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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

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Dear Jerry,

It's terrific to see a formal (re)statement of these very important ideas that continue to be influential and important more than 15 years after they were proposed. On an initial read (I may have more comments later) I was puzzled by the following statement:

"It is important to re-emphasize two concepts concerning this potential explanation for the PETM δ13C excursion (Dickens et al., 1995, 1997a; Dickens, 2000, 2003).

.....Second, the primary impact of CH4 release from a geological perspective would be addition of CO2 to the ocean and atmosphere, and modification of water chemistry, particularly a drop in pH and dissolved O2. This is because CH4 is rapidly oxidized to CO2 in the ocean or atmosphere. There has never been a suggestion that CH4 inputs from the seafloor entered the atmosphere and drove climate change during the PETM."

As a small point, I assume that by "There has never been a suggestion" you mean, that you have never suggested that. Certainly a read through the literature indicates that some people have had that interpretation. Right?

As a more central point, and maybe this is just because I am a terrible geochemist and I'm not following the argument, my reading of your 1995 paper indicates to me that you suggested exactly this scenario (bottom of page 970):

"Atmospheric CH4 concentrations also might have increased during the onset of the LPTM if ebulllition of CH4 was an important process during hydrate dissociation. The elevated atmospheric CO2 (and CH4) concentrations then might act as a positive feedback for further climatic and oceanic warmth."

So, at least at the end of this paper, after very duly avoiding saying that CH4 made it into the atmosphere throughout the rest of the paper, you speculated that ebullition occurred and CH4 in atmosphere (derived thereby from hydrate dissociation) warmed the atmosphere. Isn't that exactly what you say in this paper, was never suggested?

I'm hoping that you can clarify this obvious point of confusion for me. Thanks.

-Matthew Huber

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