



## ***Interactive comment on “Submarine groundwater discharge to a small estuary estimated from radon and salinity measurements and a box model” by J. Crusius et al.***

**J. Crusius et al.**

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Response to Reviewer #2. Responses to the main specific comments follow below:

As there is such a wealth of hydrogeologic information on Salt Pond, this site could be ideally used to more rigorously examine Rn systematics and address potential limitations of Rn as a groundwater tracer. For example, why is it apparently more difficult to model salinity fluctuations in the canal and pond than Rn? Why is there a much greater range in fresh water Rn activities, relative to saline water Rn activities? This fresh water variability in groundwater Rn is largely responsible for the reported 50% error on SGD estimates, and it would be informative if such variability could be tied to lithology, grain size, lateral/vertical hydraulic conductivities, permeabilities, ect., Seepage meters provide some evidence for discharge rate dependence on water depths and distance from shore. Response: We agree that one could examine in more de-

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tail the reasons for variable Rn in gw, for variable S in the channel, etc. We feel this deserves to be dealt with in a followup to this study, not here (this is too long already).

Ě.. it would be interesting to corroborate using additional tracers that might be more sensitive to salinegroundwater Rn release, for example, 223,224Ra, CH4. Response: Yes, Ra isotopes should have been better incorporated into this study. We had a lot of trouble collecting gw at this site, and at some point we made the decision to limit our Ra sampling. We ended up with too few samples to be useful. This, too could be a followup study. Methane wouldn't be worth itĚthere's probably a lot coming from diffusion from the organic-rich sediments in the pond center, so it wouldn't all be an advection (SGD) story.

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Interactive comment on Biogeosciences Discussions, 2, 1, 2005.

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