17/CMP.1).**
Non-annex I Parties are encouraged to use by Decision 13/CP.9



Complements the Revised 1996
IPCC Guidelines.
GPG-LULUCF provides
supplementary methods and good
practice guidance for estimating,
measuring, monitoring and
reporting on carbon stock changes
and greenhouse gas emissions
from LULUCF activities under
Article 3, paragraphs 3 and 4, and
Articles 6 and 12 of the Kyoto
Protocol.

Output of the NGGIP

2006 IPCC Inventory Guidelines

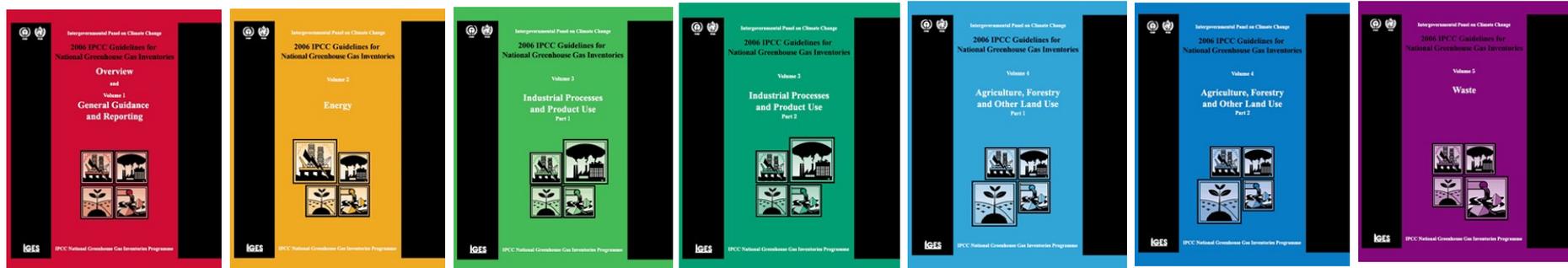
(2,000 pages, 10 Kgs. Adopted by IPCC 26 (Mauritius, April 2006)

- Revision of the Revised 1996GLs was completed on April 2006.

<<http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.htm>>

- Use by Annex I Parties from 2015 onwards

< Decision 15/CP.17>



IPCC and UNFCCC

- The IPCC TFI guidelines provide:
 - Default methodologies and data for estimating and reporting national annual human-made emissions and removals,
 - “Good Practice” – neither over- nor under-estimate inventories as far as can be judged and uncertainties are reduced as far as possible.
 - General Reporting Guidance.
- The UNFCCC agrees which guidelines to use and how to report:
 - Developed countries will use 2006 IPCC Guidelines from 2013 onwards,
 - Developing countries will use 1996 Guidelines, and are encouraged to use 2000 and 2003 Good Practice Guidance.,

In October 2013, IPCC adopted;

***2013 Supplement to the 2006 Guidelines for
National Greenhouse Gas Inventories: Wetlands
(Wetlands Supplement)***

[<http://www.ipcc-nggip.iges.or.jp/home/wetlands.html>](http://www.ipcc-nggip.iges.or.jp/home/wetlands.html)

and

***2013 Revised Supplementary Methods and
Good Practice Guidance Arising from the Kyoto
Protocol***

[<http://www.ipcc-nggip.iges.or.jp/home/2013KPSupplementaryGuidance_inv.html>](http://www.ipcc-nggip.iges.or.jp/home/2013KPSupplementaryGuidance_inv.html)

IPCC Inventory Software

- This is one of the TFI activities to assist the use of the IPCC Guidelines, particularly by developing countries
- The software will:
 - aid preparation of national GHG inventories according to 2006 Guidelines either for complete inventories or for separate categories or groups of categories.
 - assist in training and inventory review
 - harmonise reporting of greenhouse gas inventories
 - archive data and complete inventories (which may consist of estimates for a number of years).
- The IPCC Inventory Software is now available for free. It can be downloaded from:

