Hurricane impacts prediction, from days to decades

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The devastating 2005 hurricane season in the Gulf of Mexico, which capped a decade of above normal activity, together with record systems in the Australian, western North Pacific and eastern North Pacific, have strongly underscored the need for improved prediction of hurricane risk and assessment of the longer-term risk level. These marked increases in impacts over the past decade have arisen from an increase in the frequency and intensity of tropical cyclones affecting vulnerable communities and industries, combined with increasing populations, infrastructure and economic activities in these regions. This is already a major issue, but projected future increases in vulnerability combined with potential increases in tropical cyclones can only make things worse. Minimizing tropical cyclone impacts is a complex activity that requires attention to potential wind damage, heavy rain and flooding, wave and storm surge inundation, coastal erosion, and pollutant pathways, all of which depend critically on accurate forecasts of hurricane intensity and structure. The time scales range from forecasts over several days for immediate responses, to projections over years and decades to support proper planning and engineering design decisions. My presentation will provide a broad overview of these activities, highlight areas of need, and describe some of the work that is attempting to mitigate some of the impacts.