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Global Climate and Sea Level: Enduring Variability and Rapid Fluctuations Over the Past 150,000 Years

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Abstract

Although climate variations and sea level changes are often discussed interchangeably, climate change need not always result in sea level change. Perturbations in Earth's orbit cause major climate changes, and the resulting variations in the amount and distribution of solar radiation at ground level follow cycles lasting for thousands of years. Research done in the last decade shows that climate can change on centennial or shorter time scales. These more rapid changes appear to be related to modifications in ocean circulation initiated during the last glacial period either by injections of fresh meltwater or huge ice discharges into the North Atlantic. When first detected, these rapid climate changes were characterized as episodes decoupled from any significant change in sea level. New data clearly show a direct connection between climate and sea level, and even more surprising, this link may extend to times of glacial-interglacial transitions and possibly also to interglacials. The full extent of this sea level/climate coupling is unknown and is the subject of current research.

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