Scientists issue dire warning on rising sea levels

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A conference of scientists and academics that met March 8-10 in Copenhagen issued dire warnings about the rapid rate of climate change, and in particular the growing threat of rising sea levels. In a statement, it announced the key conclusion that "Recent observations confirm that, given high rates of observed emissions, the worst-case IPCC [Intergovernmental Panel on Climate Change] scenario trajectories (or even worse) are being realized." The conference was called to assess the scientific developments since the IPCC last summarized the state of climate science in 2007 in advance of global climate negotiations later this year.

Sea level rise is among the most serious threats associated with climate change. With rising seas comes increased vulnerability of extreme storms and decreased availability of fresh water, as salt water intrudes on estuaries and groundwater. This vulnerability is exacerbated by a lack of planning and preparedness to accompany the vast human migrations to the coasts.

What is most striking is the sheer enormity of this threat. The United Nations Environment Program estimates that 145 million people are at risk in the event of a 1-meter (3.3-foot) rise in sea levels. Three quarters of the vulnerable populations live along the Mekong, Ganges, and other Asian mega-deltas, many already suffering the scourge of poverty. As reported at the conference, a rise of 1 meter, which was once seen as a worst-case scenario, is now more accurately characterized as a default projection.

Global warming influences sea level in two primary ways. First, increasing ocean temperatures directly expand the volume of water within our oceans. This process, well understood, has been a driving factor in the observed sea level rise over the past century (global average of nearly 20-cm rise since 1880).

The second way warming temperatures affect sea levels is through melting or breakdown of land-based ice formations and subsequent flow into the oceans. Land ice includes glaciers and ice sheets. The ice sheets of Greenland and Antarctica, which contain vast stores of water, are most significant for future sea levels, but their behavior and interaction with the climate system suffers from uncertainties.

Note that the melting of sea ice, such as we are witnessing in the Arctic, does not have a significant impact on sea level because the ice is already submerged.

The large uncertainties in our understanding of the dynamics of land-ice flow prompted the IPCC to leave out this phenomenon in projections of future sea level rise in its most recent assessment. Excluding this phenomenon, the magnitude of the projections was nonetheless significant, ranging from 19 to 59 cm by 2100. However, since the 2007 assessment, climate scientists have expended considerable effort to gain a better understanding of ice sheets.

Over the last two years, scientists have learned the critical role played by ice sliding into the ocean, in contrast to simply melting. In addition, recent ground and satellite observations have continued to supply evidence of accelerating sea level rise.

Dr. Eric Rignot, principal scientist for the Radar Science and Engineering Section at NASA's Jet Propulsion Laboratory, summarized these findings at the conference: "The ice sheets in Greenland and Antarctica are already contributing more and faster to sea level rise than anticipated. If this trend continues, we are likely to witness sea level rise one meter or more by year 2100."

Without proper adaptation, the consequences may be

devastating for huge sections of humanity.

The warnings of scientists and academics during the Copenhagen conference were principally aimed at national governments that will assemble in the same city in November of this year to attempt to negotiate a successor to the Kyoto treaty. The rapid rate progression and large magnitude of projected sea level rise more than ever demonstrates the urgency for coordinated action to mitigate and adapt to global warming.

Despite the scientific consensus for drastic action, prospects for such a response are slim. The climate negotiations are set to take place under conditions of an intensifying crisis of capitalism. The increasing international antagonisms generated by the global financial and economic meltdown threaten to turn the gathering into little more than a forum for the rival capitalist nations to pursue the greatest economic advantage over their rivals.