

Atmospheric CO₂ and abrupt climate change during the last glacial and the Holocene

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Reconstruction of atmospheric CO₂ records during abrupt climate change may help us better understand climate-carbon cycle feedbacks. Previous ice core studies show atmospheric CO₂ increase during Heinrich stadials of the last ice age. However, the relation remains elusive for non-Heinrich stadials during the last ice age and centennial cooling events during the Holocene. This is due to the low temporal resolution of the previous ice core records. Recently, we obtained a high-resolution CO₂ record from Siple Dome ice core, Antarctica, covering 41-22 and 9.0-7.4 ka BP (before 1950). Our preliminary results reveal that CO₂ did not increase on centennial timescales during the non-Heinrich stadials. Our results also reveal that CO₂ change during the centennial cooling event at 8.2 ka BP is not remarkable when compared to other centennial variations in the Holocene that are not linked to large temperature changes. We propose that there are critical thresholds in strength of climate perturbation to change atmospheric CO₂.