



An integrated vulnerability index for socio-climate risk assessment over the continental United States

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There is no clear knowledge towards the collective risk associated with multivariate extremes for natural and human systems, as the research thus far has not taken into account the combined impact of changes in hot, cold, wet and dry extremes. Concurrently, not all the factors influencing human vulnerability to climate change are related with natural system's response to climate forcing as future changes in both the magnitude and the distribution of human population and income levels can potentially multiply or reduce the risk of human exposure to climatic changes. For a comprehensive socio-climate risk assessment, a county-level integrated vulnerability index is developed in this study to provide an estimate of future exposure to both changes in climate extremes and socioeconomic conditions over the continental United States. The integrated vulnerability index is based on the combination of a unified climate extremes indices, which summarize overall exposure to multivariate and multidimensional climate extremes, including hot, cold, wet and dry, and shared socioeconomic pathways, which identify communities at risk based on projected population and income levels. We will present results from the application of the proposed integrated vulnerability index on a high-resolution (4km) 11-member ensemble of regional climate simulations and multiple socioeconomic pathways, aggregated at county scale, which cover 1966-2005 in the baseline and 2011-2050 in the near-term future climate under Representative Concentration Pathway 8.5. Overall, this research should help advance robust strategies for assessing the risk and vulnerability associated with projected changes in temperature and precipitation characteristics, as well as socioeconomic conditions.