Contemporary and Projected Climate Change Across the Southwestern United States Relative to the Last 24,000 Years

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Since 24,000 BC climate change has affected localized areas across the Southwestern United States; however, these effects today are seen at an unparalleled rate. Climatic projections suggest that in the next 100 years -temperature across the North American continent will -increase up to 6 °C, whereas precipitation is expected to vary. While continental scales are necessary to understand global trends, climate change's effects on temperature and precipitation have never been studied extensively on a local scale. Understanding local changes are particularly important for communities across the already hot and arid American Southwest. Here we interpret and combine a diverse array of climate data based on paleoclimate "proxies", modern observations, and Coupled Model Intercomparison Project 6 (CMIP6) projections of surface temperature, and precipitation to assess recently observed and near future surface temperature and precipitation changes relative to the Last Glacial Maximum (LGM). Since the end of the LGM temperature has remained relatively stable, while precipitation has decreased between 0.3-0.2 mm. Our analysis suggests that future temperatures are projected to increase between 2°C-8°C and that future precipitation will vary between -0.2 to -0.2 mm in the next 100 years. The projected increase in temperature of 2°C-8°C, is unparalleled in magnitude since 18,000 to 12,000 BCE, when temperatures increased by 10°C; however, the rates of warming in the next 80 years will be 15 to 20 times faster than these deglacial changes. By knowing how climate is projected to change, communities can better plan metropolitan growth.

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