<http://www.ipcc-nggip.iges.or.jp/software/index.html>

The Emission Factor Database

- The IPCC Emission Factor Database (EFDB):
 - Is an electronic library of data useful to inventory compilers
 - Enables users to judge if the data is applicable to their specific circumstances
 - Provides references to source documents
 - Is freely available to all
 - Allows anyone to share data with others
 - All data is evaluated by Editorial Board
 - Is aimed at developing countries and those with limited resources

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<http://www.ipcc-nggip.iges.or.jp/EFDB/main.php>

Future IPCC Reports

- Special Report on 1.5 degrees in Sept. 2018
- Special Report on Ocean and Cryosphere in Sept. 2019
- Special Report on Land in Sept. 2019
- Methodological Report (Refinements of IPCC GHG Inventory Guidelines) in May 2019
- Sixth Assessment Report (AR6) in 2022

United Nations Framework Convention on Climate Change (UNFCCC) and International Negotiations

<<http://unfccc.int/2860.php>>

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 197 Parties (196 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

- 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.

Backgrounds

- Difference of N-S positions before UNCED (text adopted in May 1992) is reflected in “Common But Differentiated Responsibilities.”
- The Kyoto Protocol adopted at COP3 (1997, in Kyoto) contains mitigation responsibilities of Annex I Parties only.
- There are some differences among the G-77&China Group, such as those of BASIC, Least Developed Countries, AOSISs and oil producer countries.
- At COP 13 in Bali, Indonesia (December 2007) COP adopted “Bali Action Plan”, which started two track approach – AWG-LCA and AWG-KP.

Towards Climate Actions Beyond 2012

- The First Commitment Period under KP was to end on 31st December 2012.
- COP13 (2007) adopted the Bali Action Plan, which referred to, for the first time, actions by developing countries!

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)
-

COP15 and two AWGs

- From 2008, two parallel extremely difficult negotiations continued - Ad hoc Working Group on Long Term Actions ([AWG-LCA](#)) and Ad hoc Working Group on Further Commitments of Annex I Parties under the Kyoto Protocol ([AWG-KP](#))
- Most notable N-S differences were; on the need of coherence between the two AWGs, possibility of agreeing on a new integrated legal instrument covering all Parties, level of ambitions of mitigation targets, and so forth.
- Copenhagen COP15 (where more than 130 Head of States participated) only **took note** of the Copenhagen agreement – a major failure!

COP16 and 17

- Cancun COP16 (2010) managed to adopt the Cancun Agreement, but a large number of technical details were left for further negotiations.
- Durban COP17 (2011) dealt with many difficult questions, most notably, contiguous commitment after the end of the First Commitment, level of mitigation targets (of Annex-I Parties), Climate Funding, Technology Development and Transfer.
- Although Russia, Canada and **Japan** declared that they would not participate in the continued commitment (Annex B of Kyoto Protocol), contiguous extension of Kyoto Commitment was agreed by EU and developing countries. (At the time of COP17, all these opponent countries remained KP party, but Canada later declared that it will leave from KP). US will remain non-KP Party, which means that the extended commitment will cover only 14% of global emissions.

Outcome from COP18/CP8 (2012, Doha)

- CMP 8 decided that the **second commitment period** under the Kyoto Protocol **begins on 1 January 2013** and **end** on **31 December 2020**, to be decided by the AWG-KP 17 (in 2012).
- Adopted I: Annex B Table, II: Gases (NF3 Added), III: KP Amendments.

