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Interactive comment on "Seasonal response of air-water CO_2 exchange along the land-ocean aquatic continuum of the North East American coast" *by* G. G. Laruelle et al.

W-J.C. Cai (Referee)

wcai@udel.edu

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Over the past 10 to 15 years, there have been great advances in data collection and synthesis of air-water CO2 fluxes at the land-ocean interfaces. While global synthesis based on extrapolations of known systems have been presented using various approaches, we often do not know such information at regional scales. For example, while I have compared global air-water CO2 fluxes in estuaries and shelves with that of the open ocean to emphasize the importance of estuaries and shelves despite their small areas (Bauer et al., 2013; Cai, 2011), I cannot give such a comparison for the North America east coasts as, among other reasons, there is no pCO2 data from a few

largest estuaries in that regions (e.g. the Chesapeake Bay). Furthermore, while spatial and seasonal distributions from a few systems are available and a general pattern of global spatial distribution such as mid-high latitude vs. low latitudes is known, overall we do not have a good sense on spatial and temporal distributions.

The paper authored by Laruelle et al. synthesizes the spatial and seasonal variability of CO2 fluxes at the air–water interface for the entire North East American Land–Ocean Aquatic Continuum, from streams to the shelf break. This is the first of its kind done at the sub-continental scale. The paper is well written and easy to follow. The paper can be accepted after a moderate refinement. Most importantly, I feel the uncertainty of estuarine flux should be fully appreciated. As mentioned above we have no data from the region's largest estuaries such as the main stem of the Chesapeake Bay and the Delaware Bay (Long Island Sound and New York Bight?). The estuarine degassing flux could be much lower if these large estuaries, some of them are highly eutrophic with likely low pCO2, are included. This fact must be clearly pointed out and the associated uncertainty should be assessed or at least mentioned.

Bauer, J.E., Cai, W.-J., Raymond, P.A., Bianchi, T.S., Hopkinson, C.S. and Regnier, P.A.G., 2013. The changing carbon cycle of the coastal ocean. Nature, 504(7478): 61-70. Cai, W.-J., 2011. Estuarine and coastal ocean carbon paradox: CO2 sinks or sites of terrestrial carbon incineration? Annual Review of Marine Science, 3(1): 123-145.

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