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From the Loss of Mountain Glaciers and Arctic Ice to the Acidification of Oceans— Impacts of Climate Change Coming Faster and Sooner

**New UNEP Science Report Underlines Urgency for Governments to Seal the Deal in
Copenhagen Says Executive Director Steiner**

NORTH AMERICA

Washington/Nairobi, 24 September 2009 --The pace and scale of climate change may now be outstripping even the most sobering predictions of the last report of the Intergovernmental Panel of Climate Change (IPCC) including in North America..

An analysis of the very latest, peer-reviewed science indicates that many of predictions at the upper end of the IPCC's forecasts are becoming ever more likely.

Meanwhile the newly emerging science points to some events thought likely to occur in longer-term time horizons, as already happening or set to happen far sooner than had previously been thought.

Persistent drought crisis conditions for the southwestern United States and northern Mexico, unprecedented loss of sea ice in the Canadian archipelago and seasonal upwellings of acidic seawater off California are all being observed years or even decades ahead of earlier projections.

Losses from glaciers, ice-sheets and the polar regions appears to be happening faster with the Greenland ice sheet for example recently seeing melting some 60 per cent higher than the previous record of 1998.

- Some scientists are now warning that sea levels could rise by up to two metres by 2100 and five to ten times that over following centuries.

There is also growing concern among some scientists that thresholds or tipping points may now be reached in a matter of years or a few decades including dramatic changes to the Indian summer monsoon, the Sahara and West Africa monsoon and ones affecting a critical ecosystem like the Amazon rainforest.

The report also underlines concern by scientists that the planet is now committed to some damaging and perhaps irreversible impacts as a result of the greenhouse gases already in the atmosphere.

- Losses of tropical and temperate mountain glaciers affecting perhaps 20 per cent to 25 per cent of the human population in terms of drinking water, irrigation and hydro-power.
- Shifts in the hydrological cycle resulting in the disappearance of regional climates with related losses of ecosystems, species and the spread of drylands northwards and southwards.

Recent science suggests that it may still be possible to avoid the most catastrophic impacts of climate change. However, this will only happen within the time span of the current civilization if there is immediate, cohesive and decisive action to both cut emissions and assist vulnerable countries adapt.

These are among the findings of a report released today by the United Nations Environment Programme (UNEP) entitled *Climate Change Science Compendium 2009*.

The report, compiled in association with scientists around the world, comes with less than 80 days to go to the crucial UN climate convention meeting in Copenhagen, Denmark.

In a foreword to the document, the United Nations Secretary-General, Ban Ki-moon, who this week hosted heads of state in New York, writes, “This Climate Change Science Compendium is a wake-up call. The time for hesitation is over”.

“We need the world to realize, once and for all, that the time to act is now and we must work together to address this monumental challenge. This is the moral challenge of our generation.”

The Compendium reviews some 400 major scientific contributions to our understanding of Earth Systems and climate change that have been released through peer-reviewed literature, or from research institutions, over the last three years.

Achim Steiner, UN Under-Secretary General and UNEP Executive Director, said, “The Compendium can never replace the painstaking rigour of an IPCC process—a shining example of how the United Nations can provide a path to consensus among the sometimes differing views of more than 190 nations”.

“However, scientific knowledge on climate change and forecasting of the likely impacts has been advancing rapidly since the landmark 2007 IPCC report,” he added.

“Many governments have asked to be kept abreast of the latest findings. I am sure that this report fulfils that request and will inform ministers’ decisions when they meet in the Danish capital in only a few weeks time,” said Mr. Steiner.

“This is the most sobering assessment yet of how global warming is already affecting our climate and makes it very clear that we must take action,” said Phyllis Cuttino, Director,

U.S. Global Warming Campaign, at the Pew Environment Group. “The U.S. Congress, President Obama and other world leaders must act now to reduce the threat of global warming. Doing so will create a new clean energy economy, reduce dependence on fossil fuels and sustain our environment for future generations.”