Ad Hoc Working Group on the Durban Platform for Enhanced Action

- COP extended AWG-LCA by one year.
- COP decided to launch a process to develop **a protocol, another legal instrument or an agreed outcome with legal force under UNFCCC applicable 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), through an AWG-DPEA. It will initiate 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;*

Towards COP21/CMP11

- **Intended Nationally Determined Contributions**

<http://www4.unfccc.int/submissions/indc/Submission%20Pages/submissions.aspx>

- There have been a number of analyses of the submitted INDCs, such as;

- **Climate Action Trackers'**

<http://climateactiontracker.org/news/222/Emissions-Gap-How-close-are-INDCs-to-2-and-1.5C-pathways.html>

- **OECD/IEA**

[<http://www.oecd.org/environment/cc/Overview-of-INDCs-Sep2015.pdf>](http://www.oecd.org/environment/cc/Overview-of-INDCs-Sep2015.pdf)

- **UNFCCC Secretariat**

[<http://unfccc.int/resource/docs/2016/cop22/eng/02.pdf>](http://unfccc.int/resource/docs/2016/cop22/eng/02.pdf)

- **WRI**

http://www.wri.org/sites/default/files/WRI_WP_InterpretingINDCs.pdf

- In Addition, **UNEP's "2015 and 2016 Gap Reports" are relevant.**

http://uneplive.unep.org/media/docs/theme/13/EGR_2015_301115_lores.pdf

<http://drustage.unep.org/adaptationgapreport/sites/unep.org.adaptationgapreport/files/documents/agr2016.pdf>

Overview

- **COP 21 adopted;**
 - **COP21 Decisions – provided fundamental principles and steps till the Paris Agreement takes effect.**
 - **“Paris Agreement” – a legal text to be applied to all Parties, but it does not contain mandatory actions such as quantitative mitigation commitments.**

Major elements of COP21 Decision - 1

2. ... the Agreement will be **opened for signature from 22nd April 2016**
7. *Decides* to establish the **Ad Hoc Working Group on the Paris Agreement (“APA”)** under the same arrangement,
11. *Decides* that the APA shall hold its sessions starting in 2016 ... and shall prepare draft decisions to be recommended through the **Conference of the Parties to the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (“CMA”)** for consideration and adoption at its first session;
17. *Notes* with concern that the estimated aggregate **greenhouse gas emission levels** in 2025 and 2030 resulting from the intended nationally determined contributions do not fall within least-cost 2 °C scenarios but rather lead to a projected level of **55 gigatonnes in 2030**, and *also notes* that much greater emission reduction efforts will be required than those associated with the intended nationally determined contributions in order to hold the increase in the global average temperature to below 2 °C above pre-industrial levels by reducing emissions **to 40 gigatonnes** or to 1.5 °C above pre-industrial levels by reducing to a level to be identified in the special report referred to in paragraph 21 below;

Major elements of COP21 Decision - 2

19. *Requests* the secretariat to update the synthesis report [of INDCs] ... and to make it available by 2 May 2016;

20. Decides to convene a **facilitative dialogue** among Parties **in 2018 to take stock of the collective efforts** of Parties in relation to progress towards the long-term goal referred to in Article 4, paragraph 1, of the Agreement and to inform the preparation of **nationally determined contributions** pursuant to Article 4, paragraph 8, of the Agreement;

21. *Invites* the IPCC to provide a special report in 2018 on the impacts of global warming of 1.5 ° C above pre-industrial levels and related global greenhouse gas emission pathways; **[IPCC decided to prepare such report by 2018.]**

Major elements of COP21 Decision - 3

22. Invites Parties to communicate their intended nationally determined contribution (**INDC**) no later than when the Party submits its respective instrument of ratification, accession, or approval of the Paris Agreement. If a Party has communicated an INDC prior to joining the Agreement, that Party shall be considered to have satisfied this provision unless that Party

decides otherwise

23. Urges those Parties whose INDC pursuant to decision 1/CP.20 contains a time frame up to 2025 to communicate by 2020 a new NDC and to do so every five years thereafter pursuant to Article 4, paragraph 9, of the Agreement;

24. *Requests* those Parties ... INDC ... contains a time frame up to 2030 to communicate or update by 2020 these contributions and to do so every five years thereafter ... ;

25. *Decides* that Parties shall submit ... their nationally determined contributions (NDCs) referred to in Article 4 of the Agreement at least 9 to 12 months in advance of [CPA].

