

Climate Science & Actions

<Personal notes for brain-storming>

3rd August 2018

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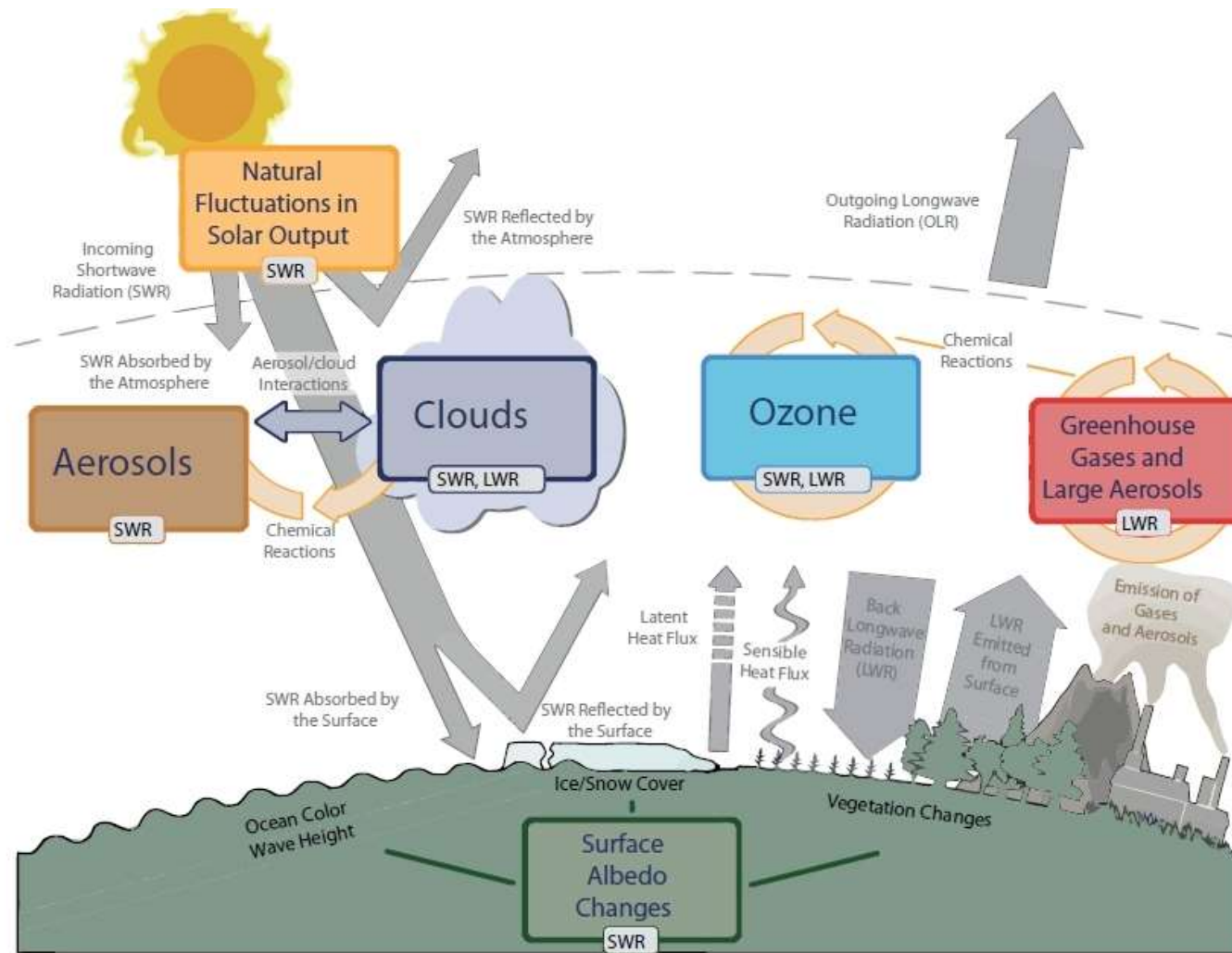
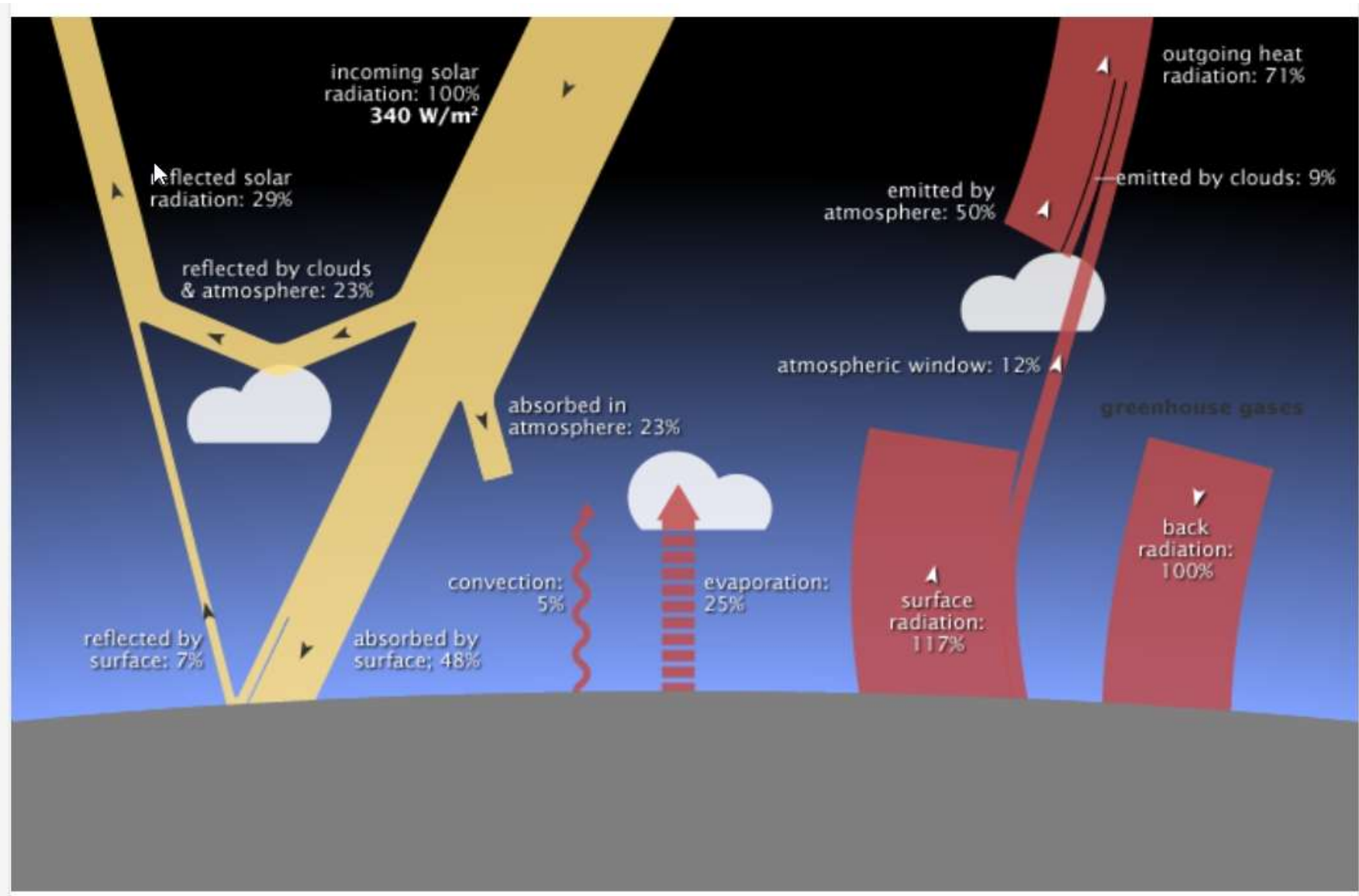


Figure 1.1 | Main drivers of climate change. The radiative balance between incoming solar shortwave radiation (SWR) and outgoing longwave radiation (OLR) is influenced by global climate 'drivers'. Natural fluctuations in solar output (solar cycles) can cause changes in the energy balance (through fluctuations in the amount of incoming SWR) (Section 2.3). Human activity changes the emissions of gases and aerosols, which are involved in atmospheric chemical reactions, resulting in modified O₃ and aerosol amounts (Section 2.2). O₃ and aerosol particles absorb, scatter and reflect SWR, changing the energy balance. Some aerosols act as cloud condensation nuclei modifying the properties of cloud droplets and possibly affecting precipitation (Section 7.4). Because cloud interactions with SWR and LWR are large, small changes in the properties of clouds have important implications for the radiative budget (Section 7.4). Anthropogenic changes in GHGs (e.g., CO₂, CH₄, N₂O, O₃, CFCs) and large aerosols (>2.5 μm in size) modify the amount of outgoing LWR by absorbing outgoing LWR and re-emitting less energy at a lower temperature (Section 2.2). Surface albedo is changed by changes in vegetation or land surface properties, snow or ice cover and ocean colour (Section 2.3). These changes are driven by natural seasonal and diurnal changes (e.g., snow cover), as well as human influence (e.g., changes in vegetation types) (Forster et al., 2007).

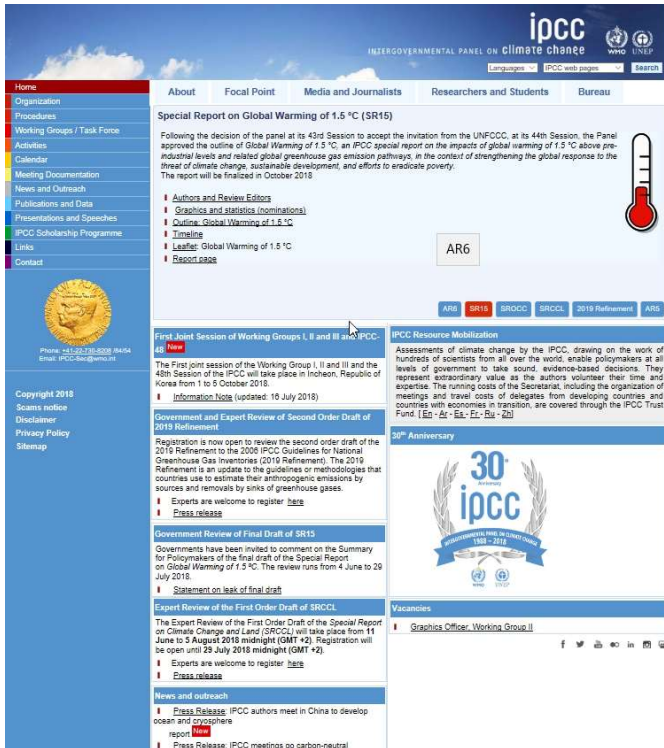
Earth Energy Balance (Image!)



<https://earthobservatory.nasa.gov/Features/EnergyBalance/page1.php>

“IPCC” (Intergovernmental Panel on Climate Change)

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

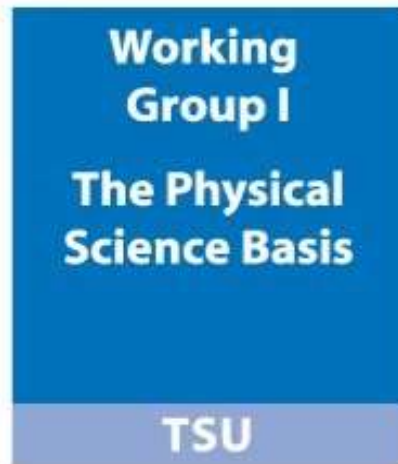


- Established by UNEP and WMO in 1988.
- Members are Governments Currently 195
- Reports have been prepared by;
 - Authors A few thousands
 - Other contributors More than 10,000 (?)
 - Secretariat
 - Central Secretariat in Geneva
 - Technical Support Units, and their supporting organisations (such as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



(France)



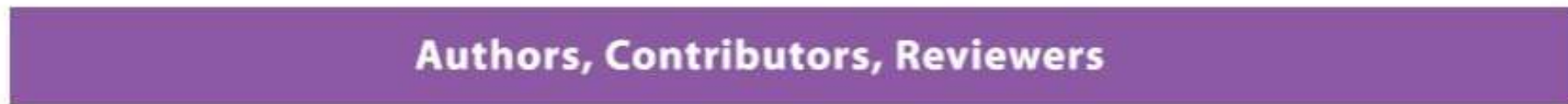
(Germany)



(UK/India)



(Japan)



Current 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 Csirvo Buendía (Peru)

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

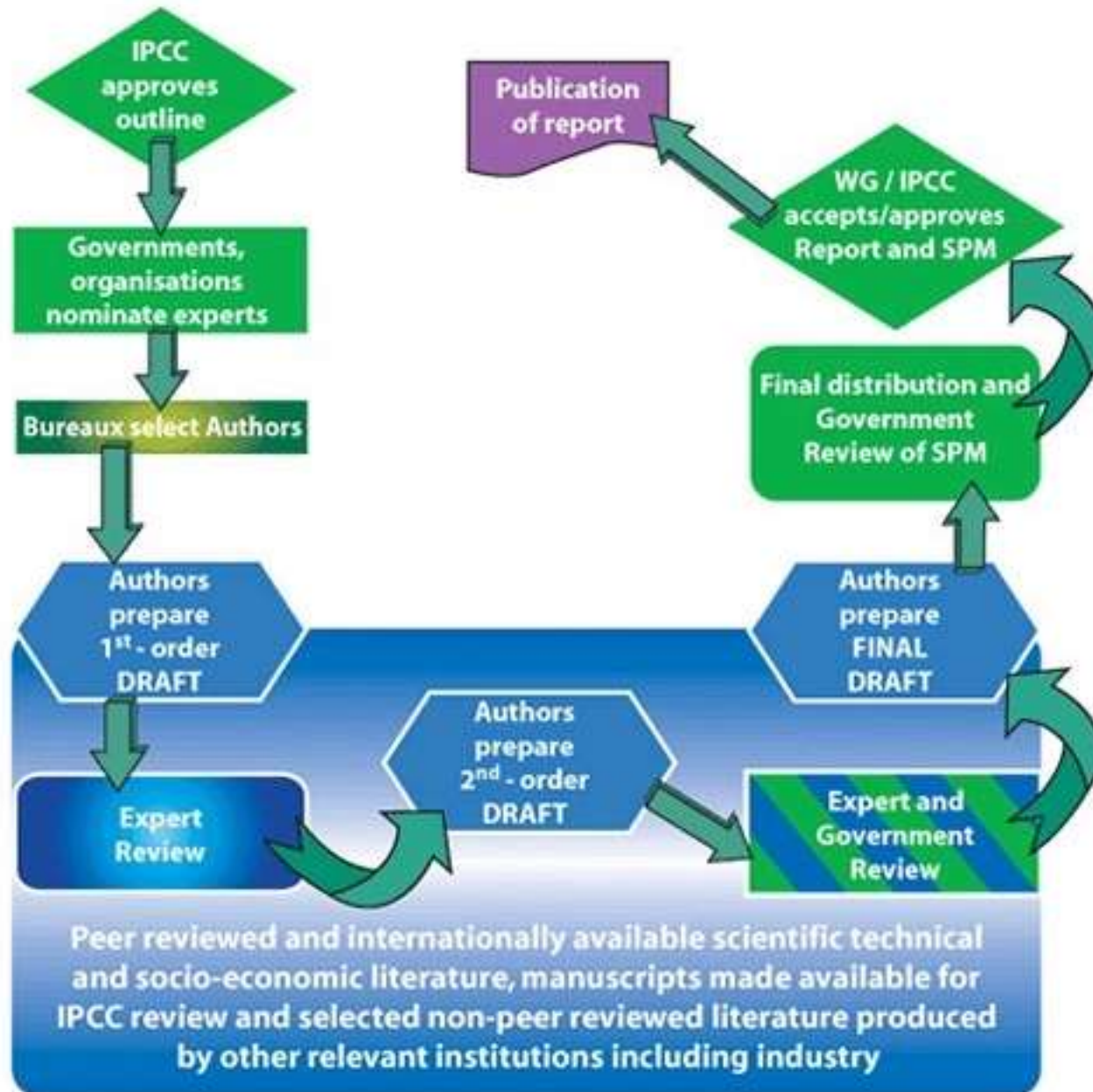
- a. Chair (1)
- b. IPCC Vice-chairs (3)
- c. WG & TFI Co-chairs (8)
- d. WG-Vice-chairs (22)
- e. TFB members (14)

