

SOUTHERN OCEAN IMPACTS ON GLOBAL CLIMATE: CLUES FROM THE ANTARCTIC MARGIN

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The Southern Ocean influences our global climate in many ways. The unimpeded flow of the circumpolar ocean around Antarctica isolates the southernmost continent, keeping it cold and contributing to the maintenance of ice on both land and sea. The densest water on Earth forms along the Antarctic margin, where warm waters from the tropics cool and sink to fill large portions of the deep ocean basins and contributing to the transport of heat from the tropics to the poles. The Southern Ocean is also thought to take up large amounts of CO₂ from the atmosphere (including up to 35% of the annual anthropogenic input) thereby impacting the planetary greenhouse. We know the Southern Ocean is changing, perhaps more rapidly than ever before. How might the biology of highly productive Antarctic seas respond? How stable is the continental ice sheet? What may lie ahead if the sea ice melts? By studying past changes in the Southern Ocean we can begin to understand key processes and even some of their rates. This lecture will blend perspectives derived from sixteen years of modern process and sedimentation studies in the Southern Ocean with new results from sediment cores collected during ODP Legs 178 and 188. Dr. Dunbar sailed as a sedimentologist on ODP Leg 128 (Japan Sea) and is a shore-based scientist for ODP Legs 178 (Antarctic Peninsula) and 188 (East Antarctica).