RED CROSS/RED CRESCENT CLIMATE CENTRE

International Federation of Red Cross and Red Crescent Societies

The Netherlands Red Cross

What does the latest climate science mean for the Red Cross Red Crescent?

Key questions and answers about the IPCC's new report on the physical climate science
September 2013

Q: What is the IPCC?

A: The Intergovernmental Panel on Climate Change (IPCC) is a scientific body under the United Nations (UN) responsible for reviewing all knowledge on climate change. Thousands of scientists worldwide contribute to the IPCC; their lengthy reports are accompanied by "Summaries for Policy Makers" (SPM), reviewed line-by-line in a formal UN meeting and thus endorsed by all governments. This document then becomes the undisputed scientific basis for international negotiations about climate change and is used for national climate policy of many countries.

The recently released report is the Working Group I (WG I) report on the physical science of climate change: what has already happened and what could happen in the future in the atmosphere and oceans, as well as ice sheets and glaciers. In late March 2014, WG II will report on impacts and adaptation – what does climate change mean for human and natural systems and how can we deal with those changes. In April 2014, WG III will report on mitigation – how to reduce greenhouse gas emissions.

Q: Why is the new IPCC report important to the Red Cross Red Crescent?

A: This report indicates how the climate has already changed and will change in the future. Climate strongly affects many areas of Red Cross Red Crescent work, for instance, disaster risk and health.

The Red Cross Red Crescent follows these IPCC reports to be well-informed of the current consensus on climate change, in light of our own work and our policy dialogues with governments. Understanding the science enables us to anticipate how climate-related disasters and other humanitarian challenges might change in the future. In this document[1], we summarize the findings of the IPCC Working Group I report (WGI AR5)[2] for a Red Cross Red Crescent audience.

Q: Why is climate change of concern?

A: Vulnerable people will be hit the hardest by these changes. Previous reports have shown that the most vulnerable, including especially poor and marginalized people, will be hit hardest by climate change. Existing coping mechanisms will not be sufficient to deal with the increasing number of unusual climate events. [More on impacts will be discussed in the Working Group II report that is coming out in March 2014. Specifically for extremes see also the recent IPCC Special Report on Extremes.]

Q: Is climate change already happening?

A: Yes, climate change is already happening in the world today. Since 1950, changes to the earth's climate have included: warming of the atmosphere and oceans, reduced snow and ice, a rise in the level of the oceans, and changes in some climate extremes. Many of these observed changes are unusual or unprecedented in the last decades to millennia.

Global temperature has increased by almost 0.85°C since 1880. Since that period, almost the entire globe has experienced surface warming. For instance, the last three decades have successively been warmer than all earlier decades since 1850. There are *very likely*[3] fewer cold days and nights and more warm days and nights on the global scale.

[1] This briefing note represent the Red Cross Red Crescent's view on the IPCC WG I report. Exact IPCC statements are made using IPCC uncertainty language which is explained in box 1. The figures presented in this briefing note are based on IPCC figures.

[2] See www.climatechange2013.org

[3] The uncertainty language used throughout this document is the official IPCC uncertainty language and will therefore be presented in *italic*. For further explanation on this language, please see box 1.

Particularly relevant to the Red Cross Red Crescent, it is *likely* that the frequency of heat waves has increased in large parts of Europe, Asia and Australia, and the number of heavy precipitation events has increased in more regions (like North America and Europe) than where it has decreased.

Sea levels have been rising in the last 100 years: it is *likely* that the rate of sea-level rise has increased over the last century. The rate of global mean sea level rise since the mid-19th century is the highest it has ever been in the context of the last two millennia (*high confidence*). The increasing CO_2 concentration is also causing the ocean to become more acidic (which threatens marine ecosystems, coral reefs and fisheries for instance, with severe implications for coastal communities; more on these impacts will be discussed in the WG II report).

Q: But isn't it true that in the past 15 years, the warming has slowed down? Are we really sure that climate change will continue?

A: Climate change has caused a clear warming trend over the last 100 years, but there are many short-term ups and downs, for example due to volcanic eruptions, changes in the intensity of the radiation coming from the Sun, and other natural variations.

Although the climate is warming in the long term, that doesn't mean that every year will not be hotter than the previous one. We expect to see ups and downs in temperatures from year to year as the overall temperatures continue to rise. These short-term ups and downs due to El Niño and other natural variations can cause specific decades have stronger or weaker warming trends, and some decades might not in general reflect long-term climate trends. For example, in the past 15 years, temperatures rose less quickly than in previous years (since 1951). Nevertheless, the last decade (2001-2010) is the warmest on the record, and again, the long-term trend since 1901, shows clear warming over time.

Q: Why is global warming happening? Are we to blame?

