# The Imprint of Southern Ocean Stratification on the Isotopic Composition of Antarctic Precipitation

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## Abstract

The local temperarture cannot explain the inter-annual variation in δ18Oprecip in the coastal Antarctic in past few decades. To understand this enigmatic variation, we have used long-term modern δ18Oprecip value of three coastal Antarctic sites. Using the δ18O-d-excess relationship and modelled δ18O value of vapor at source, we have shown that δ18Oprecip inherits the signature of moisture source parameters (MSPs). Furthermore, the wavelet analysis suggests that the variation in the MSPs impacts the seasonal cycle of δ18Oprecip which lead to disparity in the seasonal isotope-temperature relationship. The Southern Ocean surface stratification, due to increase in the freshwater flux by glacier melting, led to alignment of MSPs in such a manner that altogether significantly lowered the isotopic composition of initially formed vapor, which is reflected in δ18Oprecip at inter-annual scale. Our observations suggest that the palaeothermometry will underestimate the Antarctic temperature change for the periods characterized by warming and high glacier-melt.

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