Climate Change and Extreme Weather Events in India: Uncertainties and Challenges

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In this talk some evidences of climate change and occurrences of more frequent extreme weather events in the recent past will be highlighted based on past measurements of weather parameters in the country. The special geographical position of India and its different types of climate will be noted while emphasizing the regional aspects of climate changes. While examining the surface temperature variations in the last century the differences in their characters in the south and north of the country will be brought out in the context of the Indian Ocean and the Himalayas respectively. During the summer monsoon season the number of short spell rain events and dry spells have increased in the last half century, but long spell rain events show decreasing trend. The short spell rainfall events usually occur because of local convection, thunderstorms, western disturbances and other meso-scale phenomena which are not necessarily due to monsoon circulation and organized convection. On the other hand long spell rain events during summer monsoon months are normally associated with synoptic scale or planetary scale phenomena. The decrease in the number of long spell rain events associated with similar tendencies in the number of monsoon depressions, the mean monsoon wind and its shears over India point towards the proposition that the Indian summer monsoon circulation has been weakening. Analysis shows that extreme temperature events have increased in the east coast of India in the recent past. There has been increase in severe cases of visibility less than 200m in the north. Rainfall patterns during different seasons indicate small increase except in summer monsoon. Also during summer monsoon months, there is a decreasing trend in the frequency of depressions and systems with higher intensities together in contrast to increase in the number of low pressure areas. In this talk it will be highlighted that the climate change study in India needs extensive use of regional climate models and downscaling techniques. The current efforts of using RegCM3 at 50km horizontal resolution over Indian subcontinent as part of CORDEX will be discussed.