A: Human influence has caused these changes. It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century. (In the language of IPCC reports, "extremely likely" has a precise meaning of at least a 95 per cent chance.) This confidence on human responsibility was "very likely'' (at least 90% chance) in the AR4 in 2007, "likely'' (66%) in 2001 and just over 50 per cent in the 1995. There is *high confidence* that human influence has already warmed the ocean, melted snow and ice, raised sea levels, and changed some climate extremes.

The reason is the increasing amount of greenhouse gases in the atmosphere, which act as a blanket over the earth and result in rising temperatures. The concentration of the main greenhouse gas released by human activity, CO_2, has increased by about 40% since 1750. The increase is a result of human activity, primarily due to burning of fossil fuels (such as coal, oil and gas) and secondarily from changes to land use, such as deforestation.

The current amount of the main anthropogenic greenhouse gases (CO_2, CH_4 and N_2O) in the atmosphere is substantially higher than ever before in the past 800,000 years (as measured from ancient air bubbles that have been trapped in ice for millennia). There is *very high confidence* that the amounts of CO_2, CH_4 and N_2O have risen faster during the past century than ever before in the last 22,000 years.

Q: What will the future look like?

***A:* In the future, we expect large changes in global, regional and local climate, particularly for temperature, precipitation and sea level.**

Global average surface temperature is *likely* (at least 66 per cent probability) to be between 0.3°C to 0.7°C higher in the period 2016-2035 compared to the period 1986-2005, according to the latest scientifically generated scenarios of future human influence (*medium confidence*). Towards the end of the century, the likely temperature rise depends more strongly on the way greenhouse gases emissions will evolve over the century, with an expected increase of up to 2.6-4.8 degrees for the most pessimistic scenario.

It is *virtually certain* that, in most places, there will be more hot extremes and fewer cold extremes. It is *very likely* (at least 90 per cent probable) that heat waves will occur more often and last longer.

Many places will see changes to rain or snow, and also changes to heavy rainfall or drought. It is not clear exactly how each region will change in the future, but some patterns are projected. By the end of the century, more rain/snow on average is *likely* in mid-latitude wet regions, in the high latitudes, and the equatorial Pacific Ocean. Less rain is *likely* in many mid-latitude and subtropical dry regions. Most land in mid-latitudes and wet tropical regions are *very likely* to see more intense and frequent extreme rainfall events.

Global average sea level will rise during the 21st century and this is *very likely* to be faster than the rise we have already observed. Towards the end of the century, sea level will depend on how emissions evolve, with the most pessimistic scenario *likely* to lead to a range of possible increase by 0.52 to 0.98 m.

Q: Will climate change affect disasters?
***A:* Yes, many extreme events have changed and will continue to change.**

Already, we have seen some extreme weather and climate events change since about 1950, as described in the IPCC *Special Report on Extremes*. It is *very likely* that heat waves will occur more often and last longer; however, occasional cold winter extremes will continue to occur. Most of the land in mid-latitudes and in wet tropical regions will *very likel*y see more intense and frequent extreme precipitation events.

Q: Can this be prevented?
***A:* Changes in the next few decades cannot be prevented; however, much more drastic climate changes at the end of this century can be prevented by action today.**

The main way to reduce climate change is to limit emissions of greenhouse gases (GHGs). However, many GHGs remain in the atmosphere for a long time (decades or even centuries). Therefore, even rapid reductions in emissions will not make a big difference for the on-going climate change in the next few decades, which is mainly determined by what has already been emitted up to now. We have no choice but to adapt to the changes and deal with the impacts.

However, the choices we make now regarding emissions do matter a lot for the climate we will witness in the second half of the 21st century; without rapid action, very important climate changes in 2050-2100 may be unavoidable.

Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Most aspects of climate change will persist for many centuries even if emissions of CO_2 are stopped. This represents a substantial multi-century climate change commitment created by past, present and future emissions of CO_2. Reduction in greenhouse gases emissions is needed to prevent our climate in the long-term from being drastically changed.

Q: What can we do to respond?
A: The Red Cross Red Crescent is building resilience to limit climate, health and disaster risk for the most vulnerable, and dealing with rising uncertainty by using forecasts on various timescales.

To prevent increasing humanitarian suffering, communities, civil society and governments need to invest in increasing resilience, especially at the local level.

In addition, we can deal with the increasing risks and rising uncertainties brought about by climate change by making better use of climate and weather forecasts at shorter-timescales, from seasonal to hourly, can be used to anticipate individual events and respond before the hazard becomes a disaster.

The Red Cross and Red Crescent is also committed to contribute to addressing the root causes of climate change through the promotion of environmentally-friendly behaviours, especially when they bring both adaptation and mitigation benefits, such as in the case of reforestation of hillsides to address rising flood risks.

