Precipitation extremes in a changing climate : results from high-resolution climate simulations

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The water cycle in high spatial- and temporal-resolution IFS simulations of current and future (timeslice) climate is examined. 47-year simulations from the late 20th and 21st centuries show characteristic features of climate change on precipitation distribution and statistics: wetter high latitudes, drier subtropics, and increased propensity for both heavy rainfall events and droughts over most locations. Results corroborate the IPCC consensus regarding precipitation extremes, but reveal more about the nature of spatial structure (fine orographic and land-sea contrast patterns) and the statistics of extremes at sub-diurnal time scales. Examination of characteristics of fluxes and state variables associated with land surface feedbacks on climate suggest an increase in the land's role of driving variations in the hydrologic cycle. Many of these areas correspond with regions of enhanced drought in the 21st century simulation.