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Climate model based consensus on the hydrologic impacts of climate change to the Rio Lempa basin of Central America

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Abstract. Temperature and precipitation from 16 climate models each using two emissions scenarios (lower B1 and mid-high A2) were used to characterize the range of potential climate changes for the Rio Lempa basin of Central America during the middle (2040–2069) and end (2070–2099) of the 21st century. A land surface model was applied to investigate the hydrologic impacts of these changes, focusing on inflow to two major hydropower reservoirs. By 2070–2099 the median warming relative to 1961–1990 was 1.9° C and 3.4° C under B1 and A2 emissions, respectively. For the same periods, the models project median precipitation decreases of 5.0% (B1) and 10.4% (A2). Median changes by 2070–2099 in reservoir inflow were 13% (B1) and 24% (A2), with largest flow reductions during the rising limb of the seasonal hydrograph, from June through September. Frequency of low flow years increases, implying decreases in firm hydropower capacity of 33% to 53% by 2070–2099.

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