

Interactive
Comment

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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I have completed a set of sensitivity runs that vary the rate constant for DIC uptake by the weathering reaction. When the Urey uptake kinetics are slow or off, the modeled dissolved concentrations exceed the measured values at any of the sites (including the new alkalinity (proxy for DIC) values from Blake Ridge site 995, thanks to JD for that suggestion). This means that there is no deficit of methanogenesis/DIC production in the simulation. The largest difference between no-Urey and slow-Urey is deep in the sediment column, much deeper than data are available for. Figure 1A shows results from the model using a rate constant base of $10^{-7.3}$ yr⁻¹, which appears to be about the best fit to data in Figure 1B. Figure 1C shows the DIC concentration when the Urey reaction is disabled.

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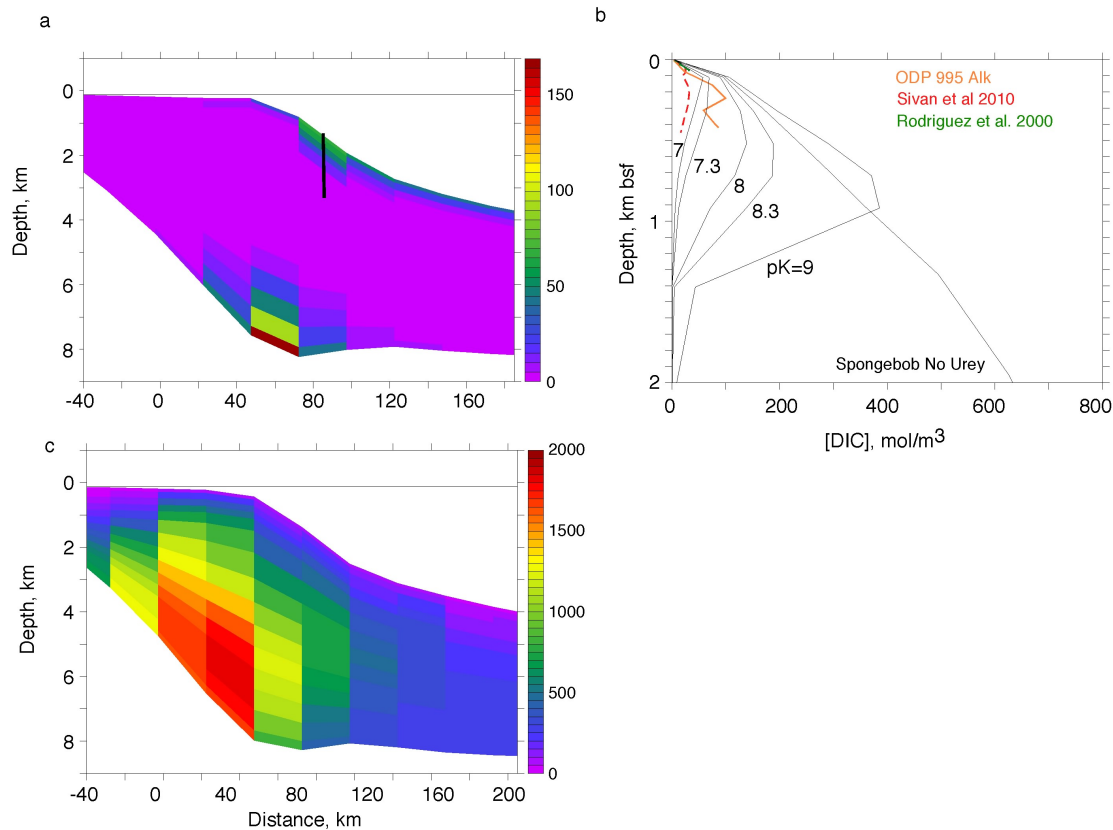


Figure 13

Fig. 1. Model DIC concentrations compared with data.

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