26. *Requests* the ADP to develop further guidance on features of [NDCs]

Paris Agreement Articles

Paris Agreement Article 2. (Purpose)

1. This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty, including by:

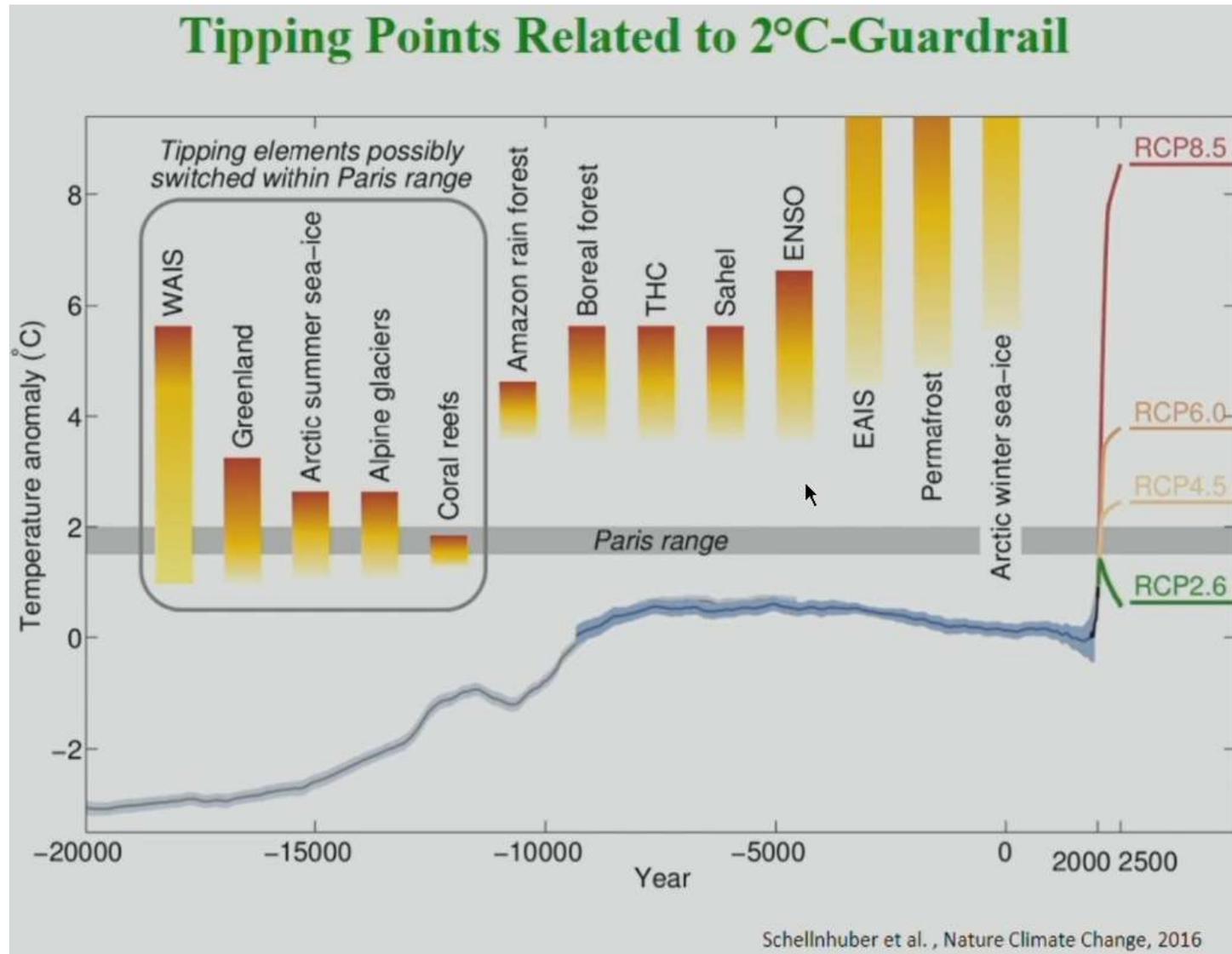
(a) Holding the increase in the global average temperature to well below 2 ° C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 ° C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

(b) Increasing the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse gas emissions development, in a manner that does not threaten food production;

(c) Making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development.