This Q&A and the following scientific summary were prepared by the Line van Kesteren, Erin Coughlan and Maarten van Aalst of the Red Cross/Red Crescent Climate Centre. We gratefully acknowledge the support of Meinrad Bürer of the IFRC Secretariat in Geneva, and of Pierre Friedlingstein, Lead Author of the WG I report and member of the Core Writing Team of the IPCC WG I AR5 Summary for Policy Makers, in reviewing and sharpening this summary of the IPCC findings. Any errors of course remain our sole responsibility. For questions of comments please e-mail to climatecentre@climatecentre.org

Key scientific information for the Red Cross Red Crescent

from the IPCC Fifth Assessment Report (AR5) Working Group I Report: The Physical Science Basis

This report consolidates all available scientific information on the "physical science basis" – what we know about what is changing in the atmosphere and oceans, as well as ice sheets and glaciers.

The Working Group I contribution to the IPCC's Fifth Assessment Report considers new evidence of past and future climate change. It is based on many independent scientific studies, including observations of the climate system, natural archives, theoretical studies of climate processes, and computer simulations.

The report was developed by an international team of over 800 expert scientists and review editors, and went through a multi-stage review process involving almost 55,000 comments by expert reviewers and governments from 55 countries. The Summary for Policymakers (SPM) was approved line-by-line by more than 110 governments and the entire report was accepted in September 2013.

The past

The atmosphere has changed due to human activity

Several gases in the atmosphere act like a blanket to keep the earth warm; these are called "greenhouse gases", one of which is carbon dioxide (CO_2). The concentration of **CO_2 in the atmosphere has increased** rapidly (by about 40% since 1750) as a result of human activity, primarily due to burning of fossil fuels (such as coal, oil and gas) and secondarily from net land use change emissions, such as deforestation.

The current amount of the main greenhouse gases (CO_2, CH_4 and N_2O) in the atmosphere is substantially higher than ever before in the past 800,000 years (as measured from ancient air bubbles that have been trapped in ice for millennia). There is *very high confidence* that the amounts of CO_2, CH_4 and N_2O have risen faster during the past century than ever before in the last 22,000 years.

Because of increased CO_2, the **chemistry of the ocean** is also affected. There is *high confidence* that when the ocean absorbs excess CO_2 from human activity, it results in acidification of the ocean.

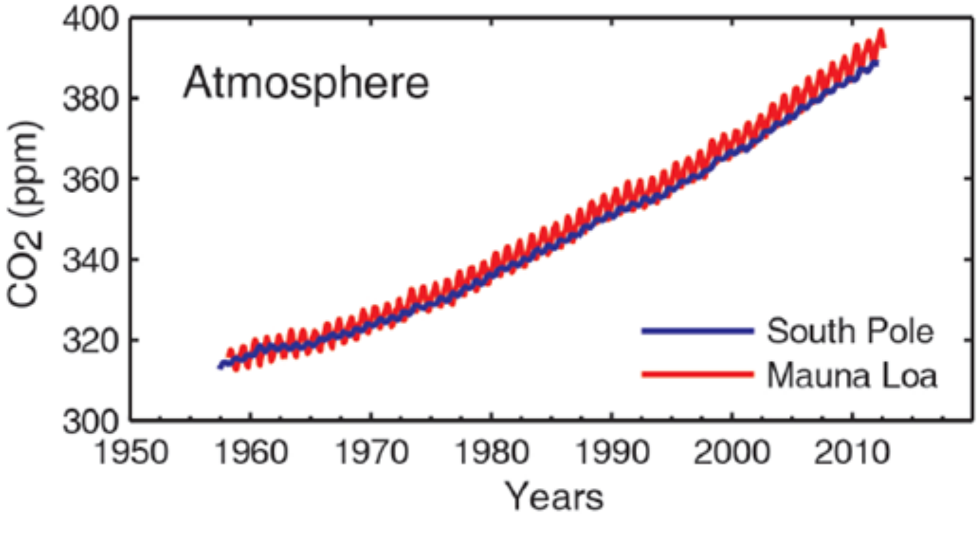

Figure 1 (SPM.4): CO_2 (carbon dioxide) is one of the greenhouse gases that humans have been releasing into the atmosphere when we burn fuel. The amount of CO_2 in the atmosphere has increased steadily. Shown are measurements since 1950, as measured in two locations (Mauna Loa, Hawaii, and the South Pole).

Temperatures are rising as a result of human changes to the atmosphere

This increase in greenhouse gases causes the earth to retain more heat, and in general, warm up. Since 1901, almost the entire globe has experienced warming (Figure 2). Between 1880 and 2012, the global average surface temperature increased approximately 0.85°C.

