

Interactive comment on “A two-dimensional model of the passive coastal margin deep sedimentary carbon and methane cycles” by D. E. Archer et al.

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Here is a revised Figure 13b showing more extensive comparison of model DIC concentrations with data. I have added DIC concentration data from Blake Ridge from Chapter 30 of the ODP Scientific Results from leg 164 (N.M. Rodriguez, C.K. Paull, and W.S. Borowski, Zonation of authigenic carbonates within gas hydrate-bearing sedimentary sections on the Blake Ridge: offshore southeastern North America, doi:10.2973/odp.proc.sr.164.227.2000). I also added profiles of DIC concentration from the first round of model results (in blue and labeled Spongebob Slow Urey), the latest results with faster DIC uptake kinetics (Spongebob Fast Urey), and the model with no Urey reaction (previously only plotted in Figure 13c, here labeled Spongebob No Urey). The point is that the DIC concentration in the pore water of the model is controlled by

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the Urey uptake kinetics, not by the strength of the carbon degradation source. If there were pore water measurements that exceeded the model "No Urey" case, then it would indicate that the DIC (and hence methane) sources were too weak in the model. But the model DIC without uptake exceeds all the measurements, so that a deficit of DIC production cannot be inferred.

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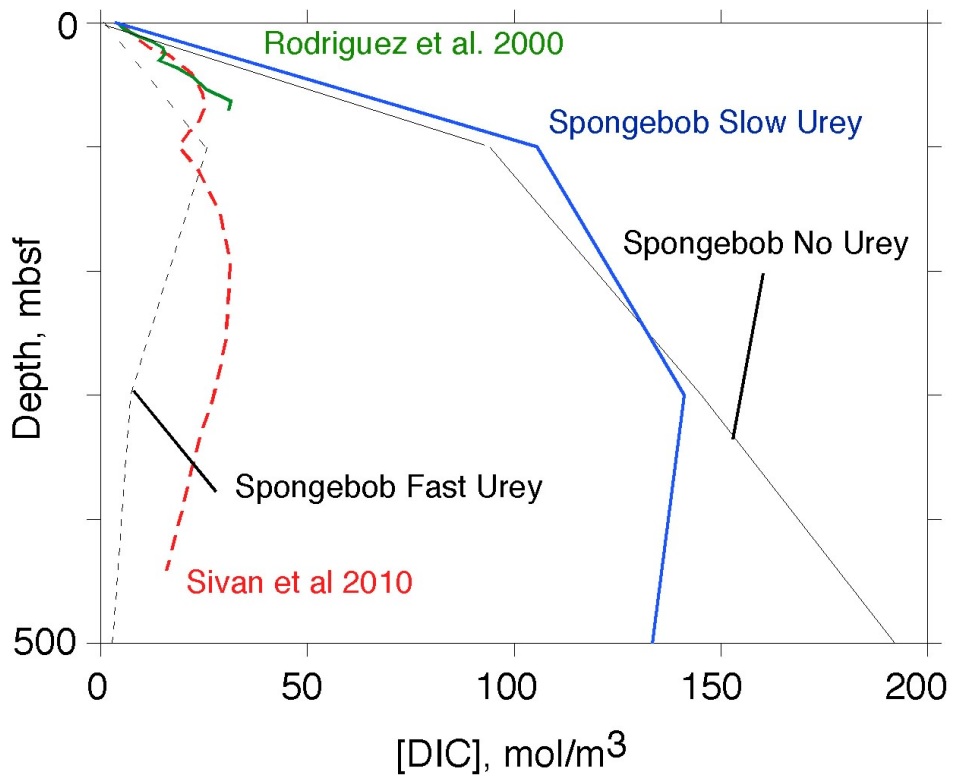


Fig. 1. Comparison of model DIC concentration profiles with data.