Constraining paleoclimate estimates using a combination of paleo glacial and terminal lake shoreline evidence

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The arid Southwest US recently experienced some of the worst droughts in recorded history. Future climate predictions suggest that these events may become more severe in the future. Glacier moraine and terminal lake shoreline evidence from the last deglaciation indicate that the Southwest U.S. underwent a series of rapid temperature and precipitation changes. The ability for Southwest US climate to suddenly transition between these different hydrological states is alarming, and emphasizes the importance of understanding the mechanics of these transitions. The focus of this work is to use computer models of glacier and terminal lake systems in the Eastern Sierra Nevada, CA with existing moraine and terminal lake shoreline chronologies to estimate changes in climate during the last deglaciation. The modeling approach for each individual system results in a set of non-unique climate (air temperature and precipitation) solutions that support the paleo climate evidence (i.e., coeval glacier moraines or terminal lake shorelines). The range of possible climate solutions is significantly reduced when the results for multiple systems are combined for a single time period.