

# Characterizing Southern Hemisphere Westerly Winds Over the Marine Isotope Stage 8 to 7 Transition

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The Southern Ocean is characterized by the fastest and strongest current found on Earth, the Antarctic Circumpolar Current (ACC). Driven by the westerly winds, the ACC plays an important role in regional and global climate. In spite of its relevance, it has been difficult to reconstruct past changes in the westerlies and the associated ocean circulation in this region due to a lack of available sediment archives. To address this gap in our knowledge, International Ocean Discovery Program Expedition 383 drilled sediment core U1539 in the central South Pacific. A preliminary age model suggests that this site contains the fastest accumulating open-ocean sediments available for the late Pleistocene. To study changes in Southern Hemisphere atmospheric and ocean circulation across dramatic shifts in climate at high resolution, we reconstruct dust and export productivity fluxes across the Marine Isotope Stage (MIS) 8 to 7 transition. Dust and export productivity fluxes were determined using the concentration of elements indicative of dust (Al, Ti, Fe, <sup>232</sup>Th) and export productivity (Ba<sub>xs</sub>), and utilizing the constant flux proxy <sup>230</sup>Th<sub>xs0</sub>. The dust flux records show a ~2 times decrease as Earth transitioned from the peak glacial conditions of MIS 8 to the warmer MIS 7. Export productivity also decreased across the transition. At the same time, the main component of sediment switched from opal to carbonate, suggesting that this change in productivity corresponds with a shift in the dominant primary producers. Overall, we interpret the combined dust and export productivity data to indicate a movement of the Subantarctic Front driven by weakening or poleward shift in the westerlies.