UCSB

EARTH SCIENCE

SPEAKERS CLUB

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What do carbon isotopes tell us about the CO_2 rise at the end of the Last Ice Age?

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High resolution and precise records of the carbon isotopic composition ($\delta^{13}C$) of atmospheric CO_2 from ice cores are now providing a valuable constraint on the origin of the deglacial CO_2 rise. Similarly, there are also new high-resolution and precise records of the $\delta^{13}C$ in oceanic carbon in the upper ocean. In this talk I will review the proposed mechanisms for the deglacial CO_2 rise and the controls on the isotopic composition of atmospheric and oceanic carbon. I will also talk about how $\delta^{13}C$ records from the atmosphere and ocean have been used to evaluate scenarios for deglacial CO_2 rise. I will show that similarities in these new highly-resolved records of deglacial $\delta^{13}C$ suggest that air-sea exchange can effectively globalize the signal of a release of carbon from the deep ocean. This limits the utility of carbon isotopes for constraining the precise mechanism of carbon release, and more direct nutrient tracers are needed. However, the difference between the atmosphere and upper ocean $\delta^{13}C$ could potentially provide an independent estimate of sea surface temperature change.