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

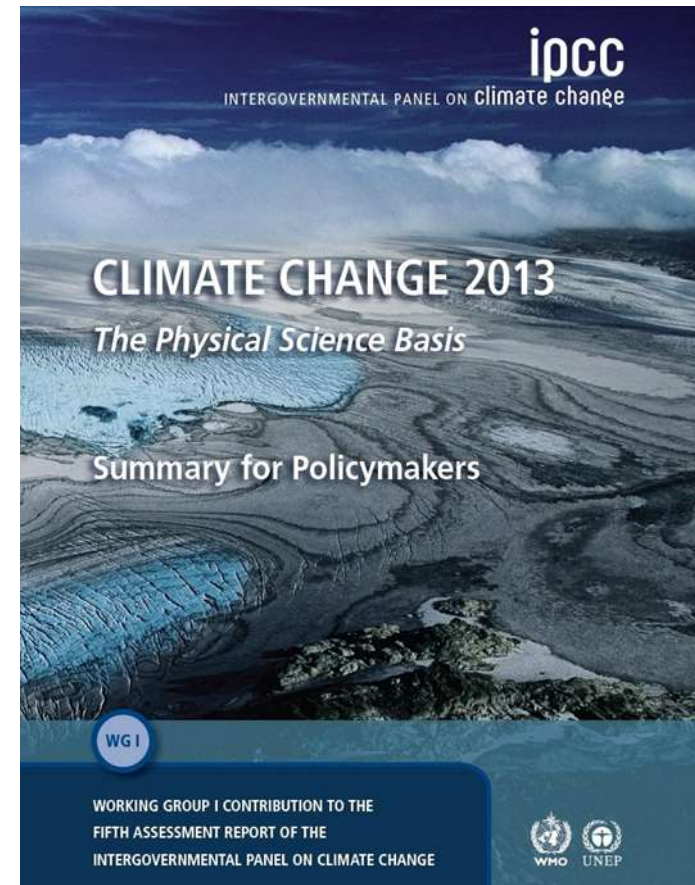
Prepared by 259 authors.
54,677 comments received.
Approved by the Panel
in September 2013

SPM

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

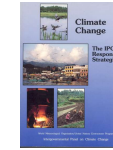
Full Report

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



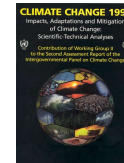
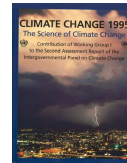
First Assessment Report (1990) (FAR)

第1次アセスメント報告書: 国連温暖化条約
の2年前。



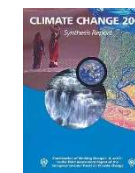
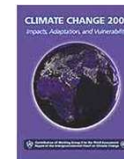
Second Assessment Report (1995) (SAR)

第2次アセスメント報告書: 京都議定書締
結の2年前。



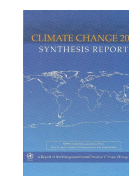
Third Assessment Report (2001) (TAR)

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。



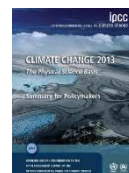
Fourth Assessment Report (2007) (AR4)

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)

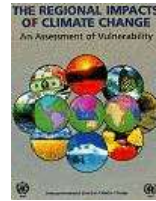
2007 Nobel Peace Prize!

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".

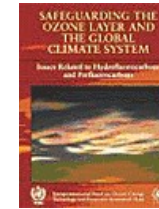


IPCC Special Reports

Regional Impacts
(1997)



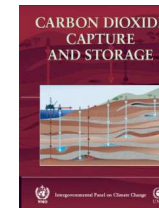
Ozone
Layer
(2005)



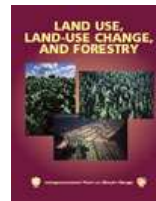
Aviation
(1999)



CO2
Capture
and Storage
(2005)



LUCF (2000)



Renewable
Energy
(May 2011)



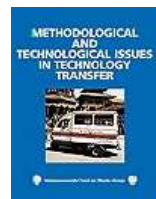
Emission Scenarios
(2000)



Extreme Events
and Disasters
(November
2011)



Technology
Transfer (2000)

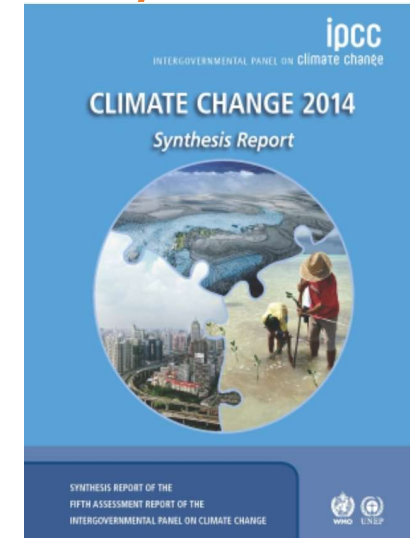
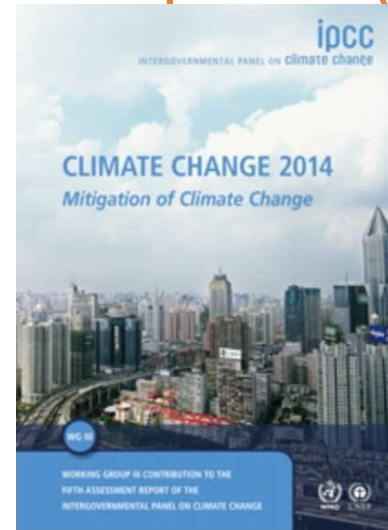
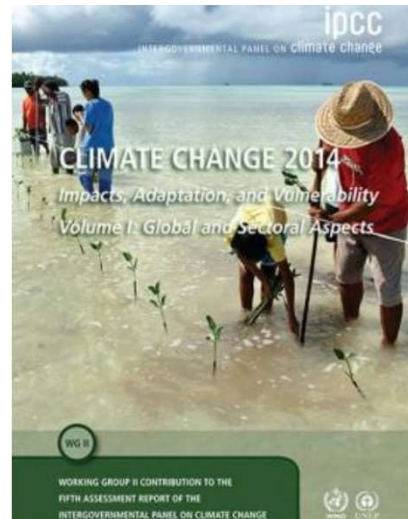
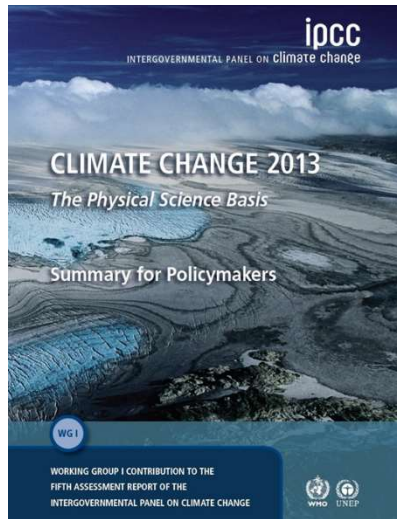


Long-term Climate Changes and Extremes (from SREX SPM)

D. Future Climate Extremes, Impacts, and Disaster Losses

- Confidence in projecting changes in the direction and magnitude of climate extremes depends on many factors, including the type of extreme, the region and season, the amount and quality of observational data, the level of understanding of the underlying processes, and the reliability of their simulation in models.
- **Models project substantial warming in temperature extremes by the end of the 21st century.** It is *virtually certain* that increases in the frequency and magnitude of warm daily temperature extremes and decreases in cold extremes will occur in the 21st century at the global scale. It is *very likely* that the length, frequency, and/or intensity of warm spells or heat waves will increase over most land areas.
- It is *likely* that the frequency of heavy precipitation or the proportion of total rainfall from heavy falls will increase in the 21st century over many areas of the globe.
- Average tropical cyclone maximum wind speed is *likely* to increase, although increases may not occur in all ocean basins. It is *likely* that the global frequency of tropical cyclones will either decrease or remain essentially unchanged.
- There is *medium confidence* that there will be a reduction in the number of extratropical cyclones averaged over each hemisphere. There is *medium confidence* that droughts will intensify in the 21st century in some seasons and areas, due to reduced precipitation and/or increased evapotranspiration.
- Projected precipitation and temperature changes imply possible changes in floods, although overall there is *low confidence* in projections of changes in fluvial floods.
- It is *very likely* that mean sea level rise will contribute to upward trends in extreme coastal high water levels in the future.
- There is *high confidence* that changes in heat waves, glacial retreat, and/or permafrost degradation will affect high mountain phenomena such as slope instabilities, movements of mass, and glacial lake outburst floods.
- There is *low confidence* in projections of changes in large-scale patterns of natural climate variability

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.

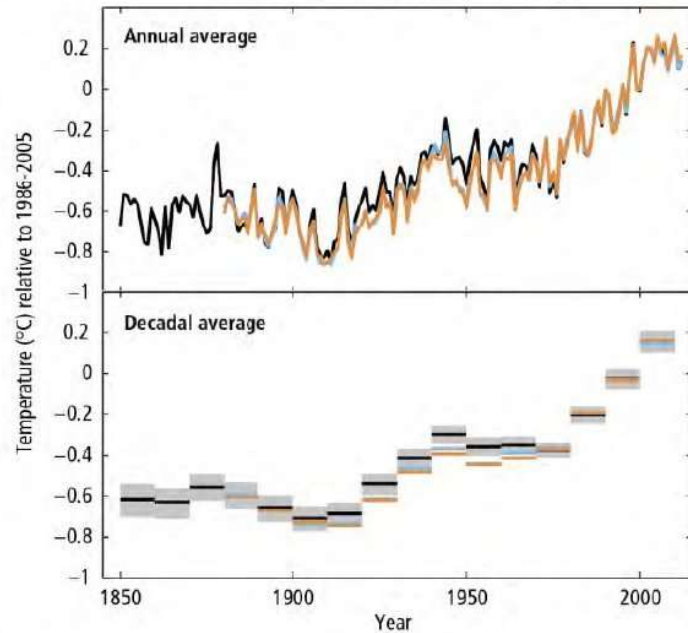
<<http://www.ipcc.ch/>>

Overall Summary

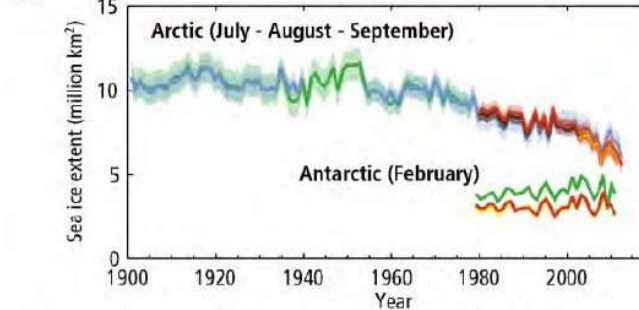
- Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems.
- Continued emission of greenhouse gases will cause further warming and long-lasting changes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

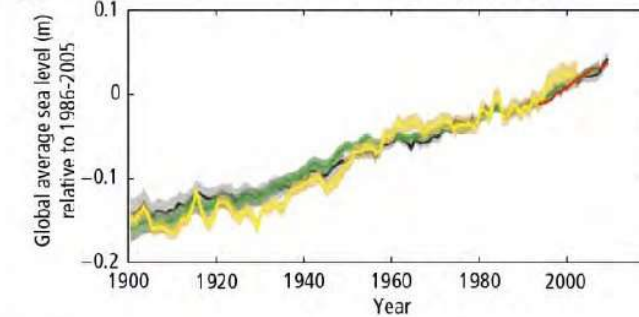
(a) Observed globally averaged combined land and ocean surface temperature anomaly 1850–2012



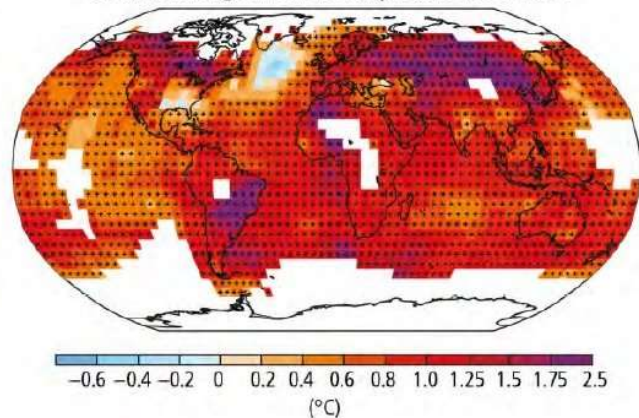
(c) Sea ice extent



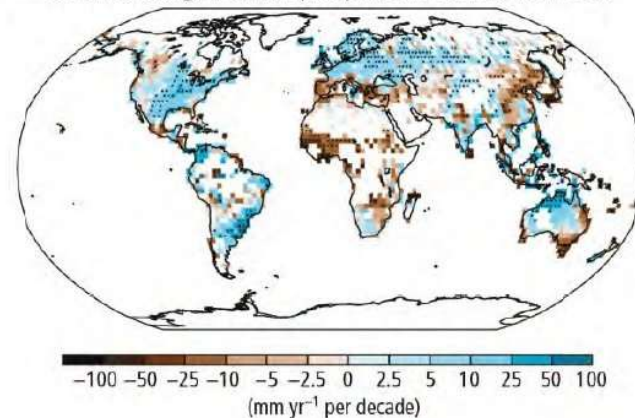
(d) Global mean sea level change 1900-2010