In the northern hemisphere, the period 1983–2012 was *likely* **the warmest** 30-year period of the last 1400 years (*medium confidence*).

However, every year is not necessarily hotter than the last one; there continue to be **ups and downs in temperature** even though average temperatures are rising over time. For example, the rate of warming over the last 15 years is slower than the period 1951-2012. Reasons for this are natural fluctuations in the climate system combined with a trend from volcanic eruptions blocking some of the sun's rays, and natural changes in solar cycles, (*medium confidence*), although these are not well-quantified (*low confidence* in quantification).

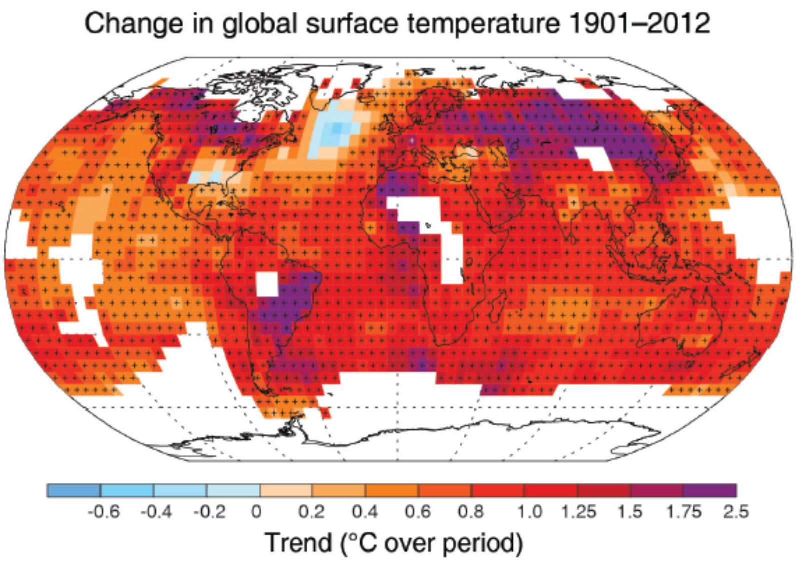

Figure 2 (SPM.1): Map of the observed change in temperatures from 1901–2012. Boxes with a + sign show a significant change in average temperature over that time. White boxes are areas with missing data.

Rising temperatures have had large impacts worldwide. Northern hemisphere spring snow cover is decreasing and permafrost is thawing. There is *high confidence* that **glaciers** have continued to shrink and lose mass world-wide, with very few exceptions.

It is *extremely likely* that human influence is the dominant cause of the observed warming since the mid-20th century. Human influence has already warmed the ocean, melted snow and ice, raised sea levels, and changed some climate extremes.

Since 1951, human-caused greenhouse gases contributed a global average surface warming *likely* to be in the range of 0.5°C to 1.3 °C; natural forcings, like volcanic eruptions and the solar activity, *likely* contributed an amount in the range of −0.1°C to 0.1 °C, and internal variability *likely* contributed in the range of −0.1°C to 0.1°C. Together these contributions are consistent with the observed warming of approximately 0.6°C to 0.7°C over this period.

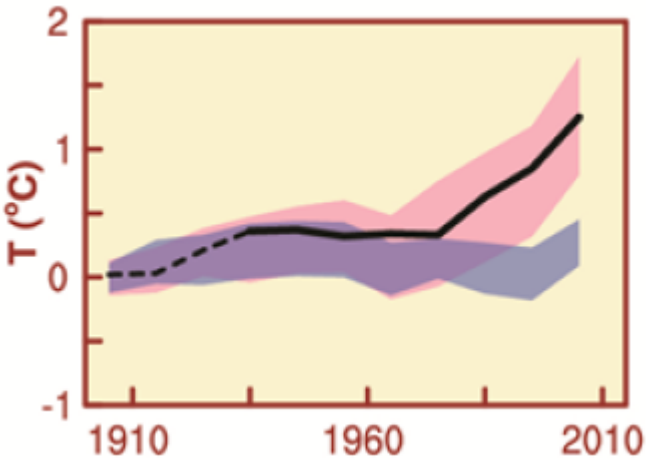

Figure 3 (SPM.6): Worldwide observed temperatures over land from 1910–2010 are depicted in the black line. Climate models simulating these temperatures for that time period create the red shaded band. If human influence on the atmosphere is removed from the models leaving only natural forcings, the result is the blue shaded band. (Note: data points are decadal averages, and the dashed lines represent observations of less than 50% of the world's land.)

Ocean levels and rainfall have also changed due to human influence

In addition to changing temperatures, **ocean levels have risen** worldwide. We can also estimate how much of the observed sea level rise happened as a result of human activity; since the early 1970s, about 75% of the observed global rise in ocean levels can be explained by a warming climate. This is caused both by runoff into the ocean from melting glaciers and thermal expansion of ocean waters from warming.

