



India can't Wait to Act upon Climate Change as Heatwaves Claim Life

Naveen Sudharsan¹, Jitendra Singh², Subimal Ghosh^{3,4,5}, and Subhankar Karmakar^{1,4,5}

¹Environmental Science and Engineering Department, Indian Institute of Technology Bombay, Mumbai, India-400076

²School of the Environment, Washington State University, Vancouver, WA, USA-98686

³Department of Civil Engineering, Indian Institute of Technology Bombay, Mumbai, India-400076

⁴Interdisciplinary Programme in Climate Studies, Indian Institute of Technology Bombay, Mumbai, India-400076

⁵Centre for Urban Science and Engineering, Indian Institute of Technology Bombay, Mumbai, India-400076

In the recent past, India has experienced an increase in daily maximum and minimum temperature by 0.8 to 1 °C and 0.2 to 0.3 °C, respectively, along with an increased number of heatwave days. Human fatality, morbidity and discomfort are often reported due to the frequent heatwaves in India. To understand the effect of humidity in heatwaves over India, here in this study, we have classified the heatwaves into oppressive (high temperature and high humidity) and extreme (high temperature and low humidity) using excess heat factor approach. The rate of increase in oppressive heatwave days is exceeding that of the extreme heatwave days, even though the total number of oppressive heatwave days is fewer than the extreme heatwave days in the considered period (1953 to 2013). Moreover, the oppressive heatwave days are found to be the fatal one, as it is well correlated with the heat-related deaths in India.

As per COP 21 agreement, countries pledged to maintain the global temperature well below a 2 °C above the pre-industrial levels while attempting to limit the same to 1.5 °C. Taking these two warming scenarios, we have identified the heatwave events in near-future (2035 to 2065) and far-future (2070 to 2100). The number of oppressive heatwave days is expected to show an alarming five-fold increase at 2 °C warming (comparing to the period 1976 to 2005) by the end of the century. Limiting the warming to 1.5 °C from the proposed 2 °C results in a 67% reduction in oppressive heatwave days. A substantial jump in the number of oppressive heatwave days when compared with extreme heatwave days proposes that the Indian population is expected to be severely affected by heatwaves in the future amidst inadequate adaptive measures.