(b) Observed change in surface temperature 1901–2012



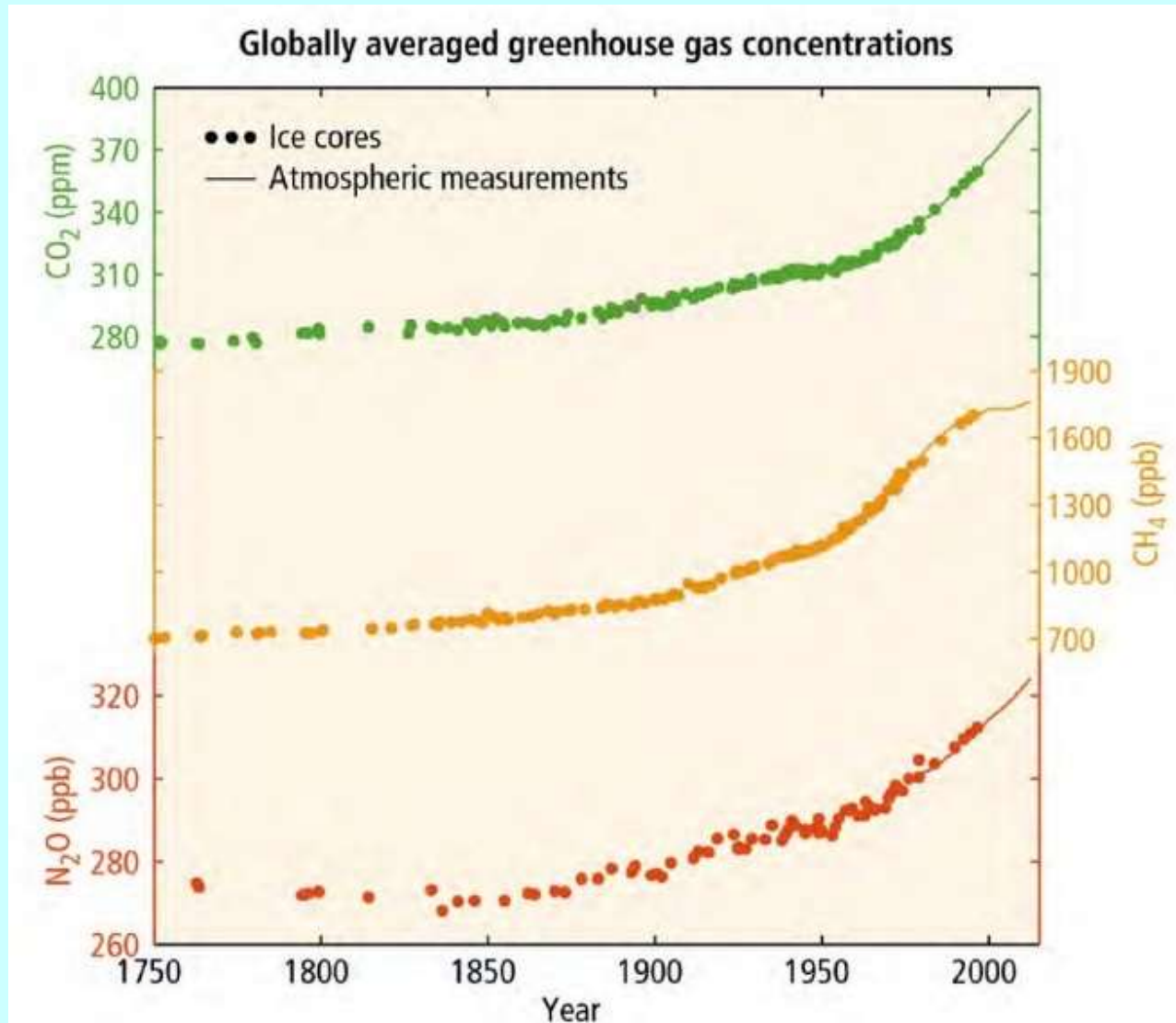
(e) Observed change in annual precipitation over land 1951–2010



- 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.

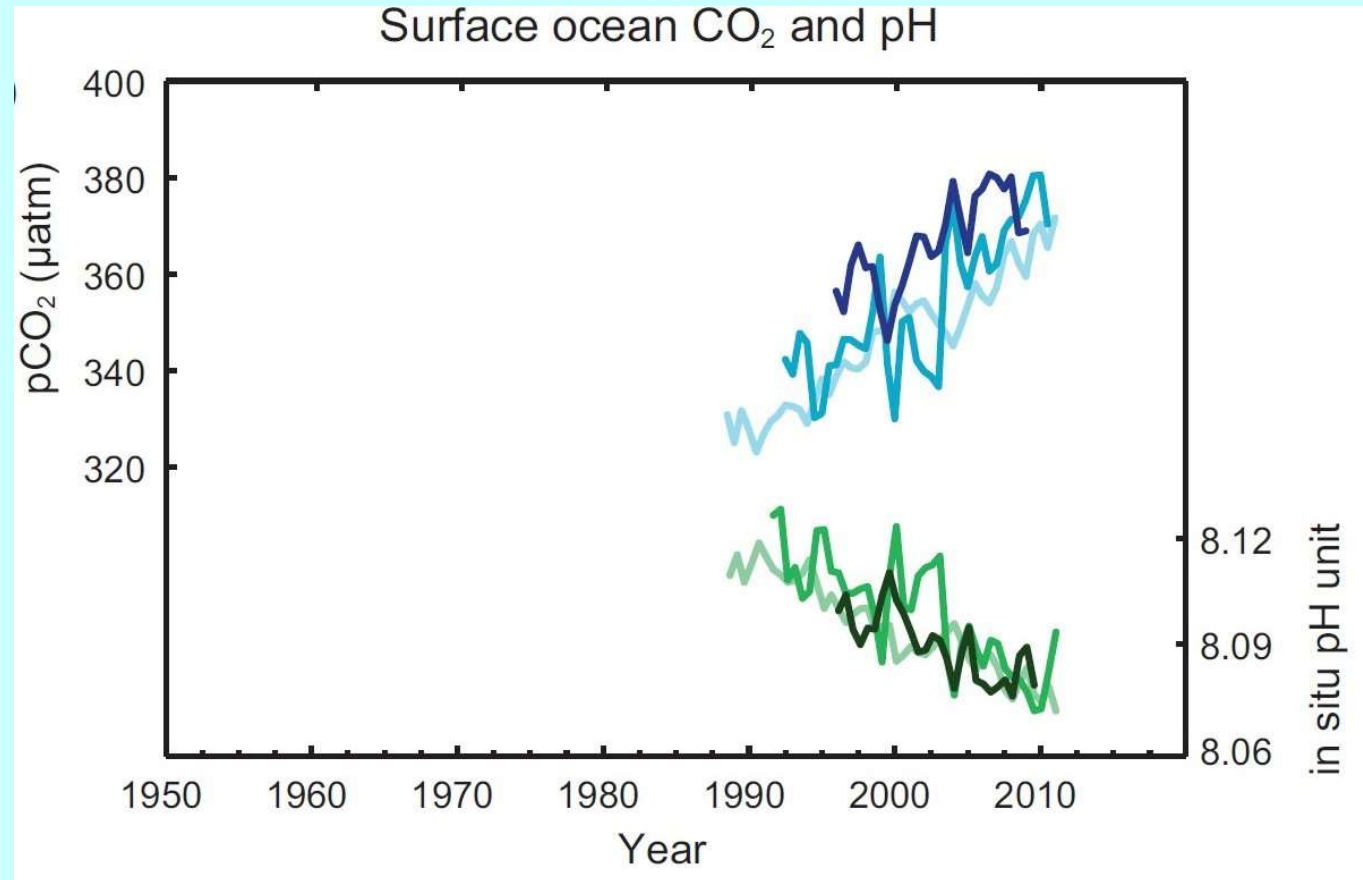
Atmospheric GHG Concentrations

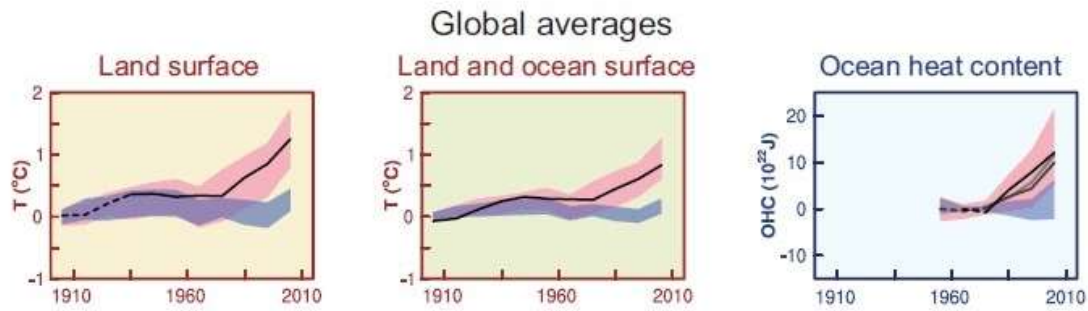
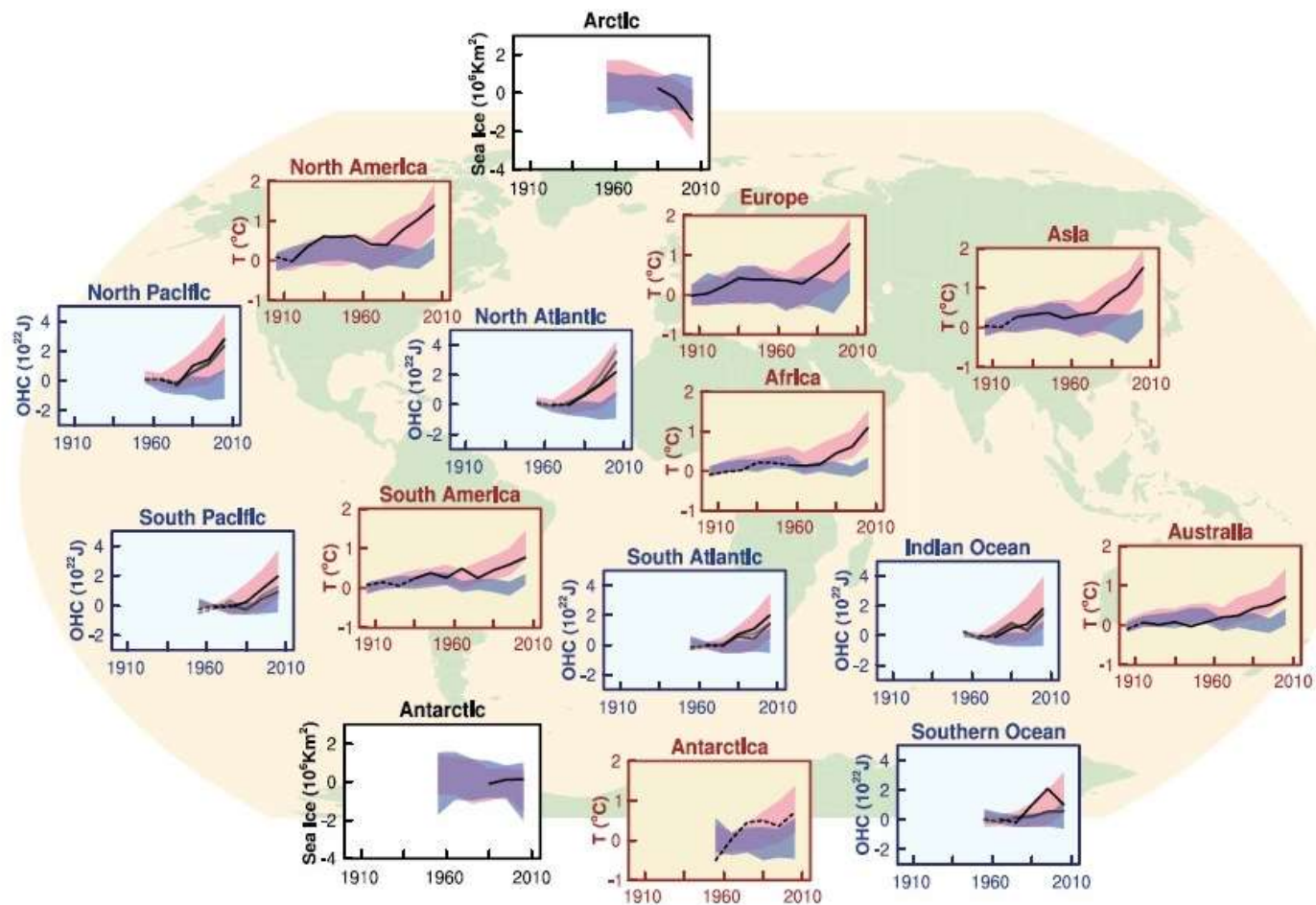


The atmospheric concentrations of carbon dioxide, methane, and nitrous oxide have increased to levels unprecedented in at least the last 800,000 years. Carbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions and secondarily from net land use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



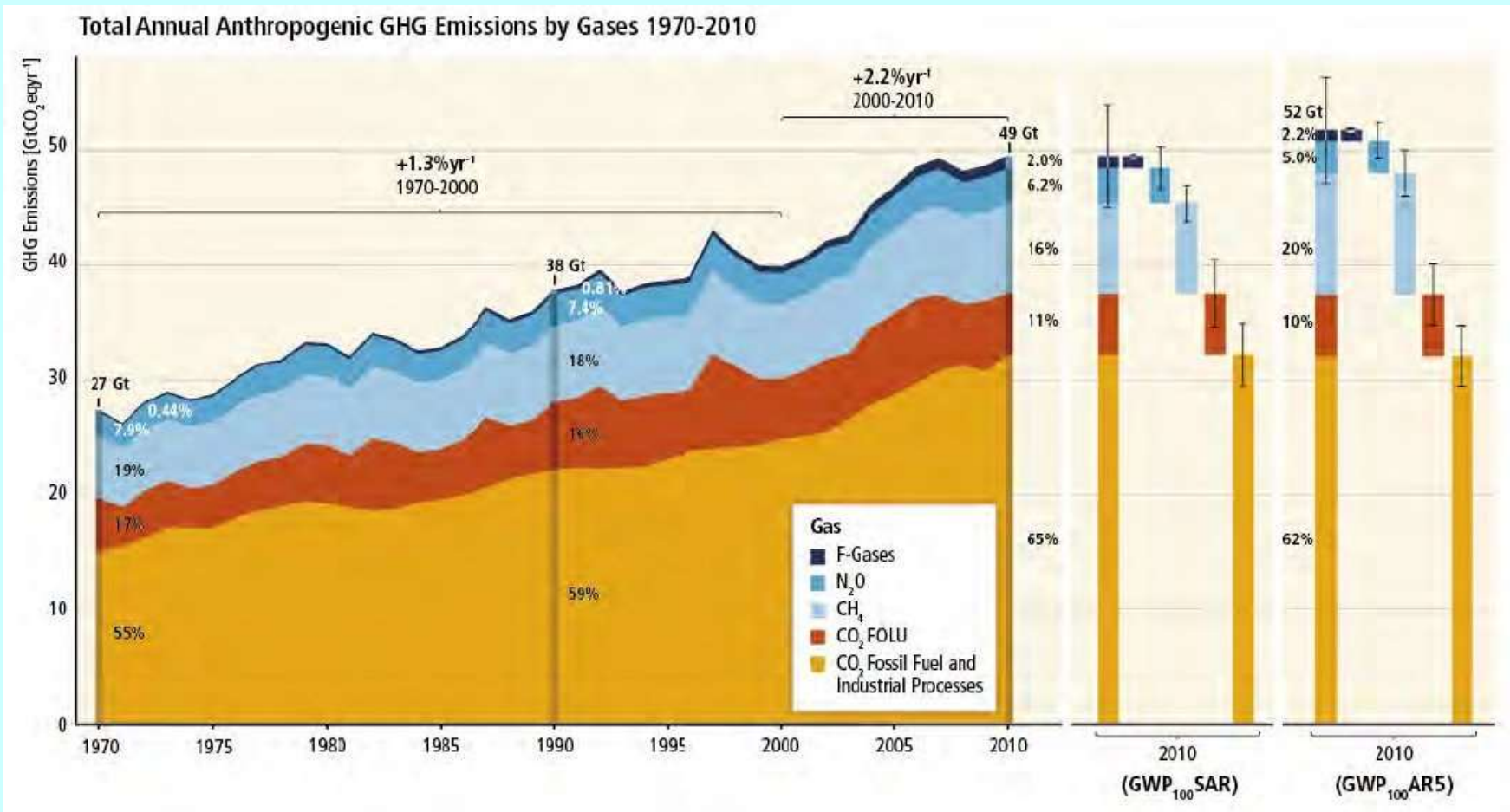


≡ Observations

■ 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.

