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Climate of the Past Discussions

Interactive comment on "Methane release from gas hydrate systems during the Paleocene-Eocene thermal maximum and other past hyperthermal events: setting appropriate parameters for discussion" *by* G. R. Dickens

G. Dickens

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Dear Matt,

Thank you for the comments and questions. I suspect that this might be addressed with some slightly different wording. The key word missing seems to be "ALL".

If thermal dissociation of gas hydrate was the primary cause of the CIE, two concepts have to be considered. First, some portion of the temperature increase across the PETM (perhaps 2°-4°C) must lead the CIE (probably by 1000 years or so). This is

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because ocean temperatures would need to rise at intermediate water depths, and because heat would need to propagate into sediment and push gas hydrate dissociation, an endothermic reaction. Second, some fraction (perhaps most) of the methane released probably would have been oxidized in the water column because this is the primary fate of methane escaping seeps on modern continental slopes.

The main point is that methane released from the seafloor, even if it caused the CIE, could not have driven ALL the temperature rise during the PETM. Certainly, however, methane release could represent a positive feedback to change initiated by other processes, and that some component (perhaps the majority) of the temperature rise was related to the carbon input.

Jerry

Interactive comment on Clim. Past Discuss., 7, 1139, 2011.