

“Climate change science and sustainable development”

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Since October 2013, the Intergovernmental Panel on Climate Change (IPCC) had released the Fifth Assessment Report (AR5) including three Working Group Reports “The Physical Science Basis”, “Impacts, Adaptation, and Vulnerability”, “Mitigation of Climate Change” and Synthesis Report. New observations have further proved that the warming of the global climate system is unequivocal. Each of the last three successive decades before 2012 has been successively warmer at global mean surface temperature than any preceding decade since 1850. 1983-2012 was likely the warmest 30-year period of the last 1400 years. The ocean has warmed, over the period of 1971 to 2010, 93% of the net energy increase in the Earth's climate system was stored in the oceans. The rate of global mean sea level rise has accelerated, anthropogenic global ocean carbon stocks were likely to have increased and caused acidification of the ocean surface water. Since 1971, the glaciers and the Greenland and Antarctic ice sheets have been losing mass, the extent of the Northern Hemisphere snow cover has decreased. Human influence has been detected in the warming of the atmosphere and the ocean, changes in the water cycle, reductions in snow and ice, global mean sea level rise, and changes in climate extremes. The largest contribution to the increase in the anthropogenic radiative forcing was by the increase in the atmospheric concentration of CO₂ since 1750. It led to more than half of global warming since the 1950s (with 95% confidence). It is predicted that the global mean surface temperature will continue to rise for the end of this century, the frequency of extreme events such as heat waves and heavy precipitation will increase, sea level will continue to rise and cryosphere will continue to warm. If the increase in temperature is higher than 2°C than before industrialization, the mean annual economic losses worldwide will reach 0.2% to 2.0% of income, and cause large-scale irreversible effects, including death, disease, food insecurity, inland flooding and water logging, and rural drinking water and irrigation difficulties that affect human security. If taking prompt actions, however, it is still possible to limit the increase in temperature within 2°C. To curb the gradually out-of-control global warming and achieve the goal of sustainable development of the human society, global efforts to reduce emissions are needed.