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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Magnitude and seasonality of wetland methane emissions from the Hudson Bay Lowlands (Canada)" *by* C. A. Pickett-Heaps et al.

Anonymous Referee #2

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This paper uses a combination of model simulations and upwind and downwind methane observations to further constrain methane emissions from the Hudson Bay Lowlands (HBL). Overall the paper should be publishable following some revisions to address the comments given below.

Major Comment: Because the GEOS-Chem model does not simulate the observed July minimum at the generally upwind station at Alert, then the model-observation differences at the generally downwind station at Fraserdale are presumably due to a combination of LBL emissions and the aforementioned upwind differences (Figure 3). The authors therefore appeal to the Fraserdale-Alert difference (Figure 4) to assess

the validity of their modeled HBL emissions. A case is apparently made for the GEOS-Chem snowfree results being a reasonable simulation of these differences. However there remain some significant model-observation differences in Figure 4 that require at least some further explanation; in particular the reasons for the 3 peaks in the model (June, Sept., Nov.) versus the single peak (July-Aug.)in the observations need to be better addressed.

Minor Comments: Pg. 22417-Line 15 and 22426-Line 3: What previous estimates are being referred to here? The authors estimate is larger than some previous assessments but seems comparable to others. Be explicit about these previous estimates. Pg. 22420-Lines 6-25: For clarity, please define the terms in equation 1 in the order in which they occur (W, etc.). Also why not include A in the exponential? And why is To negative? Pg. 22424-Line 26: How is the 0.3 Tg/yr error in the emission estimate derived? It should be related to the model-observation differences (e.g. in Figure 4) and not just to model results.

Interactive comment on Atmos. Chem. Phys. Discuss., 10, 22415, 2010.

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