Precipitation **(rain and snow) has varied** throughout the world in the last 100 years. Precipitation has increased in the mid-latitude land areas of the northern hemisphere since 1901 (*medium confidence* prior to 1950 and *high confidence* afterwards; because there is not enough data available).

The future

Climate changes are projected to occur everywhere, and include changes in land and ocean, in the water cycle (including rainfall), in the ice sheets, in sea level, in some extreme events and in ocean acidification. Many of these changes will persist for many centuries. Limiting climate change will require substantial and sustained reductions of CO_2 emissions.

It is possible to prevent climate change from worsening in the long term. But due to past CO_2 emissions, some climate changes are inevitable.

If human GHG **emissions continue, warming will increase**. Continued emissions of greenhouse gases will cause further warming and changes in all components of the climate system. Changes are projected to occur in all regions of the globe, including extreme events. Most aspects of climate change will persist for many centuries even if emissions of CO_2 are stopped. This represents a substantial multi-century climate change commitment created by past, present and future emissions of CO_2.

It is possible for humans to partly **prevent such warming** from increasing.

However, reducing emissions now will not immediately reduce current climate changes. In fact, **climate change will persist** due to GHGs that have already been emitted.

For the next few decades, there is not much difference in climate between the different emission scenarios investigated by WG I. Reducing emissions quickly is important however, in light of the longer-term future. If we do not reduce emissions rapidly, we are headed for much more severe climate change in the second half of the century.

Temperatures will increase in the future.

Global average surface temperatures is *likely* to be between 0.3°C to 0.7°C higher in the period 2016-2035 compared to the period 1986-2005 (*medium confidence*).

Towards the end of the century, the likely temperature rise depends more strongly on the way emissions will evolve over the coming decades, with an expected increase of up to 2.6-4.8 degrees for the most pessimistic scenario (see figure 4 for two possibilities based on how much CO_2 is emitted).

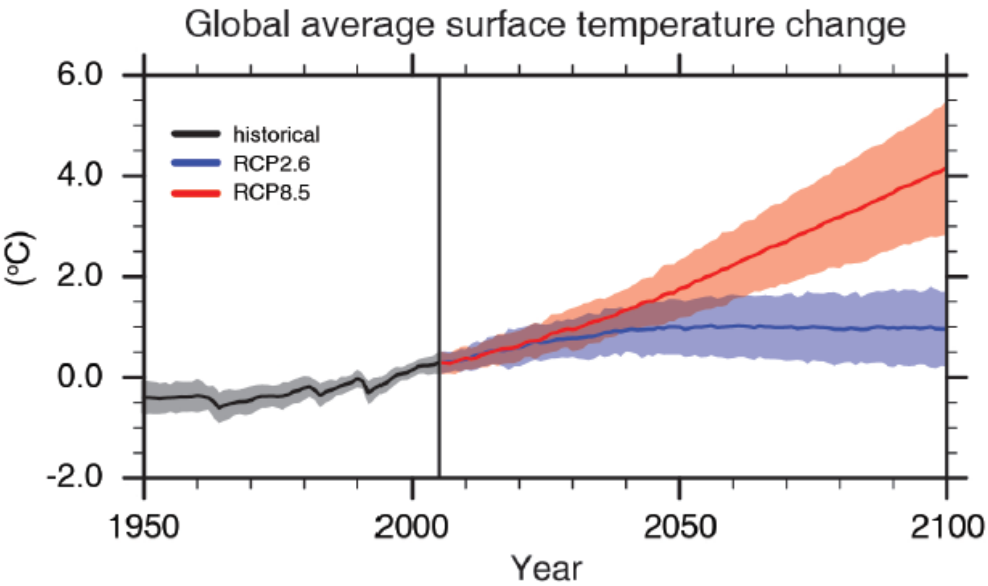

Figure 4 (SPM.7): Climate model results for historical temperatures (black line) and future temperature projections (blue or red line). The blue line represents a scenario with low greenhouse gas emissions, and the red line, a scenario with high emissions. For further explanation on these scenarios, please see Annex 1. The number of degrees change in temperature is compared to average temperatures from 1986-2005.

It is *very likely* that the Arctic sea **ice cover will continue to shrink** and thin and that northern hemisphere spring snow cover will decrease during the 21st century as global temperature rises. It is *virtually certain* that near-surface permafrost extent at high northern latitudes will be reduced. Glacier volume is projected to decrease under all scenarios.

