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Enhanced marine methane seepage during past interglacials: Evidence from the South China Sea

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Large amounts of the potent greenhouse gas methane are stored as gas hydrate in marine sediments along continental margins. Although the driving factors for gas hydrate dissociation are still poorly constrained, hydrate dissociation and resultant methane seepage are assumed to be favored by reduced hydrostatic pressure during sea-level lowstands. Here we show that periods of intense methane seepage coincided with major interglacials during the last 440-thousand years in the South China Sea when sea level rose. Instead of reduced hydrostatic pressure, hydrate dissociation was apparently caused by rapid bottom water warming at the onset of interglacial periods. This mechanism is likely to have implications for the current and future ocean, when more gas hydrate may dissociate with on-going global warming. This finding provides direct evidence for the sensitivity of the deep marine methane hydrate reservoir to glacial-interglacial cyclicity.