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Interactive comment on "North America's net terrestrial carbon exchange with the atmosphere 1990–2009" *by* A. W. King et al.

Anonymous Referee #2

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The manuscript by King et al. is part of the RECCAP series summarizing the carbon balance for North America, including Mexico, the United States and Canada. Atmospheric inversions, terrestrial biosphere models, and inventory (for croplands and forest) are used as independent measures of the North American sink for 1990-1999 and 2000-2009. Overall, the results demonstrate North America to be a carbon sink, with stronger estimates for the top down approach, followed by the bottom-up models, and then the inventory. The message of the manuscript is clearly presented and the findings, with their associated uncertainties, are quite robust in the sense that the status of North American carbon uptake is most likely positive over the past two decades.

I agree with the first reviewer who suggests that a schematic would be very helpful to compare what carbon fluxes are included or ignored for the three different accounting

approaches, with some additional attention paid to how the inclusion of fluxes vary between country. For example, the manuscript notes that the Mexican inventory is missing cropland harvest products and that the Canadian inventory is missing unmanaged forests.

The schematic will also be helpful for readers to understand in more detail on why the three different approaches disagree from one another. Again, for example, the top-down approach 'senses' all carbon inputs and outputs, whereas the terrestrial biosphere and inventory approaches make large assumptions for ignoring lateral carbon fluxes, the representation of disturbance, and also forest management and regrowth. A more detailed discussion on disturbance and its effects on carbon losses is needed for the manuscript – referring to estimates and issues presented in Kasischke et al. 2013, "Impacts of disturbance on the terrestrial carbon budget of North America" would be appropriate.

Interactive comment on Biogeosciences Discuss., 11, 11027, 2014.