2. This Agreement will be implemented to reflect equity and the principle of **common but differentiated responsibilities and respective capabilities, in the light of different national circumstances.**

“2 degree target” was not a conclusion from science, though this graph shows something ...

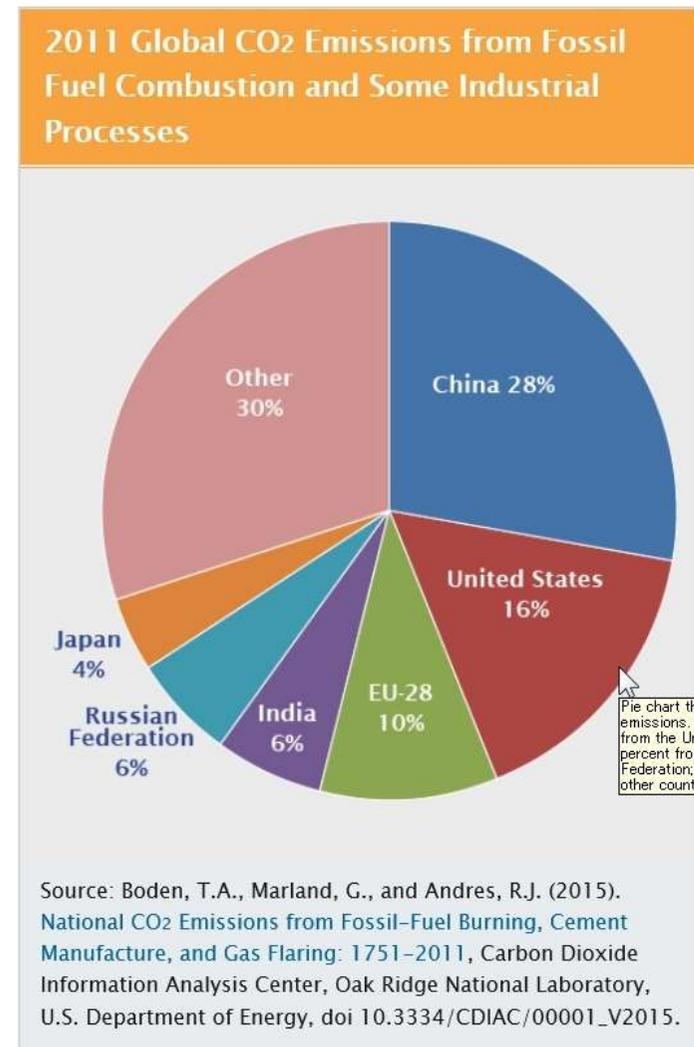


GHG Emission data for Article 21.

Country	GHG Gt-CO ₂ -eq	%	Data Year
China	7465862	20.09	2005
USA	6649700	17.89	2013
EU	4488404	12.10	2013
Russian F.	2799434	7.53	2013
India	1523767	4.10	2000
Japan	1407800	3.79	2013
Brazil	923544	2.48	2010
Canada	726051	1.95	2013
R.o.Korea	688300	1.85	2010
Mexico	632880	1.70	2013
South Africa	544314	1.46	2010
Australia	541924	1.46	2013
Global	37 168 339	100	Mixed

Source: UNFCCC Secretariat
http://unfccc.int/files/ghg_data/application/pdf/table.pdf

Other Statistics of GHG Emissions



<Source: USEPA>

Paris Agreement Article 14. (Stocktaking)

1. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement shall periodically take stock of the implementation of this Agreement **to assess the collective progress** towards achieving the purpose of this Agreement and its long-term goals (referred to as the “**global stocktake**”). It shall do so in a comprehensive and facilitative manner, considering mitigation, adaptation and the means of implementation and support, and in the light of equity and the best available science.
2. The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement shall undertake its **first global stocktake in 2023** and **every five years thereafter** unless otherwise decided by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement.
3. The outcome of the global stocktake **shall inform** Parties in updating and enhancing, in a nationally determined manner, their actions and support in accordance with the relevant provisions of this Agreement, as well as in enhancing international cooperation for climate action.