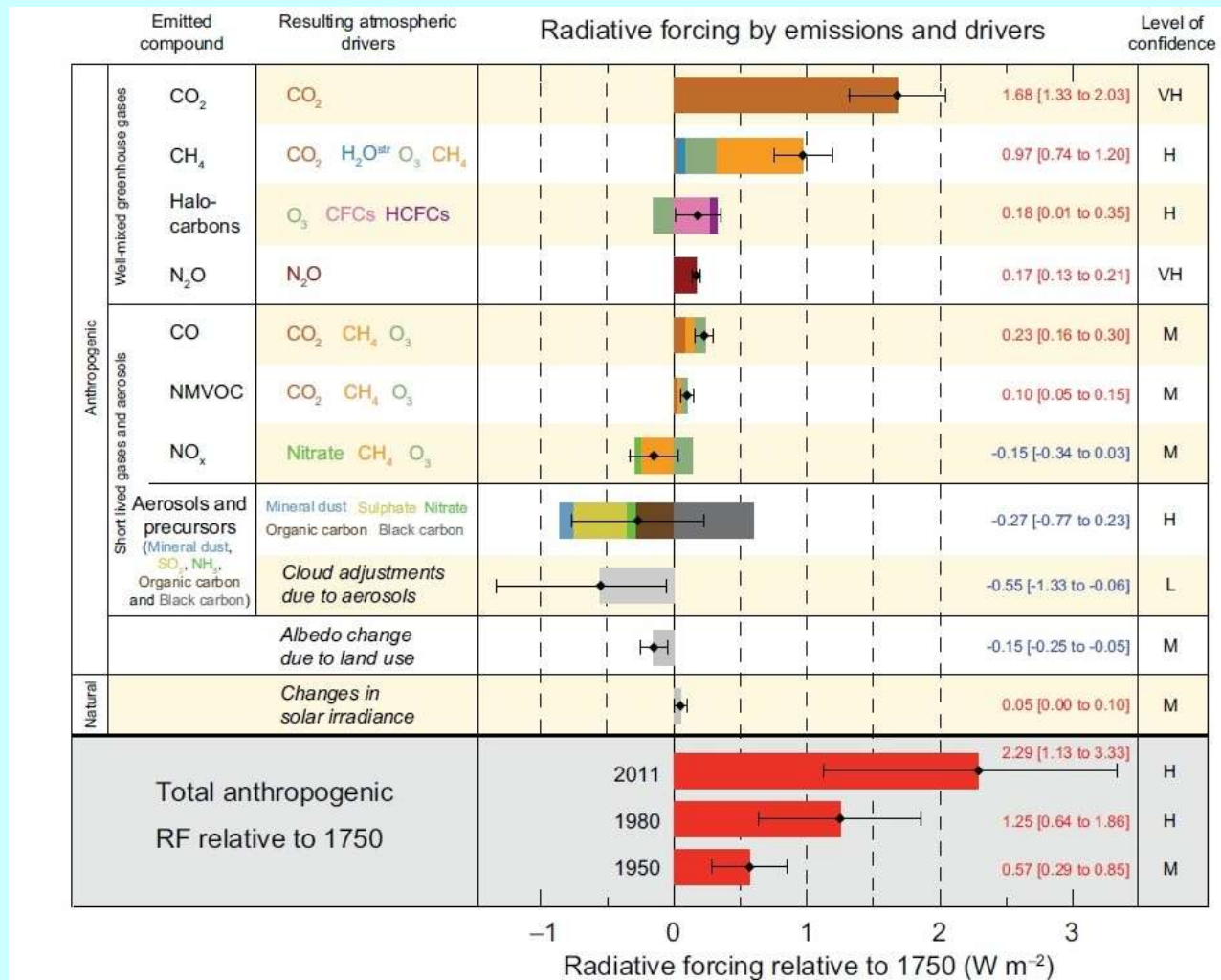
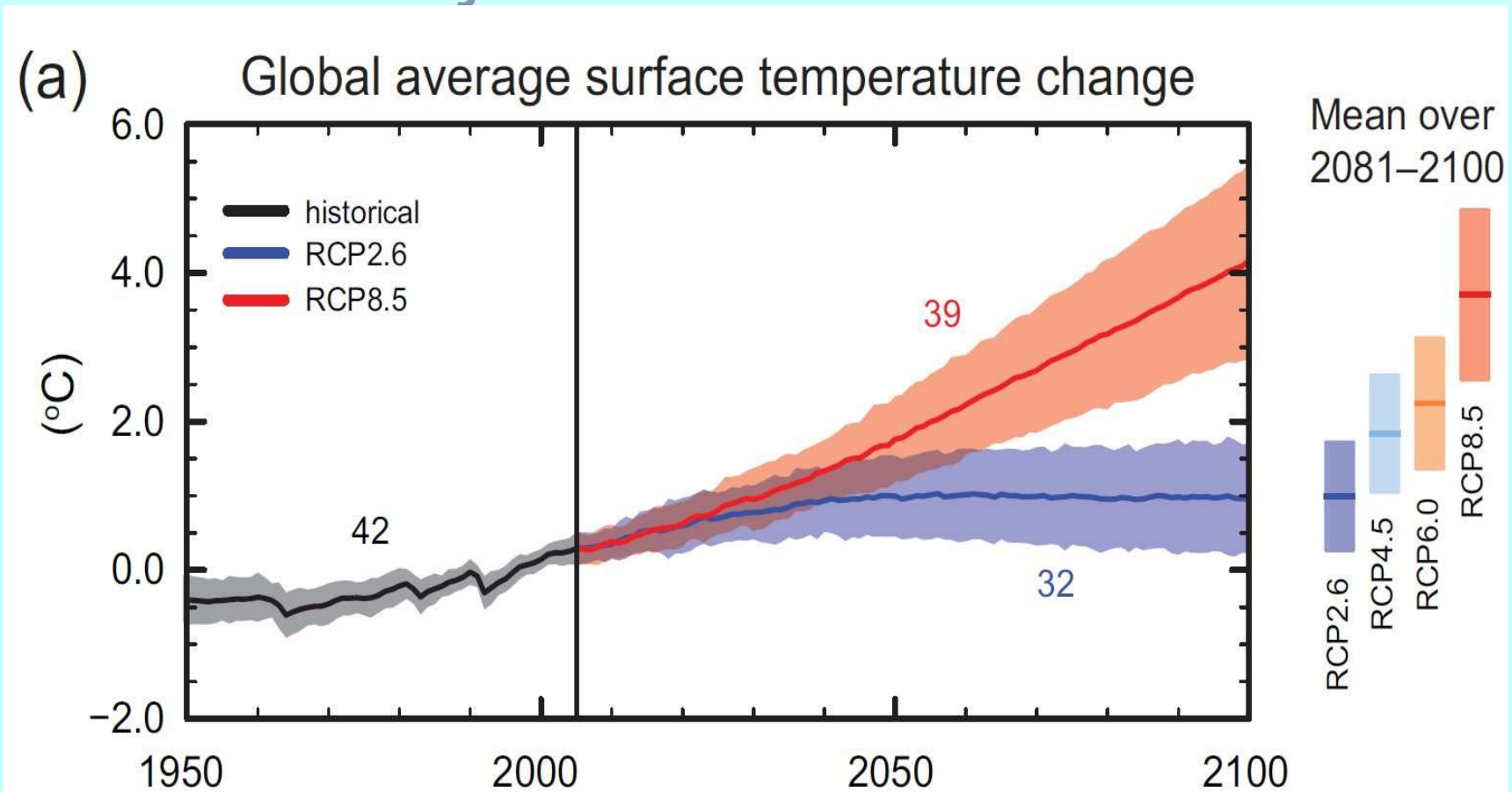


Figure SPM.5 | Radiative forcing estimates in 2011 relative to 1750 and aggregated uncertainties for the main drivers of climate change. Values are global average radiative forcing (RF¹⁴), partitioned according to the emitted compounds or processes that result in a combination of drivers. The best estimates 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-colored bars. Volcanic

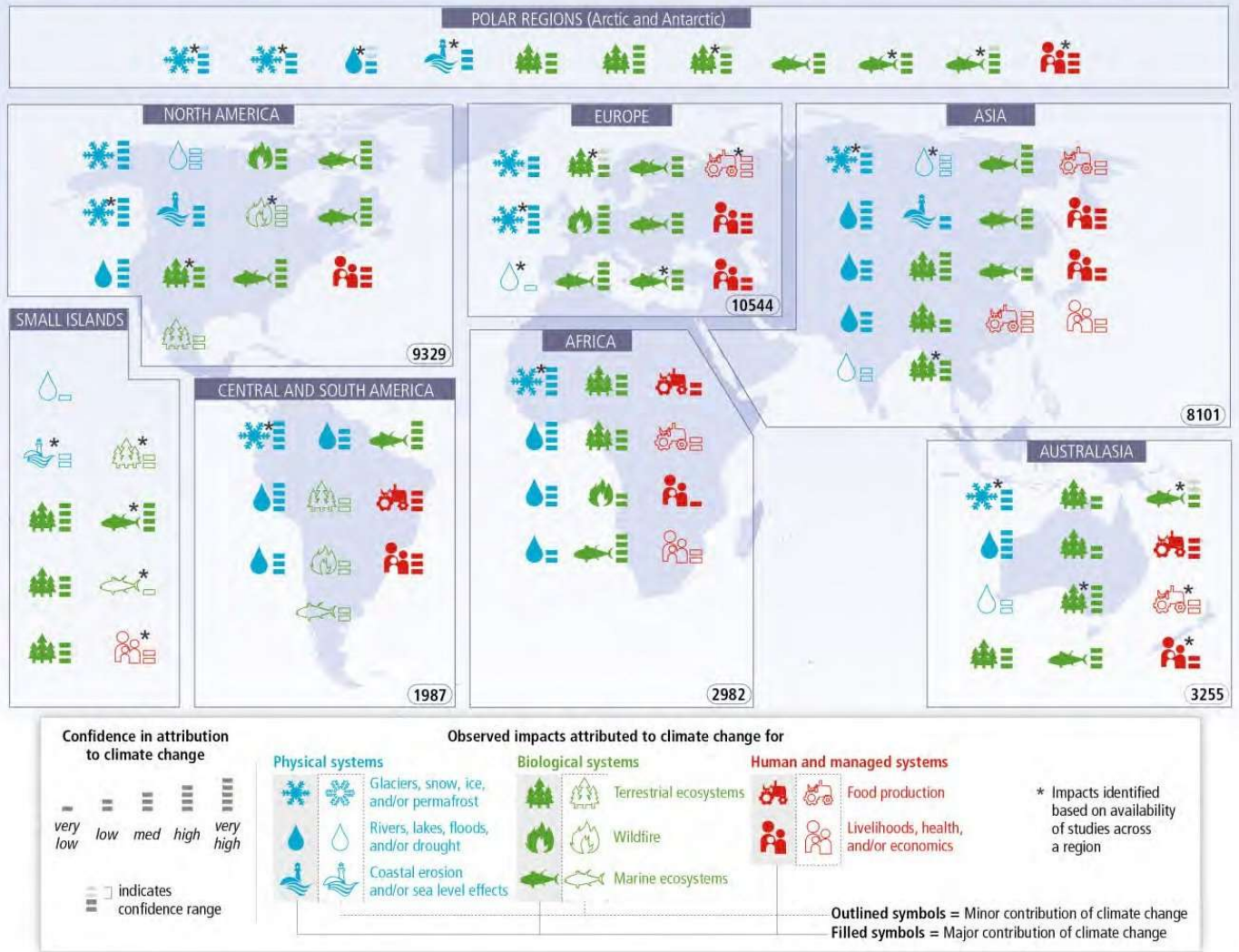
Climate Projections



- 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>**.

