EGU23-4775, updated on 15 Apr 2024
https://doi.org/10.5194/egusphere-egu23-4775
EGU General Assembly 2023
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Heavy Water Isotope Precipitation in Inland East Antarctica Accompanied by Strong Southern Westerly Winds during the Last Glacial Maximum

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Stable water isotope signals in inland Antarctic ice cores have provided wealth of information about past climates. This study investigated atmospheric circulation processes that influence precipitation isotopes in inland Antarctica associated with atmospheric circulations in the southern mid-latitudes during the Last Glacial Maximum (LGM, ~21 000 year ago). A couple of probable climates during this climate period were simulated using the isotope-enabled atmospheric general circulation model MIROC5-iso. Our results showed a steepened meridional sea surface temperature gradient in the southern mid-latitudes associated with a strengthening of the southern westerlies. This change in the atmospheric circulation enhanced the intrusion of warm and humid air from low latitudes that contributes to precipitation events, inducing heavy water isotope precipitation inland East Antarctica. Our results suggest that past southern westerlies can be constrained using water isotopic signals in Antarctic ice cores.