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Will extremes become the norm under future climate change?

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High resolution dynamical precipitation and temperature downscaling is conducted for the past (2008) and the near future (2011-2050) climates under two Representative Concentration Pathways (RCPs) (RCP4.5 and RCP8.5) over a complex topographical terrain along the eastern Mediterranean basin using the Weather Research and Forecast (WRF) model. WRF is run at two nested resolutions of 9 and 3km, forced by the High-Resolution Atmospheric Model (HiRAM) at a resolution of 25km. The future simulations covered eight years (one year per decade per scenario) that were judiciously selected based on an anomaly score that depends on the mean annual temperature and accumulated precipitation in order to identify the worst year per decade from a water resources perspective. Climate indices derived from daily simulated precipitation and temperature data show significant decrease in annual precipitation (rain and snow), reaching up to 30% relative to current conditions, in addition to changes in daily maximum summer and minimum winter temperature extremes. Seasonal variability is predicted to increase significantly, with colder winters and warmer summer projected for the study area and with notable increases in the annual occurrence of warm nights and heat wave events. The projected increase in extreme temperatures and reduction in precipitation will have an adverse effect on agriculture, ecosystems, as well as human health and comfort.

Biography

Renalda El-Samra is PhD Candidate in Environmental & Water Resources Engineering at AUB. She has over two decades of professional experience in the environmental sector.

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