Key scientific observations and developments documented since the IPCC’s Fourth Assessment Report in 2007 include:

NORTH AMERICA:

- Observation and modeling is pointing to an irreversible transition in the southwestern USA and Northern Mexico towards a sustained, drier climate. It may have been under way since 2000. “Dustbowl” conditions are projected to become the norm for the dry season in the region. This change, unprecedented in the instrumental record, is linked to global shifts of rainfall regimes as sub-tropical dry zones move towards the poles.
- Seawater acidic enough to corrode a shell-making carbonate substance called aragonite is already welling up during the summer along the California coast, decades earlier than models predict. It is an indication that oceans are becoming more acidic more quickly than expected, jeopardizing the ability of shellfish and corals to form their external skeletons.
- The average amount of sea ice within the Canadian Arctic Archipelago has decreased by an average of 8.7 per cent each decade since 1979. The melting season has lengthened by seven days per decade, with 2008 witnessing a record 129 days of melting.
- Vegetation surveys of California’s Santa Rosa Mountains between 1977 and 2007 show that dominant plants have on average moved their range 65 metres (213 feet) higher in altitude. Research suggests this has been a response to warming, more variable precipitation and less snow cover, rather than other factors such as air pollution or fire.

The compendium also documents a number of significant recent climate anomalies for North America, including:

- The third-worst fire season and persistent drought in the western and southwestern USA in 2008.
- The worst drought in 70 years in Mexico, in August 2009, affecting about 3.5 million farmers, wiping out some 17 million acres of cropland and leaving 50,000 cows dead.
- The worst wildfire in 30 years in Southern California, in April 2009.

- Alaska's snowiest winter for 30 years in 2007-8, which also saw Toronto's third snowiest winter on record.
- Hurricane Gustav in August 2008, the worst storm to hit Cuba in five decades, with recorded gusts of 341 km per hour at one location, the strongest in the country's history.

GLOBAL:

- The growth in carbon dioxide emissions from energy and industry has exceeded even the most fossil-fuel intensive scenario developed by the IPCC in the late 1990s. Global emissions were growing by 1.1 per cent each year from 1990-1999 and this accelerated to 3.5 per cent per year from 2000-2007.
- Growth of the global economy in the early 2000s and an increase in its carbon intensity (emissions per unit of growth), combined with a decrease in the capacity of ecosystems on land and the oceans to act as carbon "sinks", have led to a rapid increase in the concentrations of carbon dioxide in the atmosphere. This has contributed to sooner-than-expected impacts including faster sea level rise, ocean acidification, melting Arctic sea ice, warming of polar land masses, freshening of ocean currents and shifts in the circulation patterns of the oceans and atmosphere.
- The observed increase in greenhouse gas concentrations are raising concern among some scientists that warming of between 1.4 and 4.3 degrees Centigrade above pre-industrial surface temperatures could occur. This exceeds the range of between 1 and 3 degrees perceived as the threshold for many "tipping points", including the end of summer Arctic sea ice, and the eventual melting of Himalayan glaciers and the Greenland ice sheet.
- In 2007, summer sea ice in the Arctic Ocean shrank to its smallest extent ever, 24 per cent less than the previous record in 2005, and 34 per cent less than the average minimum extent in the period 1970-2000. In 2008, the minimum ice extent was 9 per cent greater than in 2007, but still the second lowest on record.
- Until the summer of 2007, most models projected an ice-free September for the Arctic Ocean towards the end of the current century. Reconsideration based on current trends has led to speculation that this could occur as soon as 2030.
- Recent findings show that warming extends well to the south of the Antarctic Peninsula, to cover most of West Antarctica, an area of warming much larger than previously reported.
- The hole in the ozone layer has had a cooling effect on Antarctica, and is partly responsible for masking expected warming on the continent. Recovery of stratospheric ozone, thanks to the phasing out of ozone-depleting substances, is

projected to increase Antarctic temperatures in coming decades.

- Recent estimates of the combined impact of melting land-ice and thermal expansion of the oceans suggest a plausible average sea level rise of between 0.8 and 2.0 metres above the 1990 level by 2100. This compares with a projected rise of between 18 and 59 centimetres in the last IPCC report, which did not include an estimate of large-scale changes in ice-melt rates, due to lack of consensus.
- Under the IPCC scenario that most closely matches current trends – i.e. with the highest projected emissions – between 12 and 39 per cent of the Earth’s land surface could experience previously unknown climate conditions by 2100. A similar proportion, between 10 and 48 per cent, will see existing climates disappear. Many of these “disappearing climates” coincide with biodiversity hotspots, and with the added problem of fragmented habitats and physical obstructions to migration, it is feared many species will struggle to adapt to the new conditions.

To download the full report, visit <http://www.unep.org/compendium2009/>

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