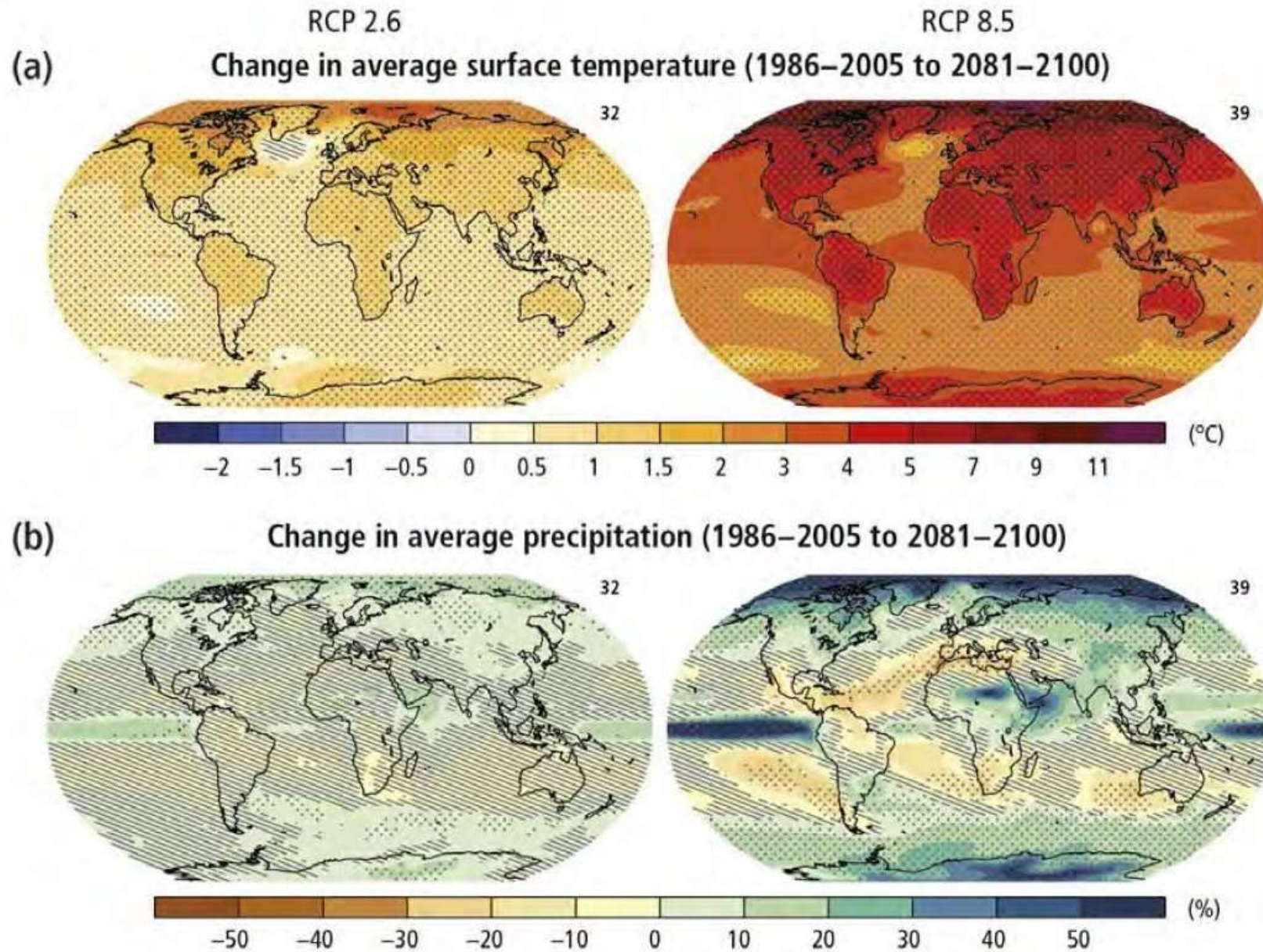
Climate Impacts

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



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.**

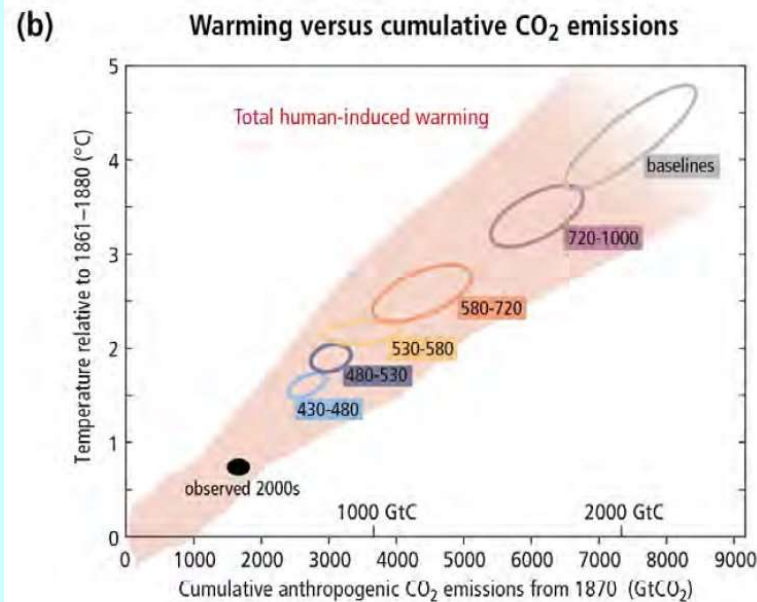
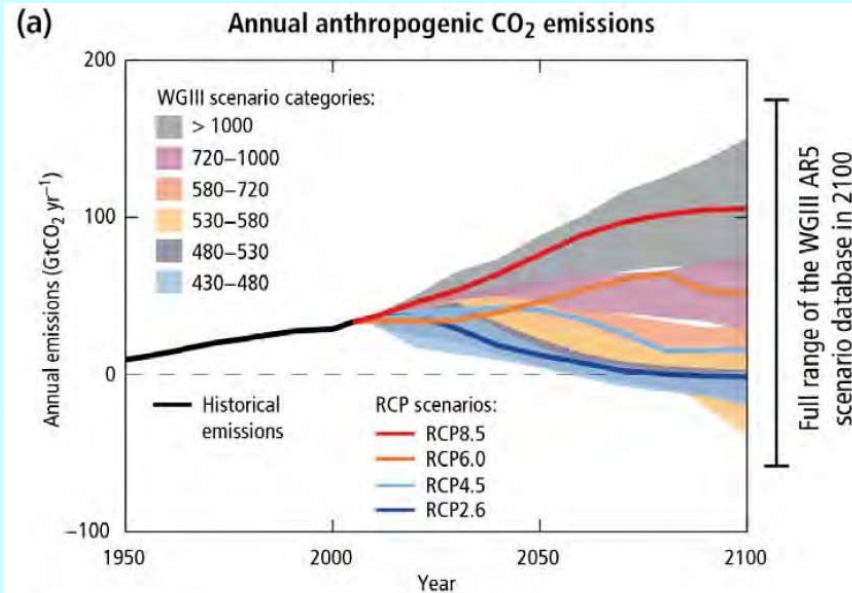
Mitigation

- **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.**

Nuclear Energy

- **WG-III AR5 SPM: “Nuclear energy is a mature low-GHG emission source of baseload power, but its share of global electricity generation has been declining (since 1993). Nuclear energy could make an increasing contribution to low-carbon energy supply, but a variety of barriers and risks exist.** Those include: operational risks, and the associated concerns, uranium mining risks, financial and regulatory risks, unresolved waste management issues, nuclear weapon proliferation concerns, and adverse public opinion (robust evidence, high agreement). New fuel cycles and reactor technologies addressing some of these issues are being investigated and progress in research and development has been made concerning safety and waste disposal.”

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.
- **The remaining “Carbon Budget” will be used up in 30 years.**

BRING HOME MESSAGE - 1

- IPCC Produces synthesis of global science literatures – science relevant but non-policy prescriptive.
- The most recent report, AR5 produced in 2013-2014, states, inter alia:
 - 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.
 - **Cumulative emissions of CO₂ largely determine global mean surface warming by the late 21st century and beyond.**

IPCC National GHG Inventories Programme

- IPCC NGGIP has produced a number of inventory guidelines, related guidance and tools, which are essentially international standards for estimation of GHG emissions and removals.

- See:

<https://www.ipcc-nggip.iges.or.jp/>

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

Before changing the gear --

- Corporate decision-making requires justification, based on, environmental regulations or other factors that affect economic status (or corporate external images).
- In other words, environment policies can take approaches of (i) “Command and Control” and/or (ii) “Economic Policy Tools”.
- In the climate context, (i) international mitigation commitment and its national implementation, and (ii) emission trading (both international and domestic) and carbon pricing (tax or subsidy) are such examples.

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/CMP8 (2012, Doha)

- CMP 8 adopted **Doha Amendment to Kyoto Protocol** and decided that the **second commitment period** under the Kyoto Protocol **begins on 1 January 2013** and **ends** on 31 December 2020, to be decided by the AWG-KP 17 (in 2012).
- I: Annex B Table, II: Gases (NF3 Added), III: KP Amendments.
- As of **3 May 2018, 112 Parties** have deposited their instrument of acceptance of DA (144 acceptance is required.)

<https://unfccc.int/process/the-kyoto-protocol/the-doha-amendment>

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>

- **UNFCCC Secretariat**

<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, 2016, 2017 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>

https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf

UNFCCC COP21

Overview

- **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 Decisions - 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:

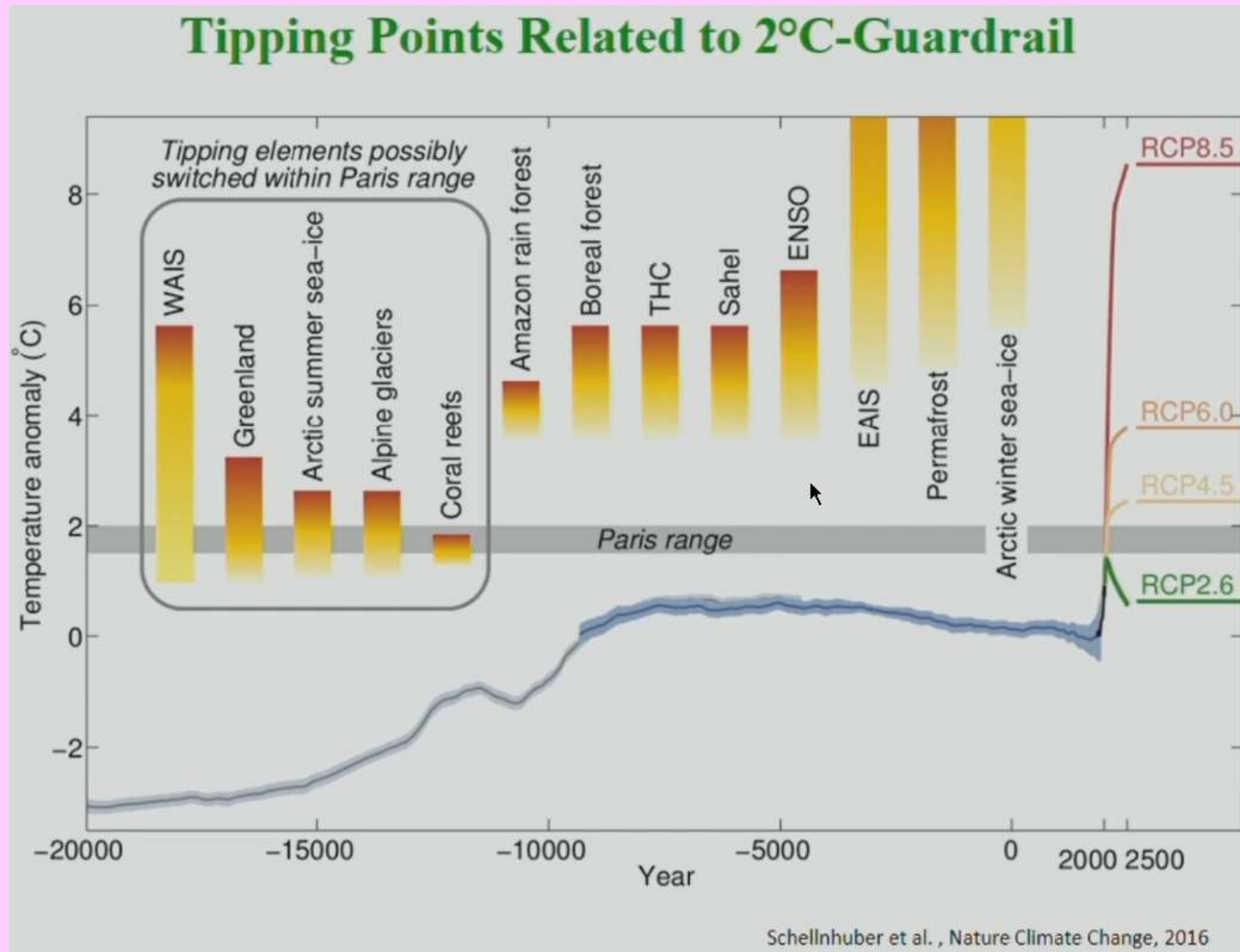
(a) Holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change;

(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 ...

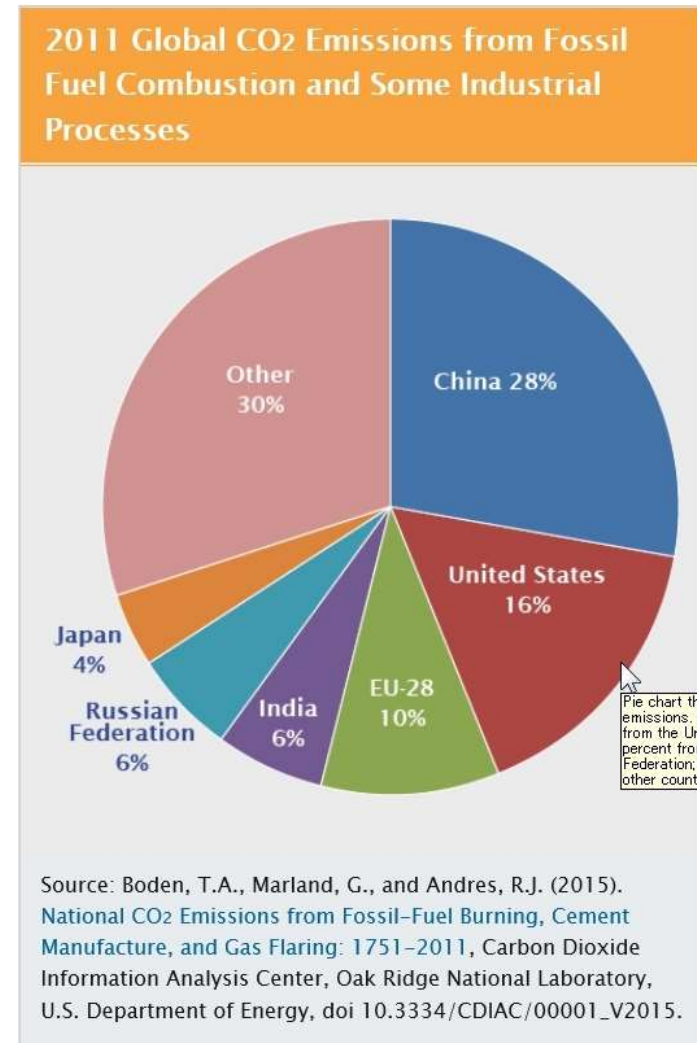


GHG Emission data for Article 21.

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.

BRING HOME MESSAGE - 2

- International legal bases are; UNFCCC (1992), Kyoto Protocol (1997) and Paris Agreement (2015) .
- UNFCCC provides legal framework, including “ultimate objectives” and “common but differentiated responsibilities、
- Kyoto Protocol contains legal obligations only for developed countries (“Annex-I Parties”) with specified mitigation commitments. ”. Kyoto Flexibility Mechanisms are provided.
- Paris Agreement is applicable to all the Parties, and provides objectives (e.g., 1.5 - 2 degrees goal), aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty. But there is no legal obligations of mitigation targets.

After UNFCCC COP21 and Paris Agreement

- Partly thanks to the US-China's expressed positive positions, the Paris Agreement took effect before the COP22 (In Marrakech, 7th November 2016.)
- US Presidential election was held on Day-2 of COP22, but US' non-Federal bodies and industry representatives maintained their commitments to implement the Paris Agreement.
- At COP23 (in Bonn, 7th November 2017), US participated in technical discussions but **there were strong presence of US "We are still in" group.**

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 (in 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/>

BRING HOME MESSAGE - 3

- PA took effect within one year.
- However, new US Administration has decided to leave from PA (the withdrawal will take effect only in November 2020 under PA Article 28). Nonetheless, US has concluded not to implement its own NDC.
- On the other hands, in June 2017, a coalition of US economic, education, and local government leaders announced they will continue to abide by the Paris agreement regardless of America's withdrawal, forming the We Are Still In movement. The coalition represents 120 million Americans and \$6.2 trillion of the US economy. In total, the group includes 125 cities, 9 states, 902 businesses and investors, and 183 colleges and universities.