DJT Administration

- On 1st June 2017, President Trump announced the US decision of withdrawal from the PA.
- <https://www.whitehouse.gov/the-press-office/2017/06/01/statement-president-trump-paris-climate-accord>
- (Please note relevant PA Articles, especially, Article 28.)

PA Article 28

1. At any time after three years from the date on which this Agreement has entered into force for a Party, that Party may withdraw from this Agreement by giving written notification to the Depositary.
2. Any such withdrawal shall take effect upon expiry of one year from the date of receipt by the Depositary of the notification of withdrawal, or on such later date as may be specified in the notification of withdrawal.
3. Any Party that withdraws from the Convention shall be considered as also having withdrawn from this Agreement.

G-20 (Hamburg, in July 2017)

Declaration of G-20 contains a paragraph specifically on US, which shows very clear contrast with the other positive actions of the other countries.

- “We take note of the decision of the United States of America to **withdraw from the Paris Agreement**. The United States of America announced it will immediately cease the implementation of its current **nationally-determined contribution** and affirms its strong commitment to an approach that lowers emissions while supporting economic growth and improving energy security needs.”
- On 4th August, USA submitted a notification to the UN on its intention to withdraw from the Paris Agreement.

<https://www.g20.org/Content/EN/StatischeSeiten/G20/Texte/g20-gipfeldokumente-en.html?nn=2189118#doc2222590bodyText1>

<http://www.climatechangenews.com/2017/08/07/trump-tells-un-intention-leave-paris-climate-accord-full/>

For Japan

- The level of ambition in INDC is very low.
- Since Japan does not participate in the KP Second Commitment Period (CP-2), Japan can not use KP Flexibility Mechanisms. In this regard, a Joint Crediting Mechanism (JCM) is being implemented as bilaterally-agreed system. This requires clear justification in terms of Paris Agreement Article 6.2.
- Japan's expansion of domestic coal-firing power stations and international cooperation to developing countries might be subject to international scrutiny.

日本のINDC – 国際比較(1)

[外務省]

「GDP当たり排出量を4割以上改善，一人当たり排出量を約2割改善することで，世界最高水準を維持するものであり，国際的にも遜色のない野心的な目標です。

- 日本のGDP当たりエネルギー消費量は現時点でも他のG7諸国の平均より約3割少なく，世界の最高水準にあります。そこからさらに2030年に向けて35%のエネルギー効率の改善を目指します。
- 上記エネルギーミックスでは，総発電電力量に占める再生可能エネルギーの比率を22-24%程度，原子力の比率を22-20%程度としています（足下から，太陽光は7倍，風力・地熱は4倍の発電電力量を見込んでいます）。」

