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Increased glacial presence of aged Indo-Pacific waters in the Southeast Indian Ocean since the Last Glacial Maximum

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The Southern Ocean is thought to play an outsized role in regulating atmospheric CO_2 and Earth's climate on millennial and centennial timescales. An abundance of evidence suggests that the mid-depth and deep ocean stored CO_2 during the last glacial period, releasing it to the atmosphere during deglaciation. Records of water mass provenance and deep flow speeds suggest that Lower Circumpolar Deep Water (LCDW) within the Indian sector of the Southern Ocean was sluggish, stratified, and primarily fed by Indo-Pacific rather than Atlantic sourced Northern Component Waters (NCW) during glacial periods. A shoaled contribution of NCW and increased presence of carbon-rich Indo-Pacific sourced deep waters within the Southern Ocean may have allowed the deep ocean to store more remineralized carbon during the Last Glacial Maximum (LGM; ~18 to 23 ka), reducing atmospheric CO_2 concentrations. Here, we present paired benthic (mixed) and planktic (*Globorotalia inflata*) radiocarbon records from core TT1811-34GGC (41.718°S, 80.163°E; 3,167 m water depth) collected east of the Kerguelen-Île St. Paul Island Passage within the main flow path of the modern Antarctic Circumpolar Current. Our data indicates that LCDW was similar in age to cores sourced from within Indian Deep Water (IDW) in the northern Indian Ocean during the LGM. This coincided with more radiogenic ε_{Nd} values and smaller sortable silt sizes measured in the same core. We suggest that a more expansive lower limb of over-turning circulation sourced from the Southern Ocean resulted in increased contribution of IDW to LCDW at the expense of NCW. We find that water mass age gradually decreased through the deglaciation with a pause in ventilation during the Antarctic Cold Reversal (ACR; 12.9 to 14.5 ka), consistent with atmospheric CO_2 rise.