Sea level rise is also projected to increase

By the end of the 21st century, it is *very likely* that sea level will **rise in more than 95% of the world's ocean** area. The rate of sea level rise will *very likely* exceed the rate during 1971–2010 due to increased ocean warming and increased loss of mass from glaciers and ice sheets.

It is *virtually certain* that global average sea level rise will continue beyond 2100, with sea level rise due to the natural expansion of warming ocean waters expected to continue for many centuries.

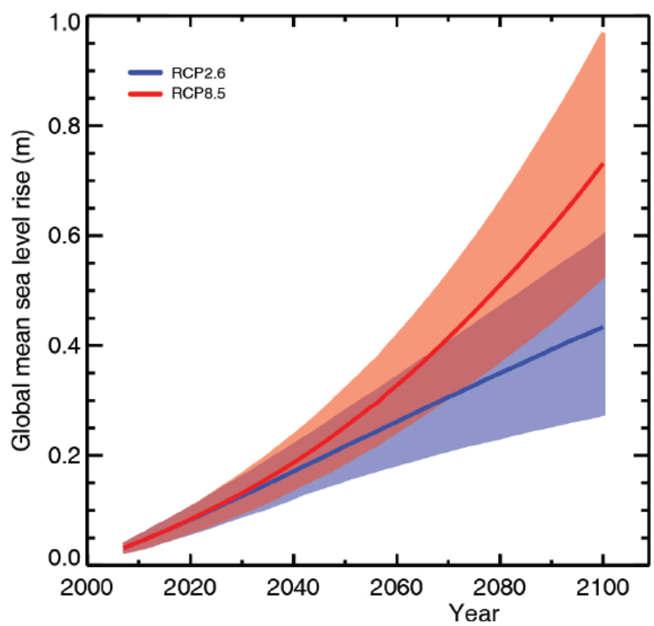

Figure 5 (SPM.9): Climate model projections for how the global average sea level could change over the 21st century. The blue line represents a scenario with low greenhouse gas emissions, and the red line, a scenario with high emissions. The shaded areas are the "likely ranges", which, based on current understanding, will not be exceeded unless portions of the Antarctic ice sheet collapse (even this might not drastically change the graph). The amount of change is compared to average sea level from 1986-2005.

Rainfall patterns are projected to change, but how they will change is less certain

Many places will see changes to rain or snow, and also changes to heavy rainfall or drought. It is not clear exactly how each region will change in the future, but some patterns are projected.

Projections for rainfall for the next few decades show large-scale changes similar to the changes that are expected by the end of the century, but will also be influenced by natural variability (ups and downs) in the next few decades.

By the end of the century, more rain/snow on average is *likely* in mid-latitude wet regions, the high latitudes, and the equatorial Pacific Ocean. Less rain is *likely* in many mid-latitude dry regions.

Most land areas in mid-latitudes and wet tropical regions are *very likely* to see more intense and frequent extreme rainfall events.

Globally, it is *likely* that the area encompassed by **monsoon** systems will increase over the 21st century. Also, while monsoon winds are *likely* to weaken, monsoon precipitation is *likely* to intensify. Monsoon onset dates are *likely* to become earlier or not to change much. Monsoon retreat dates will *likely* be delayed, resulting in lengthening of the monsoon season.

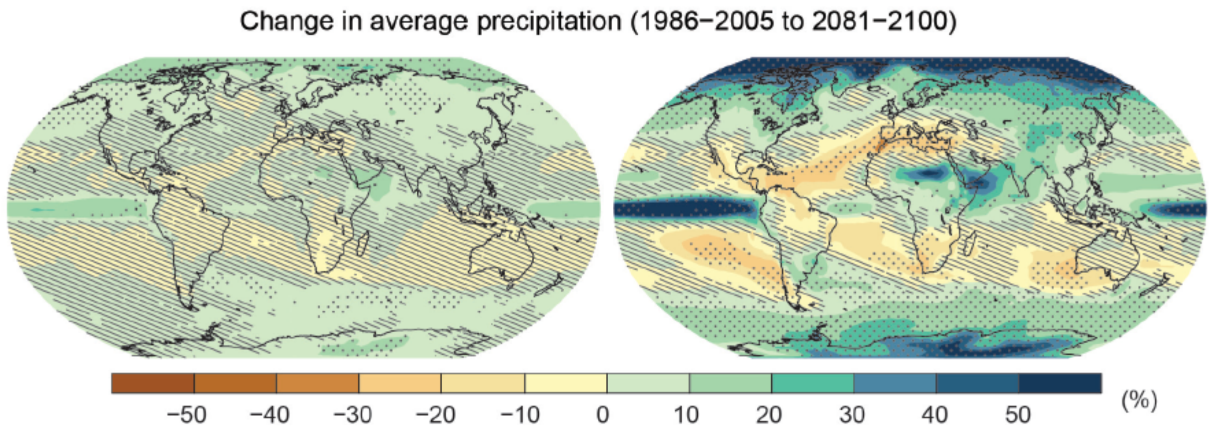

Figure 6 (SPM.8): Model results for possible changes in precipitation under two future scenarios (lower emissions on the left, higher emissions on the right). Colours show the average change that is expected for each region, but areas with hatching (diagonal lines) are uncertain about this change. Areas with stippling (dots) have stronger projections, and have more agreement among the models about the projected changes.