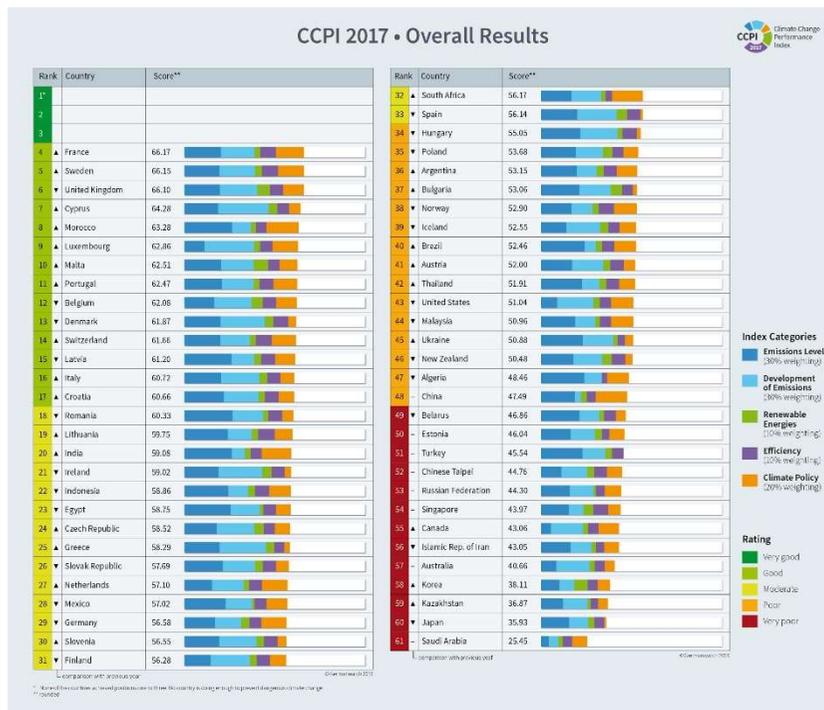
http://www.mofa.go.jp/mofaj/ic/ch/page1w_000121.html

日本のINDC – 国際比較(2)

	2020年以降の削減目標（自国が決定する貢献案）		【参考】カンクン合意に基づく2020年目標・行動
	内容	提出時期（2015年）	削減目標・行動
日本	2030年に-26%（2013年比） （2030年に-25.4%（2005年比））	7月17日	-3.8%（2005年比）
米国	2025年に-26%～-28%（2005年比） -28%に向けて最大限努力	3月31日	-17%程度（2005年比）
EU	2030年に-40%（1990年比）	3月6日	-20%（1990年比）
ロシア	2030年に-25%～-30%（1990年比）	3月31日	-15～-25%（1990年比）
カナダ	2030年に-30%（2005年比）	5月15日	-17%（2005年比）
豪州	2030年に-26%～-28%（2005年比）	8月11日	-5%（2000年比）
スイス	2030年に-50%（1990年比）	2月28日	-20%（1990年比）
ノルウェー	2030年に-40%（1990年比）	3月27日	-30%（1990年比）
中国	2030年前後にCO2排出量のピークを達成。また、ピークを早めるよう最善の取組を行う。 2030年にGDP当たりCO2排出量で-60～-65%（2005年比）	6月30日	GDP当たりCO2排出量で -40～-45%（2005年比）
インド	2030年にGDP当たり排出量で-33～-35%（2005年比）	10月1日	GDP当たり排出量で-20～-25%（2005年比）
メキシコ	2030年に-22%（BAU比），条件付きで2030年に-36%（BAU比）	3月30日	条件付きで-30%（BAU比）
南アフリカ	2025年及び2030年までに-398～-614Mt（BAU比）	9月25日	-34%（BAU比）
ブラジル	2025年に-37%（2005年比），2030年に-43%（2005年比）	9月28日	-36.1～-38.9%（BAU比）

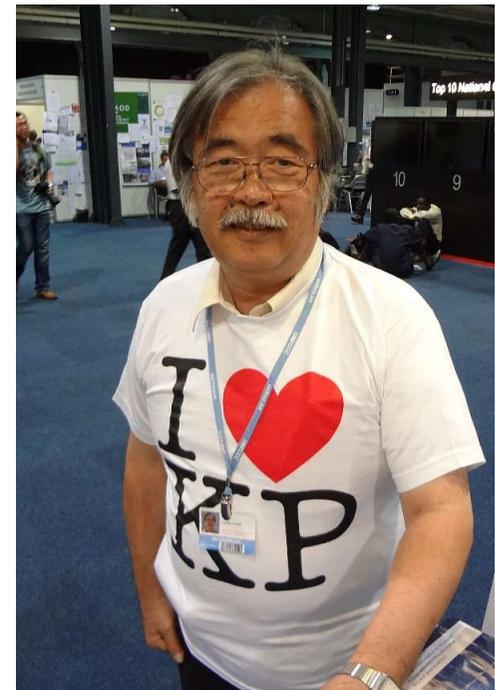
日本は?

