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Heat Events in the Indian Subcontinent under a warming climate scenario: Detection and its Drivers

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Global temperatures have shown a warming trend over the last century, mainly as a result of anthropogenic activities. Rising temperatures are a potential cause for increase of extreme climate events, such as heat waves, both in severity and frequency. Under an increasing extreme event scenario, the world population of mid- and low-latitude countries is more vulnerable to heat related mortality and morbidity. In India, the events occurred in recent years have made this vulnerability clear, since the numbers of heat related deaths are on a rise.

Over India, the heat waves occur during the months of April to June and can impact various sectors including health, agriculture, ecosystems and the national economy. In May 2015, a severe heat wave due to the delayed onset of southwest monsoon affected parts of south-eastern India, which claimed more than 2500 lives.

Preliminary results show the prevalence of Heat events in North-West, Central and South-Eastern regions of India during the pre-monsoon (March, April, May) and transitional (May, June, July) months. We consider the Heat Index (HI), a combination of temperature and relative humidity, also known as apparent temperature, gives an insight into the discomfort because of increment in humidity, that reduces the efficiency of body's cooling mechanism as it blocks evaporation. Thus, along with temperature anomalies, humidity also plays a role in transitional period.

Heatwaves over India are known to be linked with El-Niño-Southern Oscillation or ENSO, but some studies indicated that the processes generating heat waves over northwest-central and coastal eastern India could be linked to anomalous blocking over North Atlantic and to the cooling over central and east equatorial Pacific. While other studies demonstrated that anomalous persistent high-pressure systems, supplemented with clear skies and depleted soil moisture, are primarily responsible for the occurrence of heat waves over India.

The changes in the frequency and intensity of extreme events have profound impact on human society and the natural environment. The heat stress and underlying anomalous conditions can exacerbate an increase in the number of deaths. While global heat wave and health impact research is prolific in some regions, the global population most incline to risk of death and

conspicuous harm caused by extreme heat is under-represented. Heat wave and health impact research are needed in regions where this impact is expected to be most severe.