Climate Change and IPCC

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

- Established by UNEP and WMO in 1988.
- Members are Governments ….. Currently 193
- In 26 years, 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 recommend any policies.
“IPCC should be policy-relevant but not policy-prescriptive.”
IPCC organisation

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

- Working Group I
  - The Physical Science Basis
  - TSU (Switzerland)

- Working Group II
  - Climate Change Impacts, Adaptation and Vulnerability
  - TSU (USA)

- Working Group III
  - Mitigation of Climate Change
  - TSU (Germany)

- Task Force on National Greenhouse Gas Inventories
  - TSU (Japan)

Authors, Contributors, Reviewers
IPCC Reports are drafted (synthesising international literature) by selected authors, but go through two stages of international Peer Review Process. Thus, they represent a broad spectrum of international science.
First Assessment Report (1990) (FAR)
2 years before the UNFCCC

2 years before Kyoto Protocol

Made when Parties were considering Kyoto Protocol ratification

Made when Parties were negotiating post-2012 climate agreement.
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 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/>
Observed Climate Change

- Warming of the climate system is unequivocal.
- 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, sea level has risen, and the concentrations of greenhouse gases have increased.
Anthropogenic greenhouse gas emissions have increased that are unprecedented in at least the last 800,000 years. Between 1750 and 2011, cumulative anthropogenic CO2 emissions to the atmosphere were $2040 \pm 310$ GtCO2. About 40% of these emissions have remained in the atmosphere ($880 \pm 35$ GtCO2). The ocean has absorbed about 30% of the emitted anthropogenic CO2, causing ocean acidification.
Ocean Surface Water CO2 and decrease of pH

海面の二酸化炭素と pH
Emission of GHGs
Drivers of Climate Change (WG-I SPM)

- 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.
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>.
Future Climate Change Projections

- Global mean surface temperature increase as a function of cumulative total global CO2 emissions from various lines of evidence.
- In order to limit temperature rise below 2 degrees C, cumulative CO2 emissions must be lower than 3000 Gt. (1890Gt have been already emitted and cumulative emission would reach at this level in about 30 years.)
There have been many reports on climate impacts on the environment. Since 1950s, many climate extremes have been observed, such as decrease of extreme low temperature, increase of high temperature, sea level rise, and extreme rain storms.
Future Projections

(a) RCP 2.6
Change in average surface temperature (1986–2005 to 2081–2100)

(b) RCP 8.5
Change in average precipitation (1986–2005 to 2081–2100)
Climate change poses risks for food production

(A) Change in maximum catch potential (2051–2060 compared to 2001–2010, SRES A1B)

(B) Percentage of yield projections

Color Legend:
- 50 to 100%
- 25 to 50%
- 10 to 25%
- 5 to 10%
- 0 to 5%
- 0 to –5%
- –5 to –10%
- –10 to –25%
- –25 to –50%
- –50 to –100%
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

• Means do exist to limit temperature rise below 2 degrees C, but they require 40-70% emission reduction by 2050, and near-zero emissions by the end of of 21st Century, which involves technological, economic, social and institutional challenges.

• Mitigation options exist for all the major sectors. 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.
International Climate Actions
- Recent Developments
United Nations Framework Convention on Climate Change (UNFCCC)

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

21
Kyoto Protocol & First Commitment Period (2008-2012)

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

• International negotiations are on-going to develop new climate regimes after the second commitment period (2013-2020), towards COP21, to be held in November-December 2015 in Paris.

• United Nations Climate Summit was held in September 2014, where governments, inter-alia, reconfirmed the 2 degrees C target, but without concrete commitment for climate mitigation.

• In November 2014, USA and China agreed, bilaterally, including, (i) USA targets 26-28% mitigation by 2025, and (ii) China will aim at peaking out by 2030. However, some researchers projects 3 degrees warming (with EU’s 40% mitigation by 2030 from 1990.)
Outcome from COP20, Lima

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