Summary of key changes in extremes, rainfall patterns, temperature and sea level

Table 1 (Table SPM.1): Summary of the likely range of climate change in the past, human contribution to these changes, and projected further changes for the early (2016-2035) and late (2081-2100) 21st century. Projections in the AR5 are relative to the reference period of 1986–2005, and use the new RCP scenarios.

Phenomenon and direction of trend	**Have these changes already occurred (since 1950)?**	**Have humans contributed to these changes?**	**Likelihood of further changes**		**Summary message**
			Early 21st century	**Late 21st century**	
Warmer and/or more frequent hot days/nights and/or fewer cold days and nights over most land areas	*Very likely*	*Very likely*	*Likely*	*Virtually certain*	**More certainty that the climate has warmed in the past and will warm in the future.**
More frequent and/or longer warm spells and heatwaves over most land areas	*Medium confidence* on a global scale. *Likely* in large parts of Europe, Asia and Australia	*Likely*	Not formally assessed	*Very likely*	**More warm spells/heat waves in the future.**
Increases in intense tropical cyclone activity	*Low confidence* in long term (centennial) changes *Virtually certain* in North Atlantic since 1970	*Low confidence*	*Low confidence*	*More likely than not* in some basins	**Low confidence on tropical cyclone intensity increases in past and future.**
Increased incidence and/or magnitude of extreme high sea level	*Likely* (since 1970)	*Likely*	*Likely*	*Very likely*	**Extreme high sea levels increasing in the future.**
Heavy precipitation events. Increase in the frequency, intensity, and/or amount of heavy precipitation.	*Likely* more land areas with increases than decreases *Very likely* in central North America	*Medium confidence*	*Likely* over many land areas	*Very likely* over most of the mid-latitude land-masses and over wet tropical regions	**More intense and frequent heavy rains over most of the mid-latitude and wet tropical regions.**
Increases in intensity and/or duration of drought	*Low confidence* on a global scale. *Likely* increased in the Mediterranean and West Africa and *likely* decreased in central North America and north-west Australia	*Low confidence*	*Low confidence* (in projected changes in soil moisture)	*Likely (medium confidence)* on a regional to global scale	**Low confidence on droughts in past and future.**

Rainfall patterns	Precipitation **(rain and snow) has varied** throughout the world in the last 100 years. No clear long-term trends have been observed in global average precipitation because of data insufficiency. Regionally, precipitation has increased in the mid-latitude land areas of the northern hemisphere since 1901 (*medium confidence* prior to 1950 and *high confidence* afterwards).	It is *likely* that anthropogenic influences have affected the global water cycle and precipitation patterns since 1960.	Projections for rainfall for the next few decades show large-scale changes similar to the changes that are expected by the end of the century (box to the right), but will also be influenced by natural variability (ups and downs) in the next few decades. In addition, the contrast in precipitation between wet and dry regions and between wet and dry seasons will increase, although there may be regional exceptions.	Many places will see changes to rain or snow, and also changes to heavy rainfall or drought. It is not clear exactly how each region will change in the future, but some patterns are projected. By the end of the century, more rain/snow on average is *likely* in mid-latitude wet regions, in the high latitudes, and the equatorial Pacific Ocean. Less rain is *likely* in many mid-latitude dry regions. Most land areas in mid-latitudes and wet tropical regions are *very likely* to see more intense and frequent extreme rainfall events.	**Rainfall patterns are changing, but the changes are more spatially varied than for temperature, and depending on the region, there are higher uncertainties and many ups and downs are expected.**
			2046 - 2065	**2081 - 2100**	
Global Average Surface Temperature Change (°C)	We have observed a warming of the planet over time. In the northern hemisphere, the period 1983–2012 was *likely* the warmest 30-year period of the last 1400 years (*medium confidence*).	It is *extremely likely* that human influence has been the dominant cause of the observed warming since the mid-20th century.	1 – 2	1 – 3.7	**Past and future warming due to human influence.**
Global Average Sea Level Rise (m)	Global average sea level has risen in the last 100 years, and the rate of rise is unusually high compared to how the ocean has behaved in the last two million years. The rate of sea level rise since the mid-19th century has been larger than the mean rate during the previous two millennia (*high confidence*).	There is *high confidence* that human influence on climate raised global average sea level in the second half of the 20th century.	0.24 – 0.30	0.40 – 0.63	**Past and future sea level rise due to human influence.**

Annex 1. About the scenarios for future climate change used by the IPCC

Projections of how the climate will change are based on assumptions about our emissions of greenhouse gases and other drivers of climate change. Of course we cannot predict future human emissions (for instance, we don't know what choices will be made about the use of fossil fuels, or how technology will evolve). Therefore, the IPCC uses different standardized scenarios. Climate change projections in IPCC AR5 are based on these specific scenario or set of scenarios.

