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ABSTRACT

The early Holocene had been considered as a climatically calm period. However, recent studies revealed several short-period climatic anomalies superposed on a long-term climate trend. Here we present a high resolution methane (CH₄) record from Siple Dome (Antarctica) and compare it with other climate proxies. The CH₄ record was obtained by a melting-refreezing gas extraction system at Seoul National University. In order to isolate millennial phenomena, we high-pass filtered the CH₄ record at 1/1800 yr⁻¹, and observed four CH₄ local minima with a mean duration of 2-300 years at 8.2, 9.2, 10.3 and 11.0 ka. The CH₄ minima are coincident with those of NGRIP δ¹⁸O record implying a close link to North Atlantic climate. Further, the CH₄ minima are correlated with proxies for the Inter-Tropical Convergence Zone (ITCZ) mean position, strength of East Asian summer monsoon, and solar activity, within age uncertainty. As previous studies suggested for other time periods, the CH₄ minima might have been caused by decreased CH₄ source strength in the Northern tropics which was controlled by cooling in the North Atlantic and subsequent southward ITCZ migration and finally decreased precipitation in the northern tropics.