

## ***Interactive comment on “Atmospheric inversion of the surface carbon flux with consideration of the spatial distributions of US crop production and consumption” by J. M. Chen et al.***

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I appreciate your very careful review and detailed comments. This is a short reply to your main points, while a detailed reply will be given after we revise our manuscript.

As in my reply to Reviewer #1, I see the value of our work is in quantifying the impact of lateral transfer of crop carbon on the spatial distribution of carbon sources and sinks estimated through atmospheric inversion. This impact could explain a large portion of the difference in existing inversion results. The results are not surprising but the importance of lateral carbon transfer could not be fully appreciated if the magnitude of this impact is not quantified. The main issue is that people tend to think that given

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the fairly dense atmospheric CO<sub>2</sub> data over North America, the prior flux may not be important. We determined that the prior flux can influence greatly the inverted spatial distribution of the carbon sink, and the crop production and consumption areas are particularly sensitive to the prior flux.

I appreciate the many suggestions to improve the manuscript, and we will follow them up if we are given the opportunity to revise our manuscript.

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