

# Stretched polar vortex increases mid-latitude climate variability during the Last Glacial Maximum

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Table S1. PMIP4-LGM simulations and their variable accessibility

	PI				LGM				references	Duration (y)
	tas	sea ice	Zg	slp	tas	sea ice	zg	slp		
<b>MIROC-ES2L</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	Ohgaito et al. (2021)	2200
<b>AWI-ESM1-1-1-LR</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	Lohmann et al. (2020)	600
<b>MPI-ESM1-2-LR</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>1000</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	Mauritsen et al. (2019)	3850
<b>CESM2-FV2</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	Zhu et al., 2021	<b>500</b>
<b>CESM2-WACCM-FV2</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>500</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	Zhu et al., 2022	500
<b>INM-CM4-8</b>	<b>530</b>	<b>530</b>	<b>530</b>	<b>530</b>	<b>100</b>	○	○	<b>100</b>	Volodin et al. (2018)	50
<b>IPSLCM5A2</b>	<b>250</b>	<b>250</b>	<b>250</b>	<b>250</b>	○	○	○	○	Sepulchre et al. (2020)	1200
<b>UoT-CCSM4</b>	○	○	○	○	○	○	○	○	Chandan & Peltier (2017)	2900
<b>HadCM3B-M2.1aD</b>	○	○	○	○	○	○	○	○	Valdes et al. (2017)	400
<b>iLOVECLIM1.1.4</b>	○	○	○	○	○	○	○	○	Lhardy et al. (2020)	5000

NB: Numbers indicate the duration of monthly variable, and circles indicate no available data. Shading color marks four model used in this study.

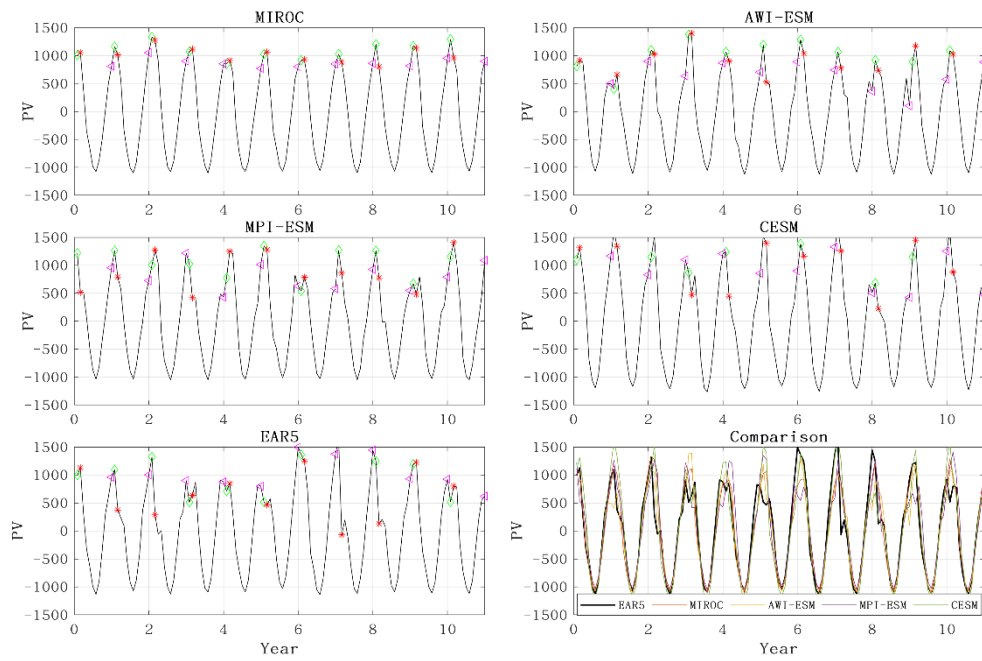


Fig S1. Seasonal change of VSI of the PI simulations and ERA5 re-analysis data, illustrating strong PV and their large variation during the winter. The green, red and magenta markers mark Jan, Feb and Dec VSI in turn.