<https://www.wearestillin.com/we-are-still-declaration>

<https://www.businessinsider.com/we-are-still-in-group-represents-62-trillion-of-the-us-economy-plans-to-stay-in-paris-agreement-2017-6>

As for Japan,

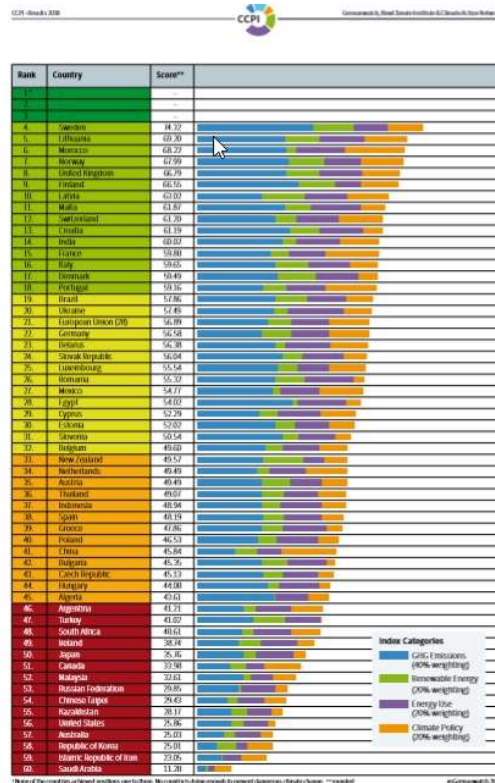
- The level of ambition in INDC is perceived rather low.
- Since Japan does not participate in the KP Second Commitment Period (CP-2), Japan can not use KP Flexibility Mechanisms., including CDM. In this regard, a Joint Crediting Mechanism (JCM) is being implemented as bilaterally-agreed system. However,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

INDCs – an international comparison

	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だろう。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。

Germanwatch は、日本のINDCをかなり低く評価している。(60か国中50位。)

Annex

Mitigation Options

A variety of options exist, but all are challenging.

- Energy conservation
- Afforestation/REDD+
- Biomass utilization
- CCS/BECCS
- Nuclear energy
- Mitigation by renewable power generation.
 - **Renewable Energy** (hydro, wind, solar (PV and heat), geothermal)

Climate Mitigation Actions

– Focusing on Renewable Energy

Data Sources

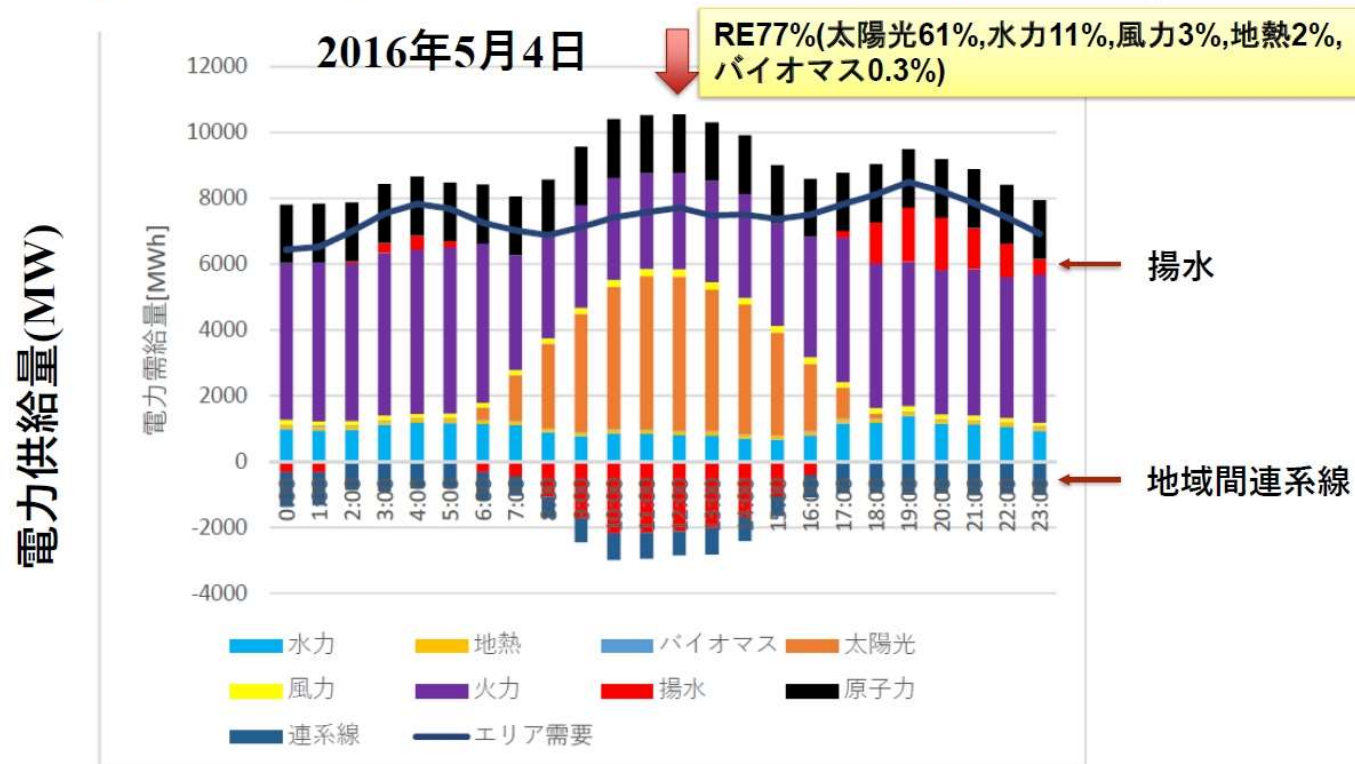
- [Renewable Research Institute https://renewable-ei.org/en/](https://renewable-ei.org/en/)
- [IRENA <http://www.irena.org/>](http://www.irena.org/)
- Institute for Sustainable Energy Policies [<https://isep-energychart.com/>](https://isep-energychart.com/)
- [Bundesnetzagentur - SMARD](#)
- [Fraunhofer Institute - Energy Charts](#)
- Agora Energiewende - [Agorameter](#)
- [Energinet.dk](#)
- Kyoto University Economic Research Institute http://www.econ.kyoto-u.ac.jp/renewable_energy/about

Renewable Energy

Costs of Solar (PV) and of Wind Power generation have been drastically decreasing, but to further increase them, investments and technologies are required to accommodate their output fluctuations.

電力供給エリア毎の需給実績データ:九州電力エリア

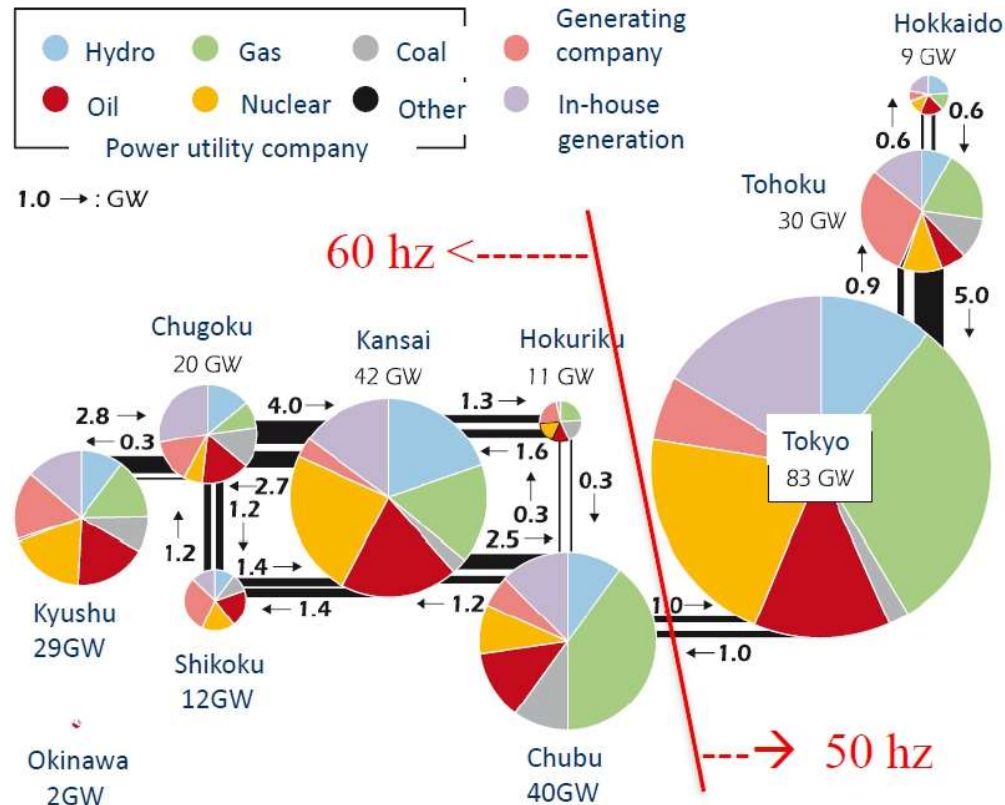
九州電力エリアの自然エネルギーが電力需要の最大77%に(1時間値)



Difficulties caused by small and thin power grids in Japan

<公益財団法人 笹川平和財団会長 田中 伸男氏の資料から>

Lack of Grid connectivity in Japan



Source: Agency for Natural Resources and Energy, The Federation of Electric Power Companies of Japan, Electric Power System Council of Japan, The International Energy Agency

Power Sources – Japan (August 2017)

地域

全国

日付

年 月 日

2017 8 1

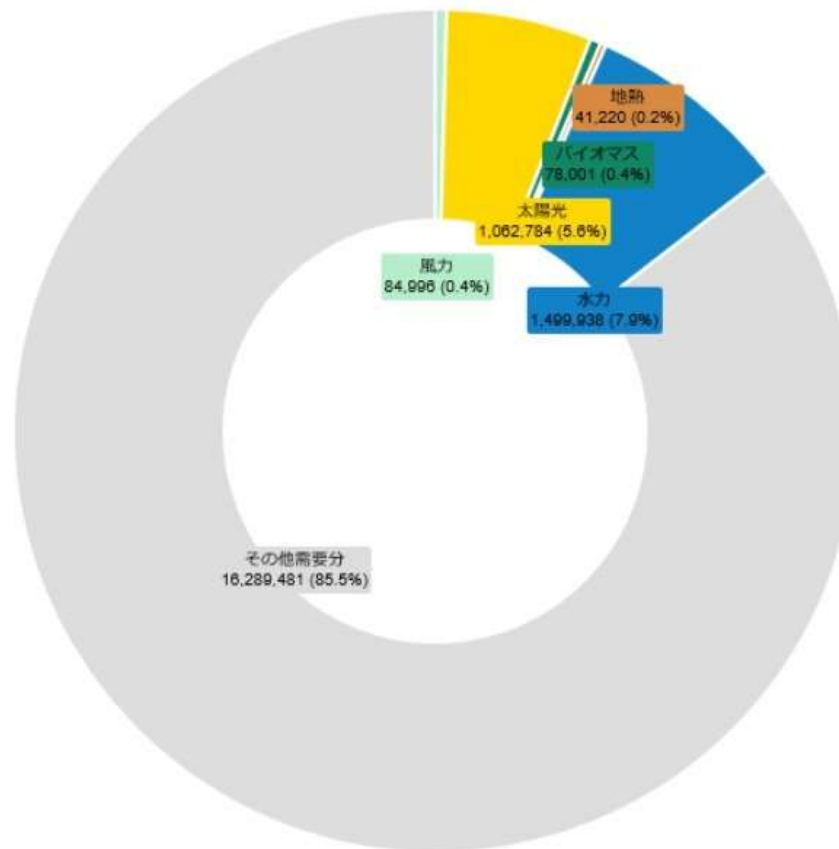
期間

1週

表示形式

需要に占める割合

ダウンロード



電源構成 - 全国 - 発電量[MWh]

風力	84,996	0.4%
太陽光	1,062,784	5.6%
バイオマス	78,001	0.4%
地熱	41,220	0.2%
水力	1,499,938	7.9%
再生可能エネルギー 合計 (MWh)	2,766,939	14.5%
エリア需要(MWh)	19,056,420	100.0%

風力 太陽光 バイオマス 地熱 水力 その他需要分

Examples from Germany

- Power Sources

Fraunhofer ISE

ENERGY CHARTS Publishing Notes | Data Pr

Home | Power | **Energy** | Emissions | Prices | Map of power plants | Information

Electricity generation in Germany in 2018

date selection

year: 2018

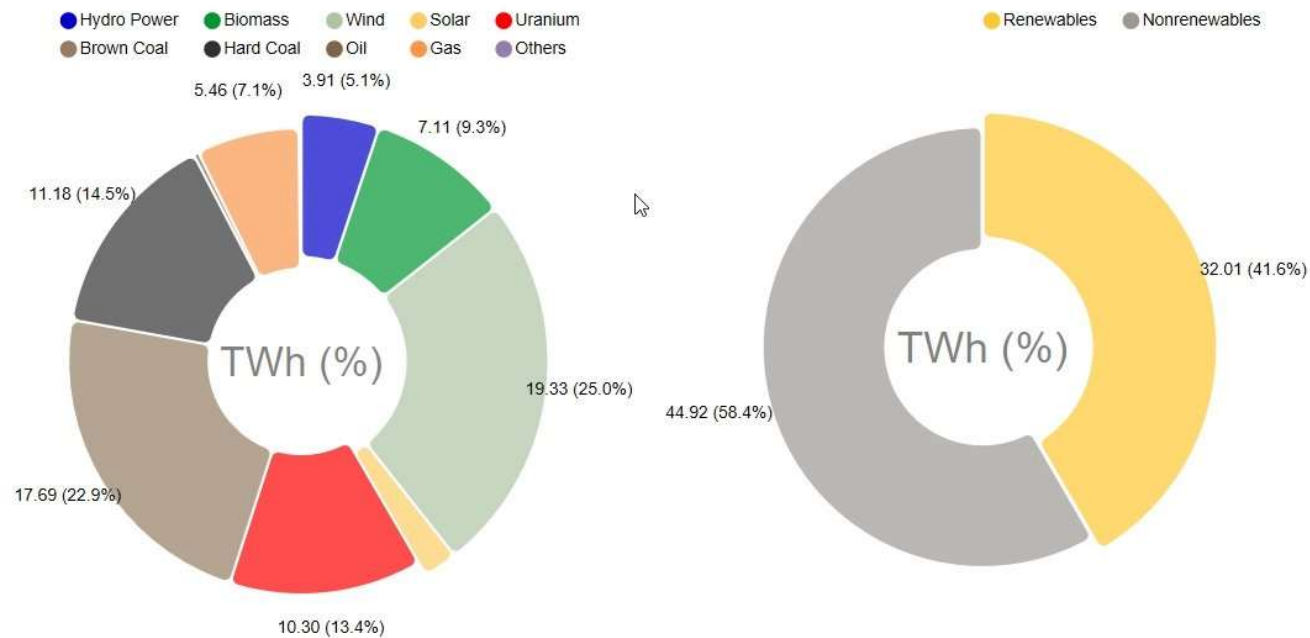
month:

week:

day:

print

usage tips

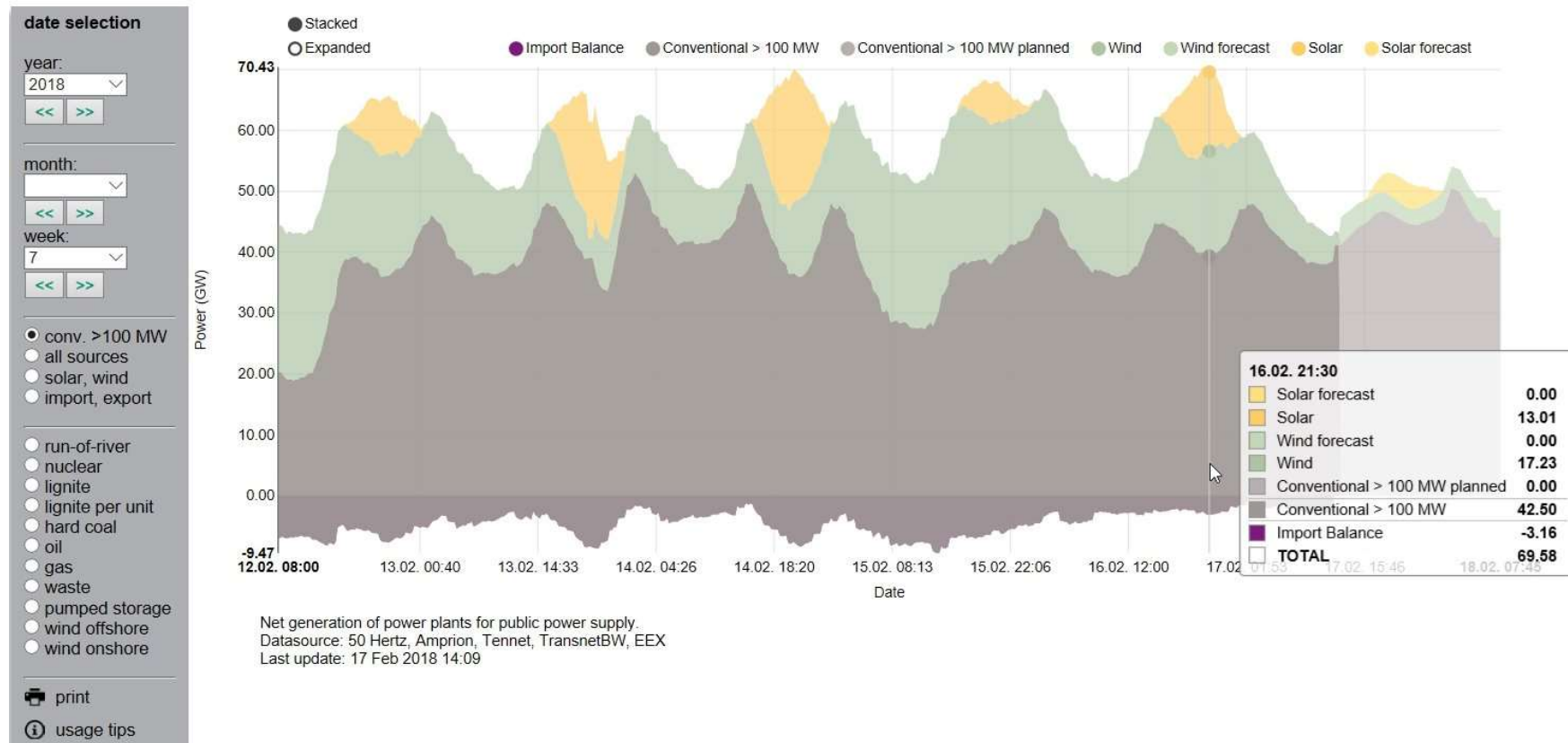


Net generation of power plants for public power supply.
 Datasource: 50 Hertz, Amprion, Tennet, TransnetBW, Destatis, EEX
 Last update: 17 Feb 2018 14:09

Examples from Germany - daytime



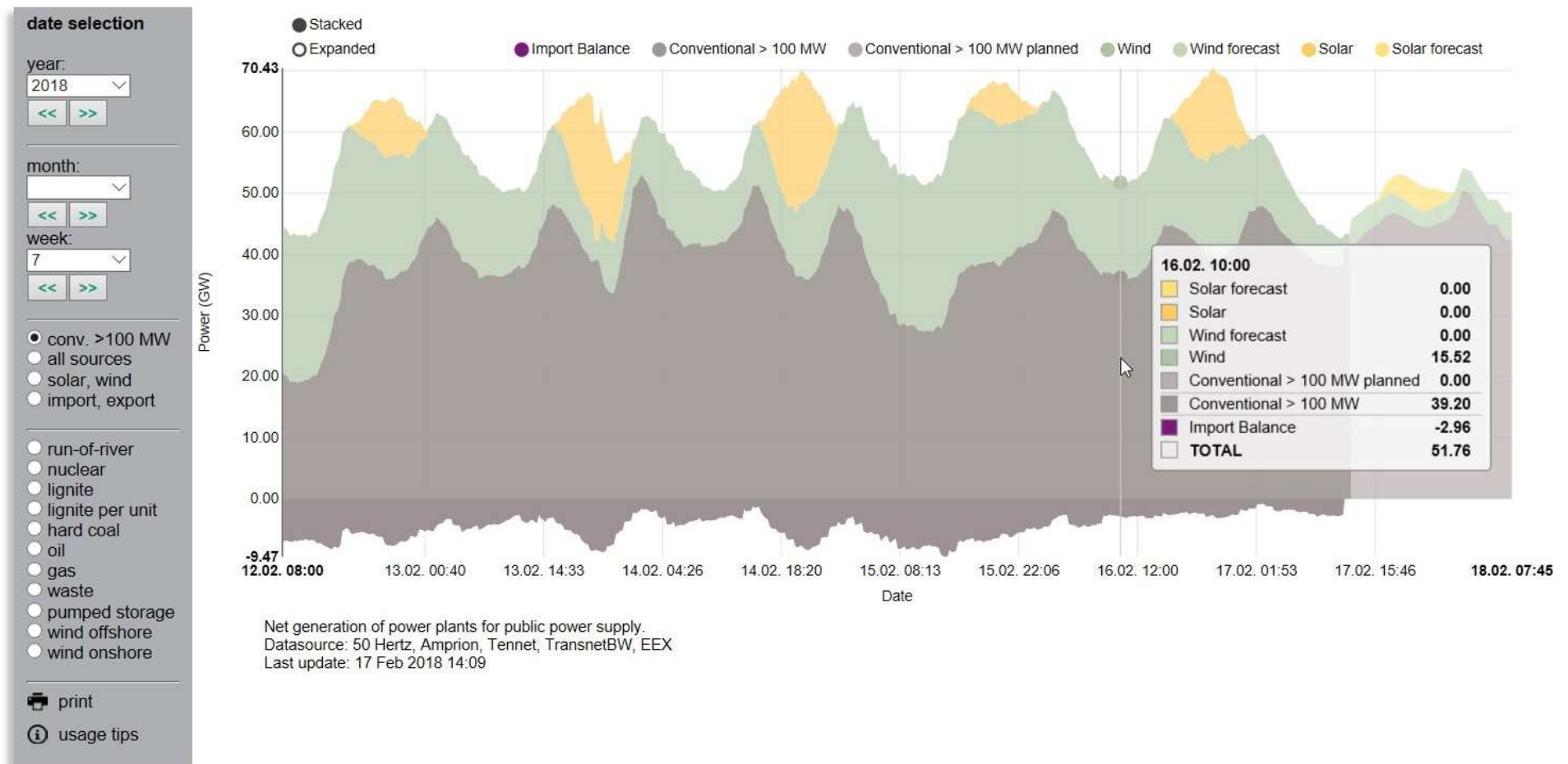
Electricity production in Germany in week 7 2018



Examples from Germany - nighttime



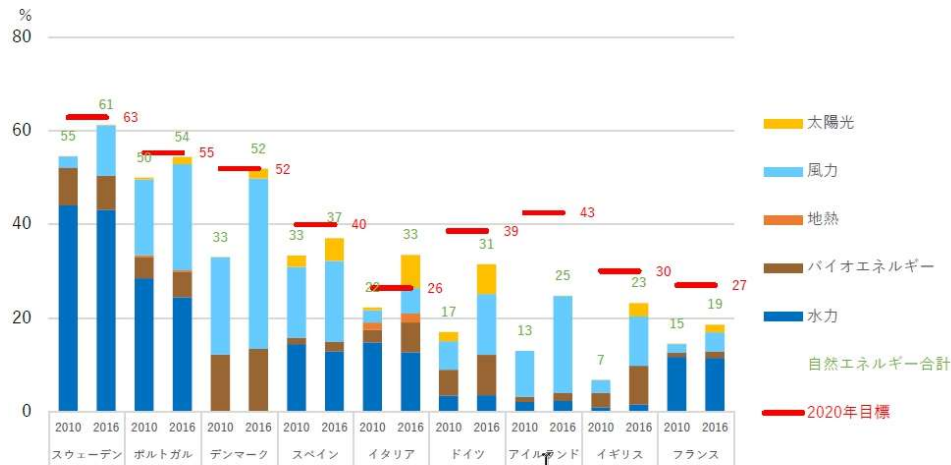
Electricity production in Germany in week 7 2018



自然エネルギー：日欧比較

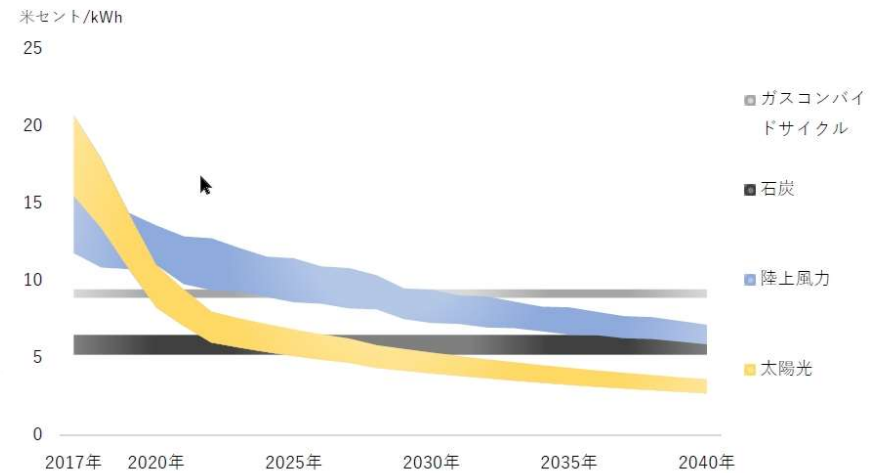
- 公益財団法人 自然エネルギー財団報告書「電力会社に迫る変革の波－欧州が先行する新時代の戦略－」 → [報告書](http://renewable-ei.org/activities/reports_20171006.php)
- http://renewable-ei.org/activities/reports_20171006.php

図 2：欧州の主要国における発電電力量に占める自然エネルギーの比率



出典：IEA 「Electricity Information 2017」ほか

図 26：日本における均等化発電コスト（LCOE）の将来予測



注：運転期間を太陽光が25年、陸上風力が20年、ガスコンバインドサイクルが25年、石炭が35年で計算

出典：BNEF 「Japan range of LCOE forecasts by technology」 (April 2017)

石炭: 開発、投資に関する国際的議論

近年、温暖化防止の観点から、石炭への投資を制限すべきとする国際的な議論が増大しており、日本に対する批判的な意見が多くみられている。

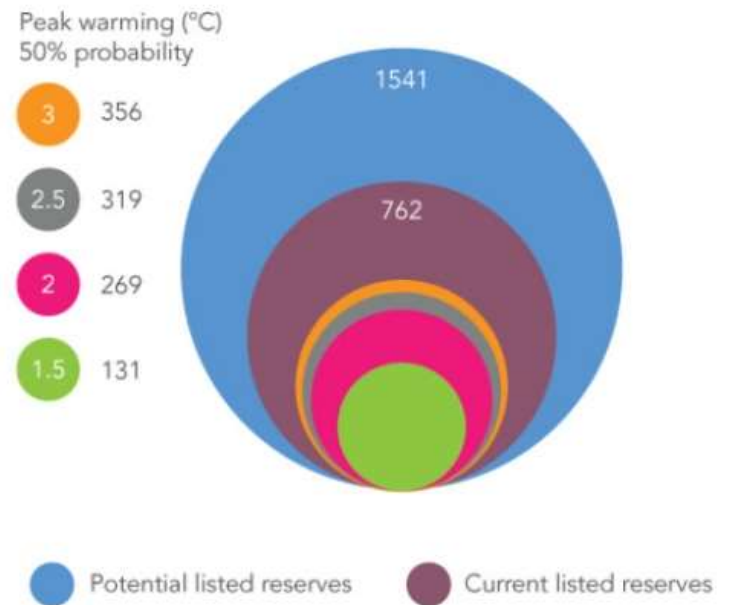
- <http://www.carbontracker.org/report/unburnable-carbon-wasted-capital-and-stranded-assets/>
- <http://www.smithschool.ox.ac.uk/research-programmes/stranded-assets/>
- <http://web.unep.org/emissionsgapreport2015>
- http://uneplive.unep.org/media/docs/theme/13/EGR_2015_Technical_Report_final_version.pdf
- <http://www.unep.org/publications/ebooks/emissionsgapreport2014/>
- <http://gofossilfree.org/>
- <https://350.org/>
- <https://breakfree2016.org/>

OECD 石炭ECA (Export Credits Arrangement)

- [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=tad/pg\(2016\)1](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?doclanguage=en&cote=tad/pg(2016)1)
- <http://www.oecd.org/tad/xcred/theexportcreditsarrangementtext.htm> (Export Credit Arrangement <ECA>)

http://awsassets.panda.org/downloads/ngos_will_oecd_lag_behind_emerging_countries_oct15.pdf

Comparison of listed reserves to 50% probability pro-rata carbon budget



Carbon Tracker and [the Grantham Research Institute](#) on Climate Change and the Environment

2030年SDアジェンダ

- UNGA Resolution 70/1. Transforming our world: the 2030 Agenda for Sustainable Development (25th Sept. 2015)
- http://www.keepeek.com/Digital-Asset-Management/oecd/economic-and-social-development/the-sustainable-development-goals-report-2016_3405d09f-en#page10
- http://www.un.org/en/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E



- 17 のゴール、169 の目標、300近いインディケーターを含む。

- 実施原則として、①普遍性、②包摂性、③参画型、④統合性、⑤透明性と説明責任、が掲げられている。

- 邦訳(外務省仮訳)
<http://www.mofa.go.jp/mofaj/files/000101402.pdf>

- SDG 虎の巻
http://www.unic.or.jp/files/UN_DPI_SDG_0707.pptx

インディケーター:

<https://unstats.un.org/unsd/statcom/48th-session/documents/2017-2-IAEG-SDGs-E.pdf>

温暖化対策(2030 SD Goal 13)

2030年Agendaはパリ協定の3か月前に合意されたため、Goal 13には定量的目標が入っていない。

Goal 13. Take urgent action to combat climate change and its impacts*

13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries

13.2 Integrate climate change measures into national policies, strategies and planning

13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible

13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

非政府機関や地方自治体の 前向きな対応が多くみられる。

NAZDA (後述)

