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Biogeosciences Discussions

Interactive comment on "Quantifying in-situ gas hydrates at active seep sites in the eastern Black Sea using pressure coring technique" *by* K. Heeschen et al.

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Dear Katja,

(A) "Out of curiosity: Which method would you choose?"

Given that we can only sample and constrain gas hydrate abundance at a few locations, I think that the best approach is this:

(1) Develop a set of models that predict the amount of gas hydrate at locations where it has been drilled and quantified.

(2) Establish the key parameters of variance.

(3) Develop methods for accurately determining the amount of methane and gas hydrate in deep-sea sediment (as well as fluxes of methane).

(4) Drill and quantify gas hydrate at a new set of locations from this model-based framework using the best techniques available. Can we predict the amount and distribution of gas hydrate ahead of time?

(5) Once, we have this, then we can model the amounts of gas hydrate and free gas across the planet.

We, the community, is sort of there with 1-3, touched on 4, but has moved onto 5 anyhow. It is clear that there are major problems. The most obvious is that recent models for global gas hydrate distribution and abundance do not replicate the gas hydrate distribution and abundance at sites where it has been drilled and quantified. For example, we think we know through direct measurements that sediment on the crest of Blake Ridge has about 400 kg C/m2 of seafloor as gas hydrate. Recent models showing maps of gas hydrate suggest it is < 100 kg C/m2. It does not give me much faith in current modeling, and I think some key parameters are missing (e.g., differential supply of organic carbon over time; upward flow of methane in dissolved and free gas phases).

But, I agree with you that this is well beyond the scope of the current paper, except 3.

(B) The floating temperature during degassing may explain much! This problem probably should be stressed and discussed in a short paragraph.

Jerry

Interactive comment on Biogeosciences Discuss., 8, 4529, 2011.