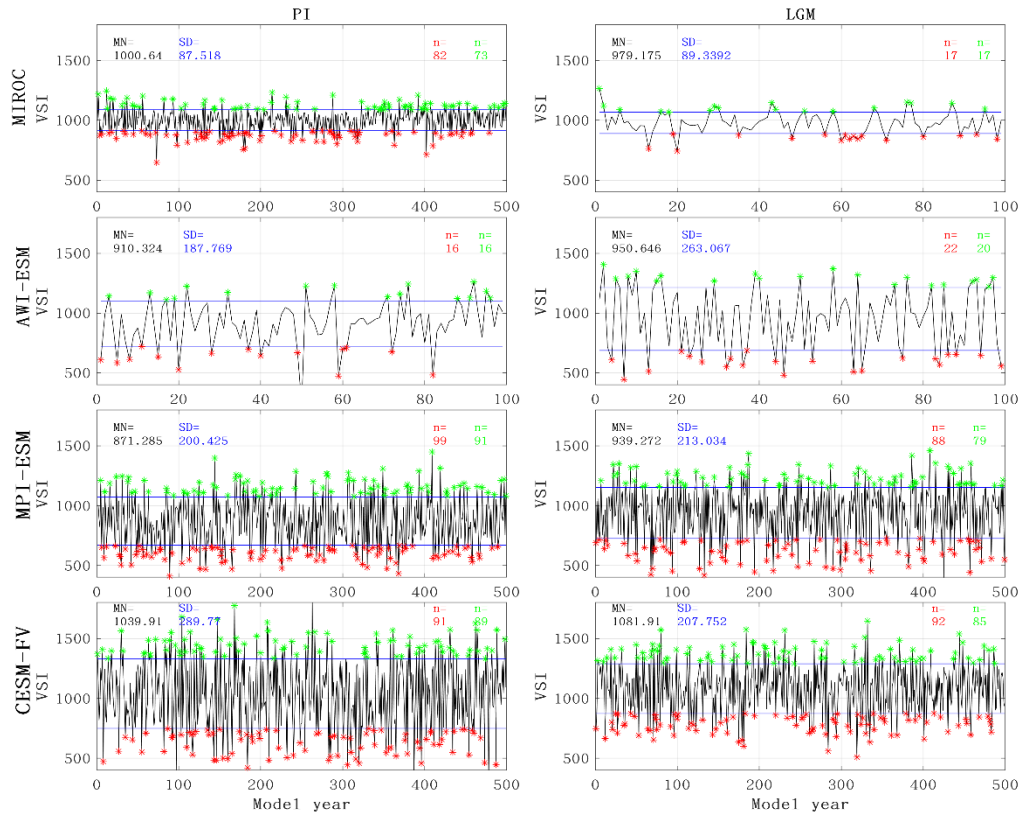


Fig S2. Time series of the vortex strength index (VSI) and composite for weak (red stars) and strong (green stars) PV years. Mean and standard deviation has been shown in black and blue color.

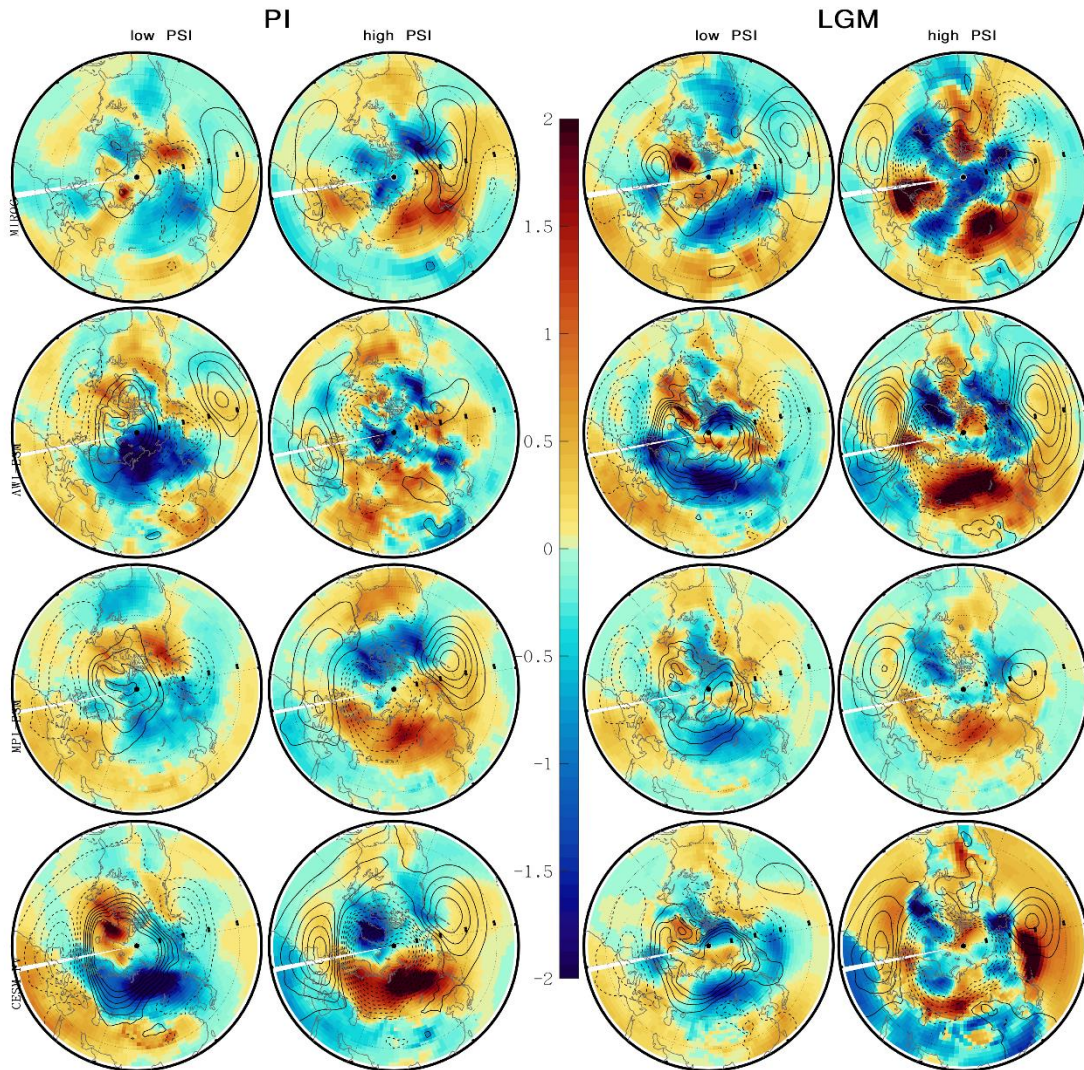


Fig. S3 DJF Surface air temperature (SAT) differences between the weak PV (low PSI) and strong PV (high VSI) composites, shown as the anomalies of the corresponding composites from their full-time climate mean fields (coloured, in °C). The corresponding sea level pressure (SLP) anomalies are shown as contours, with the interval of 60 hPa.