グローバルコンパクト

<http://ungcjin.org/>

エコアクションガイドライン

<http://www.env.go.jp/policy/j-hiroba/04-5.html>

http://www.env.go.jp/policy/j-hiroba/ea21/guideline2009rev_ja.pdf

エコファースト

<http://www.env.go.jp/guide/info/eco-first/kijun.html>

関係リンク

http://www.env.go.jp/policy/keiei_portal/link/index.html

2030年SDアジェンダの推進

- 持続可能な開発目標(SDGs)推進本部が内閣に設置されており、2016年10月SDG実施指針の骨子等がまとめられ、パブコメに付されたのち、12月22日決定された。

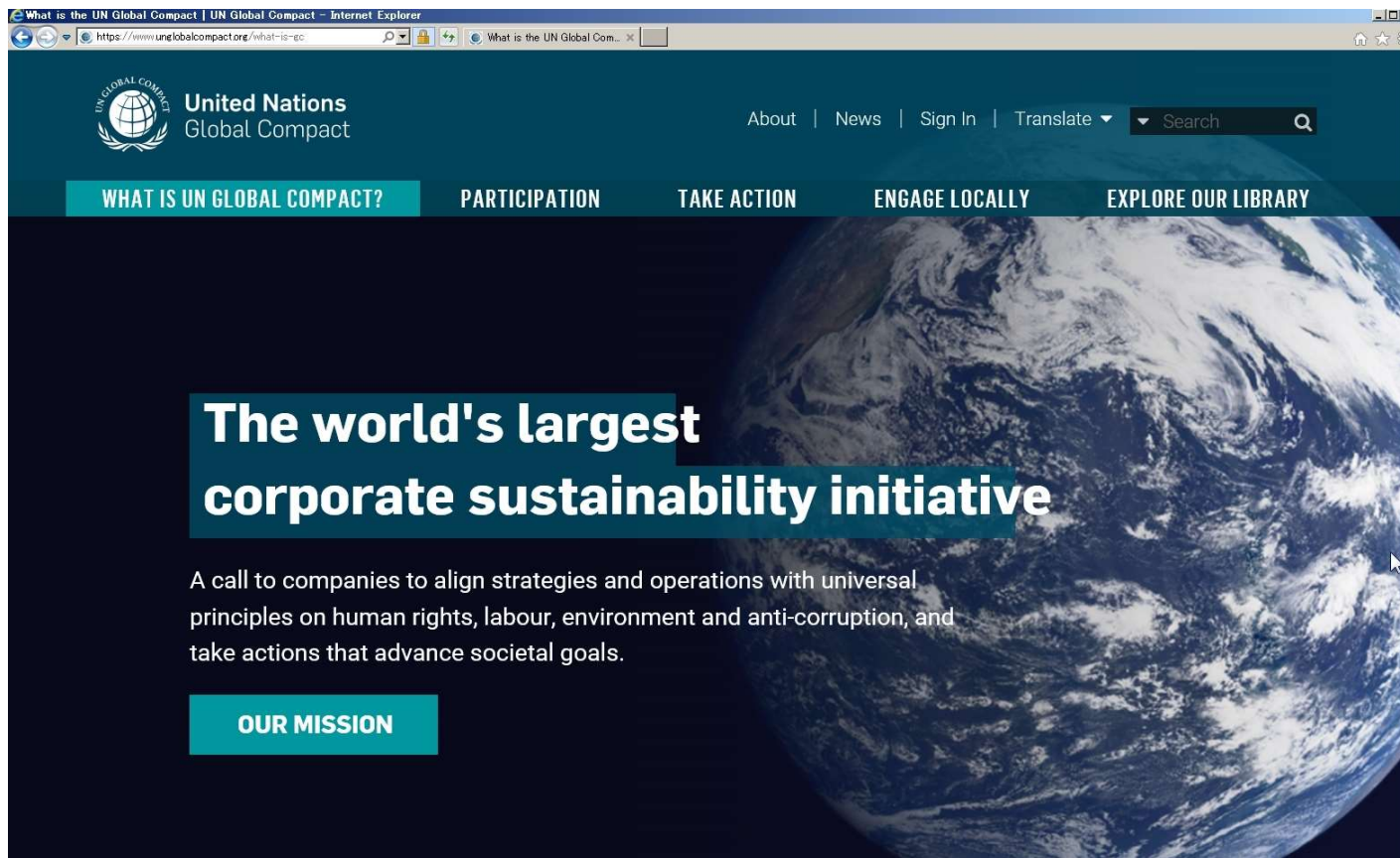
<http://www.kantei.go.jp/jp/singi/sdgs/index.html>

- 実施指針本文:

<http://www.kantei.go.jp/jp/singi/sdgs/dai2/siryoku1.pdf>

- 同指針では、「持続可能で強靱、そして誰一人取り残さない、経済、社会、環境の統合的向上が実現された未来への先駆者を目指す」ことを、ビジョンと規定。なお、この指針では、SDGを8つの優先分野として再編成している。
- 2030 Agenda は、各ゴール、ターゲットが相互に深く関係しているものが多く、実施面でも多くの課題がある。
- なお、温暖化関係では、パリ協定の採択より3か月先行したこともあり、定量的な目標が不足しているという面がある。

自治体、産業団体等の非政府機
関の努力の拡大の動き



国連グローバルコンパクト

世界約160カ国で1万3000を超える団体（そのうち企業が約9,000。日本企業は、>250. ）

<https://www.unglobalcompact.org/what-is-gc>

グローバルコンパクト10原則

<http://ungcn.org/gc/principles/index.html>

日本の組織 <http://ungcn.org/>

温暖化問題に取り組む企業グループ

- [日本気候リーダーズ・パートナーシップ \(Japan-CLP\)](http://www.japan-clp.jp/index.php/japanclp)

<http://www.japan-clp.jp/index.php/japanclp>

Japan-CLP 3つの目的

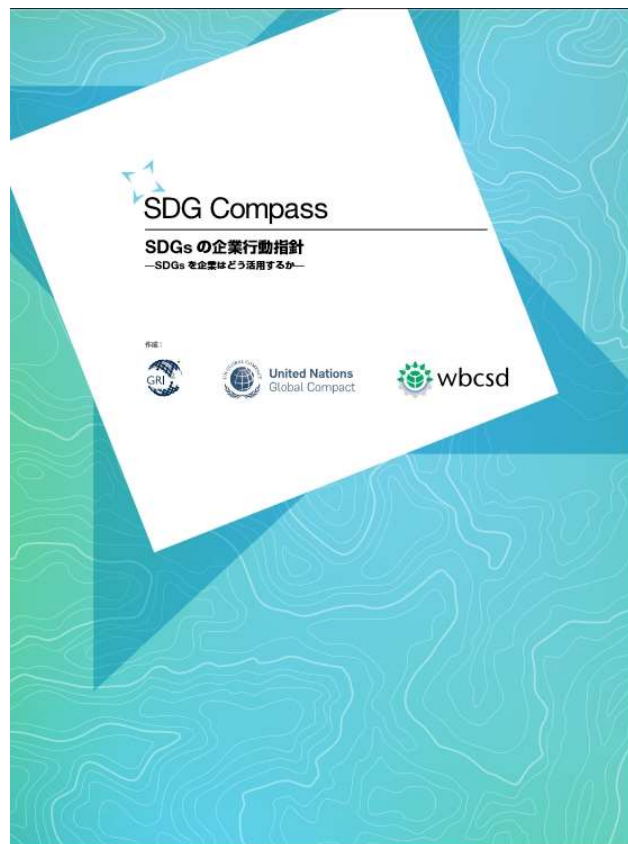
- 1** 脱炭素化を経済活動の前提として捉え、持続可能な脱炭素社会の実現を目指す
- 2** 持続可能な脱炭素社会に向けた共通のビジョンを描き、参加企業が自らコミットメントを掲げ、率先して実行する
- 3** 社会の変化を加速するために積極的なメッセージを発信し、アジアを中心に活動する

2030年SDアジェンダ

- **SDGコンパス(企業の活動指針)**

http://sdgcompass.org/wp-content/uploads/2016/04/SDG_Compass_Japanese.pdf

http://sdgcompass.org/wp-content/uploads/2016/04/SDG_Compass_Japanese.pdf

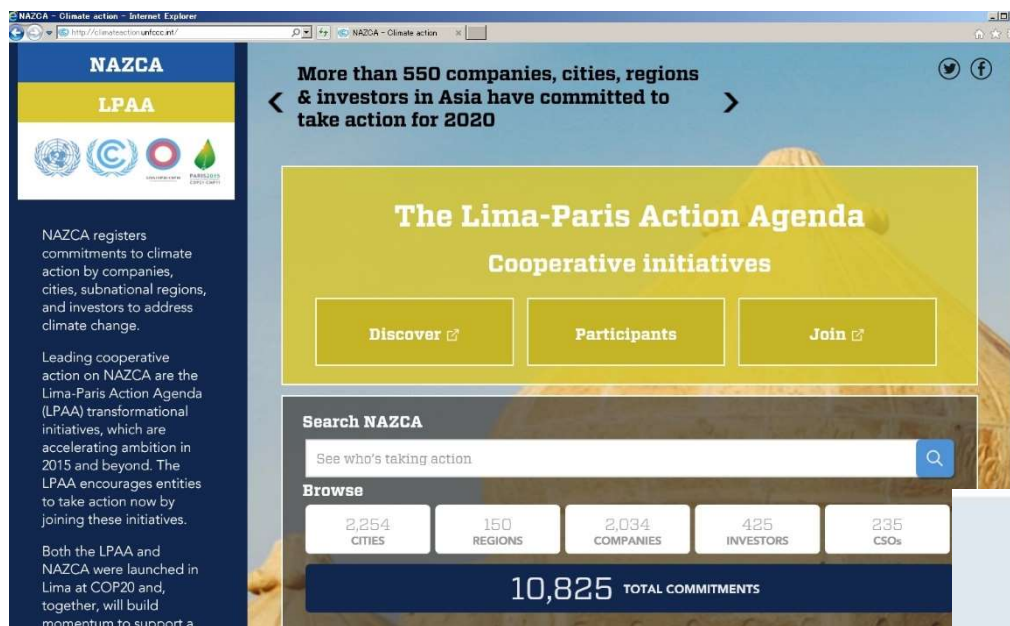


“本SDG Compassは、各企業の事業にSDGsがもたらす影響を解説するとともに、持続可能性を企業の戦略の中心に据えるためのツールと知識を提供するものである。”

- 目標 1 あらゆる場所のあらゆる形態の貧困を終わらせる
- 目標 2 飢餓を終わらせ、食料安全保障及び栄養改善を実現し、持続可能な農業を促進する
- 目標 3 あらゆる年齢のすべての人々の健康的な生活を確保し、福祉を促進する
- 目標 4 すべての人々への包摂的かつ公正な質の高い教育を提供し、生涯学習の機会を促進する
- 目標 5 ジェンダー平等を達成し、すべての女性及び女児のエンパワメントを行う
- 目標 6 すべての人々の水と衛生の利用可能性と持続可能な管理を確保する
- 目標 7 すべての人々の、安価かつ信頼できる持続可能な近代的エネルギーへのアクセスを確保する
- 目標 8 包摂的かつ持続可能な経済成長及びすべての人々の完全かつ生産的な雇用と働きがいのある人間らしい雇用（ディーセント・ワーク）を促進する
- 目標 9 強靱（レジリエント）なインフラ構築、包摂的かつ持続可能な産業化の促進及びイノベーションの推進を図る
- 目標 10 各国内及び各国間の不平等を是正する
- 目標 11 包摂的で安全かつ強靱（レジリエント）で持続可能な都市及び人間居住を実現する
- 目標 12 持続可能な生産消費形態を確保する
- 目標 13 気候変動及びその影響を軽減するための緊急対策を講じる
- 目標 14 持続可能な開発のために海洋・海洋資源を保全し、持続可能な形で利用する
- 目標 15 陸域生態系の保護、回復、持続可能な利用の推進、持続可能な森林の経営、砂漠化への対処、ならびに土地の劣化の阻止・回復及び生物多様性の損失を阻止する
- 目標 16 持続可能な開発のための平和で包摂的な社会を促進し、すべての人々に司法へのアクセスを提供し、あらゆるレベルにおいて効果的で説明責任のある包摂的な制度を構築する
- 目標 17 持続可能な開発実施手段を強化し、グローバル・パートナーシップを活性化する

非政府機関の温暖化対策イニシアティブの例

「NAZCA」は、広義の企業責任と社会的貢献
企業、団体等の活動のデータベースプラットフォーム
(UNFCCC COP21 で発足した。)



COP21 当時

<http://climateaction.unfccc.int/>

2017.08 現在



広義の企業責任と社会的貢献 – コミットメント

グローバルコンパクト

<http://ungcjin.org/>

エコアクションガイドライン

<http://www.env.go.jp/policy/j-hiroba/04-5.html>

http://www.env.go.jp/policy/j-hiroba/ea21/guideline2009rev_ja.pdf

エコファースト

<http://www.env.go.jp/guide/info/eco-first/kijun.html>

関係リンク

http://www.env.go.jp/policy/keiei_portal/link/index.html

広義の企業責任と社会的貢献 – 報告

Global Reporting Initiative (GRI)など
-- 相互関係が複雑。

GRI Standards

<https://www.globalreporting.org/standards/Pages/default.aspx>

<https://www.globalreporting.org/standards/g4/Pages/default.aspx>

Transition to Standards

<https://www.globalreporting.org/standards/transition-to-standards/Pages/default.aspx>

G4 暫定訳

<http://www.nippon-foundation.or.jp/news/articles/2013/80.html>

サステナビリティ日本フォーラム

<http://www.sustainability-fj.org/gri/>

環境報告ガイドライン

<http://www.env.go.jp/policy/report/h24-01/index.html>

<http://www.env.go.jp/policy/report/h24-01/full.pdf>

G4

Global Reporting Initiative
Sustainability Reporting Guidelines

G4

サステナビリティ・レポート・ガイドライン
日本語版(暫定版)

環境金融・投資

環境省 21世紀金融行動原則

http://www.env.go.jp/policy/keiei_portal/kinyu/gensoku.html

http://www.env.go.jp/policy/keiei_portal/common/pdf/principlesbooklet.A3.20150916.pdf

Accounting for Sustainability

<http://www.accountingforsustainability.org/>

<https://www.fsb-tcfd.org/>

The International Integrated Reporting Council

<http://integratedreporting.org/the-iirc-2/>

Climate Disclosure Standards Board (CDSB)

<http://www.cdsb.net/international/japan/page-one>

UNEP FI

http://www.unepfi.org/regional_activities/asia_pacific/japan/about/

Principles for Responsible Investment Initiative

<https://www.unpri.org/>

Equator Principles

<http://www.equator-principles.com/>

<http://www.bsr.org/files/jp-newsletter/003-japan-newsletter.html>

グリーンボンド

<http://www.worldbank.org/en/topic/climatechange/brief/what-are-green-bonds>

グリーンボンドに関する検討会。

<http://www.env.go.jp/policy/greenbond/gb/conf/conf.html>

環境省グリーンボンドガイドライン2017。

http://www.env.go.jp/policy/greenbond/gb/conf/greenbond_guideline_17.pdf

金融安定理事会気候関連財務情報開示タスクフォース (TCFD)

<https://sustainablejapan.jp/2017/06/29/tcfd-final-report/27274>

Taka Hiraishi (平石 尹彦)

- 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)