- 現在、京都議定書の第2次コミットメントには不参加。したがって、それに基づく国際的なマーケットメカニズムは使えない状況。京都メカニズムと国際的な削減目標の設定は、炭素価格の決定の有効な手法の一つと考えられるが、それが十分に機能していない状況なのでは?
- JCM (Joint Crediting Mechanism)が国際的にどのように認知されるかは、なお、未確定な面あり(パリ協定6条参照)。



PAの関連では、EUは、2030年までに40%、スイスは2030年までに50%削減とのINDCを出している。日本は、これらはもちろん、米国(2005年=>2025年で、26-28%)と比較しても非常に低いレベルの削減目標(2013年=>2030年で、26%)を出しており、COP21の合意に則ったINDC(NDC)の改善が必要ではないか?中期目標は、2050年までの長期削減(80%削減(閣議決定))への過程として考えていく必要がある。最近の石炭火力の増加は、国際的な批判の的になっている。

Thank you for your attention!



Taka Hiraishi

- Born in Tokyo on 3rd December 1944.
- B.Sc. (1966) and M.Sc. for Industrial Chemistry (1968) from Tokyo University.
- Joined Ministry of Labour (Occupational Health and Safety Department) in April 1968.
- Moved to the newly-established **Environment Agency** in 1971 and, till 1996, worked in the fields of offensive odour, acid rain, ozone layer, hazardous wastes, hazardous chemicals and water pollution, except the overseas posting shown below.
- 1987-1989: Director, Water Pollution Control Division, Environment Agency (current Ministry of the Environment) (1987-89)

Overseas posting:

•**1975-1978: Environment Attache (liaison with UNEP) and Second Secretary for bilateral technical co-operation (for Kenya, Uganda and Malawi) at the Embassy of Japan in Kenya.**

•1980-1982: Principal Administrator (A-4, information exchange on chemicals control policies, including chemicals management policies in developing countries), Chemicals Division, Environment Directorate, **OECD Secretariat.**

•**1989-1998: Worked for UNEP as (consecutively);**

- Co-ordinator of Support Measures, Programme Bureau (D-1),
- Officer-in-Charge, Environmental Law and Institutions Centre,
- Deputy Director of Policy Division,
- Deputy Director of Environment Programme Division,
- Assistant Executive Director for Environmental Information and Assessment (D-2).
- (President, UNEP Staff Association (in 1996))

More recently,

- 1999-2006: Visiting Principal Researcher, National Institute for Environmental Studies, Japan.
- 1999-2015: Member, IPCC Bureau and Co-chair, IPCC Inventories Task Force Bureau**
- 1999-2015: Senior Consultant, and Member, Board of Directors, Institute for Global Environmental Strategies (**IGES**), Japan (Part-time),
- February-April 2001: Special Advisor to the Minister of the Environment, Japan (Chair of Communique Drafting Group for G-7 Environment Ministers).
- 2002-2010: Special Advisor to the Minister of the Environment, Japan. (on OECD sustainable development activities, Part-time)
- 2005-2009: Specially assigned Professor (Risk Management and Global Environmental Issues), Osaka University, Japan (Part-time)
- Vising Lecturer for Tokyo Institute of Technologies, Sophia University, Gakushuin University, Osaka University, Atomi University.*
- 2001- : Contributed to the work of the Ministry of the Environment in Japan for CDM, J-VER, JCM, adaptation and “co-benefits”
- 2002-2011: UNFCCC, member of CGE (Consultative Group on non-Annex-I national communications).**
- 2004-2008: UNFCCC, member of EGTT (Expert Group on Technology Transfer)**

Currently:

- Counsellor, Institute for Global Environmental Strategies (**IGES**), Japan (Volunteer),
- Member, Board of Directors, Japan Association for UNEP (NPO) (Volunteer)