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Abstract

Examining ocean currents off West Antarctica through particle-size analyses of a sediment core

In this study, sediments from the Pliocene warm period (3-5 million years ago) from a sediment drift deposit in the Amundsen Sea in Antarctica (drillsite U1533) were treated and analyzed for particle size distribution and sortable silt percentage. These variables help explain how fast ocean currents were moving under warmer climate scenarios. The sediments from beneath the seafloor were treated using hydrogen peroxide to break down any organic matter, followed by boiling with hydrochloric acid to break down carbonate. To remove chemicals, the sediment samples were placed into a centrifuge with 50 mL of DI water for 30 minutes, decanted, then another 30 minutes with 50 mL of DI water. After the samples were treated, they were placed into the Malvern Mastersizer 2000 to measure particle size distributions by using a laser and the resulting scatter patterns of the sediment particles. The results were graphed with depth beneath the seafloor to show the differences in sortable silt percentage over time. The results showed that the sortable silt percentage was low around the onset of the warm period, concluding that the movement of ocean currents during this time period dropped. These results were not typical, as models had predicted that warm periods would have faster ocean currents, and opens up the possibility for future research.

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