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Mid-Holocene circulation changes and Neoglacial activity in the Southern Hemisphere mid-latitudes: insights from PMIP2 simulations.

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We set out to investigate past variations in the southern westerly winds at 6 ka by means of eight GCM simulations carried out by PMIP2. Paleoclimate studies in NW and SW Patagonia indicate a multimillennial trend in westerly activity with a conspicuous warm-dry phase between 10-7 ka, an increase in precipitation that peaked at 5 ka, and increased variability since then. The model mean indicates for south america slightly cooler conditions than the control run for latitudes $>30°$S, focusing of near-surface wind speeds between ˜45-40°S and a decline in precipitation during winter and spring. Positive precipitation anomalies developed during summer and autumn, inducing a decline in precipitation seasonality. Similar results are also seen in other mid-latitude regions of the southern hemisphere. These results are in agreement with palynological, lake-level, and glacial chronologies showing the onset of positive anomalies in westerly activity and neoglacial conditions throughout the Patagonian Andes.

Our results suggest that cooling and increased precipitation during the ablation (DJF) season, along with lower precipitation and temperature seasonality, could explain the well-documented neoglacial activity and vegetation changes in the southern mid-latitudes.