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Interactive comment on “Seasonal response of air-water CO₂ exchange along the land-ocean aquatic continuum of the North East American coast” by G. G. Laruelle et al.

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General Comments:

The manuscript addresses the important problem of estimating the CO₂ exchange at the air-water interface across the land-ocean boundary, from streams to the coast and shelf region, ranging from Cape Hatteras to the Scotian Shelf. The methodology is sound and the results provide useful insights into the processes that control the CO₂ budget. I believe that the manuscript should be published with some minor changes, primarily to provide more details of the methodology and expanding the discussion of results.

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Specific Comments:

Page 11989, sentence starting on line 9, “The riverine data ...”. Here the authors should be more specific on how the data, riverine pH and alkalinity and shelf SOCAT pCO₂ are used to derive the air-water CO₂ exchange. Specifically, details on how was the pCO₂ derived from pH and alkalinity.

Equation (1), the procedure to derive k should be more detailed as it requires an approach quite distinct from the gas transfer coefficient evaluation in the open ocean.

The discussion of methods for rivers, estuaries and continental shelves is a bit out of balance, with much longer description for rivers than for estuaries and shelves. Also, the manuscript could improve with the use of a table summarizing the data sources used for each of the three regions.

Page 11993, the “Results and discussion” session has rivers, estuaries and continental shelf results blended together. It makes the interpretation somewhat difficult, especially taking in consideration that in the methods section they were treated separately.

Nine lines of conclusions seem a bit short.

Technical Corrections:

Page 11988, line 24, change region to regions.

Page 11990, equation (1), give units of all variables used, for instance, units for FCO₂ and k are not given.

Page 11992, “uncertainty of the yearly FCO₂s”? “yearly estimates of FCO₂” reads better.

Page 11993, line 17, change “Scotian shelves” to “Scotian Shelf”. Check other occurrences in the text as well.

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