For the Fifth Assessment Report of IPCC, the scientific community has defined four new scenarios, called the "Representative Concentration Pathways (RCPs)". They are identified by the total radiative forcing in 2100, which is similar to taking a measurement of how much heat the world is retaining due to the changes in greenhouse gases. The four new scenarios range from approximately 2.6 $W\ m^{-2}$ for RCP2.6 (the lowest emission scenario used) to 8.5 $W\ m^{-2}$ for RCP8.5 (the highest emission scenario used), which roughly spans the range of possible 21st century climate policies and development, going from optimistic (RCP2.6) to pessimistic (RCP8.5).

It is impossible to say if one of these scenarios is more likely than another. By contrasting the outcomes under various scenarios, we can see how our choices may affect the future climate.

It is important to recognize the for the next few decades, climate change will continue in almost the same pace in all of the scenarios, given that it is largely determined by what we have already emitted until now (greenhouse gases stay in the atmosphere for decades or even centuries). Later in this century however, very big differences start to appear, and our choices about emissions NOW and in the near future will affect which scenario outcome we (and our children and grandchildren) will face in the second half of the 21st century.

Box 1: IPCC Uncertainty Language

The IPCC interprets lots of scientific information to create these reports. The authors therefore try to indicate not only their findings based on that information, but also their best estimate of how certain we are about those findings.

In presenting that level of certainty, the IPCC uses very precise terminology, which may differ slightly from how these terms are used in daily life. For instance, even when they are very certain about a particular finding, scientists will almost never say they are sure, but rather that something is “very likely”.

The IPCC uses two different metrics to communicate the degree of certainty in key findings:

- A qualitative *level of confidence* that is higher if there is more evidence for that statement and the different pieces of evidence agree with each other (see Figure.box.1).
- A quantitative *likelihood* statement about the probability of something happening (based on statistics and expert judgment) (see Table.box.1).

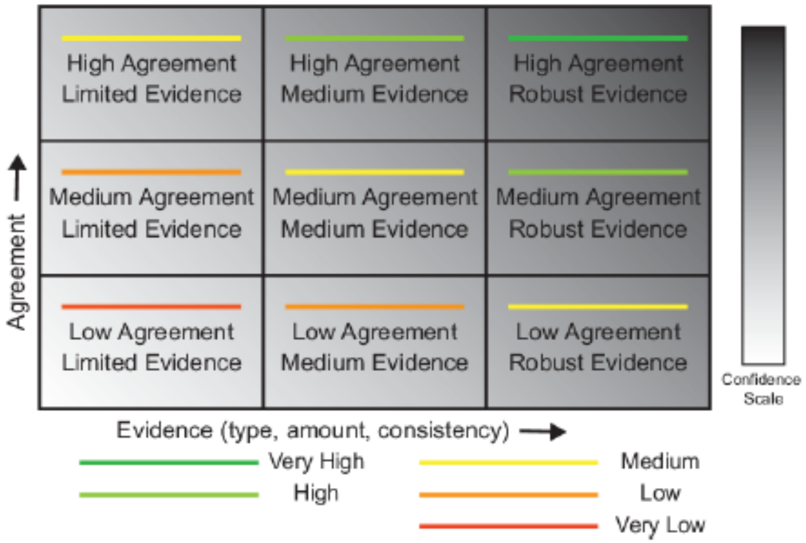

Figure box.1 (Figure 1.12): The basis for the confidence level is given as a combination of evidence (limited, medium, robust) and agreement (low, medium, and high). The confidence level is given for five levels (very high, high, medium, low, and very low) and given in colours.

Term	Likelihood of the Outcome
Virtually certain	99–100% probability
Very likely	90–100% probability
Likely	66–100% probability
About as likely as not	33–66% probability
Unlikely	0–33% probability
Very unlikely	0–10% probability
Exceptionally unlikely	0–1% probability

Table box.1 (Table 1.1): Likelihood terms associated with outcomes used in the AR5.

Notes: Additional terms that were used in limited circumstances in the AR4 (extremely likely: 95–100% probability, more likely than not: 50–100% probability) may also be used in the AR5 when appropriate.