

Climate Responses to a carbon dioxide doubling for California (United States of America)

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In a sensitivity study we use a regional climate model (RegCM2) to examine the steady state climate under conditions of 280 and 560 ppm CO₂, for a domain centered over California, U.S.A. We find statistically significant responses by mean annual and monthly temperature, precipitation, and snow accumulation to the CO₂ doubling. Monthly responses exceed the annual responses in many areas. We also looked at the model results in terms of regions that represent the hydrologic drainage basins defined by the California Department of Water Resources. For the large-scale drainage basins we find a shift in temperature distributions towards higher values across all months of the year. We also find increased precipitation in general throughout the region, with greatest increases in the northern region, and find that annual snow accumulation is reduced by 50% or more in the doubled CO₂ case.