

## ***Interactive comment on “Seasonal variations in metallic mercury (Hg<sup>0</sup>) vapor exchange over biannual wheat – corn rotation cropland in the North China Plain” by J. Sommar et al.***

### **Anonymous Referee #2**

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In this study, Sommar et al., by employing a relaxed eddy accumulation (REA) method, conducted comprehensive investigations over a full year period on air-surface exchange of gaseous elemental mercury (Hg<sup>0</sup>) over a wheat-corn rotation cropland in the North China Plain. The main findings of the study the authors reported here suggest that this wheat-corn rotation cropland acts predominantly as a source of Hg<sup>0</sup> emission from soil into the atmosphere, as evidenced by the dominance of Hg<sup>0</sup> soil e-flux during the wheat growing season (approximately 2/3 of a year period) and a weak sink role exhibited by corn field. In addition, the authors also examined the response of air-surface Hg<sup>0</sup> flux to incidental events associated with agricultural management operations, such as irrigation and in-field burning of crop biomass, and found that both field

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flooding irrigation (particularly the initial flooding of dry soil) and crop burning could enhance Hg<sup>0</sup> emission into the atmosphere. The study design and techniques employed here are sound, and the results are dependable and of broad implications on studying local and regional air-surface Hg cycling. Overall, the manuscript is well written and of good quality. Nonetheless, some clarifications may be needed during discussion section about the enhanced Hg<sup>0</sup> emission from soil during irrigation. Did the authors measure Hg concentrations in the water used for irrigation? Or, did the authors estimate the potential contribution of Hg in the irrigation water to the Hg released into the atmosphere during these events? Are there any possibilities that the Hg from the irrigation water contributed to the enhanced Hg<sup>0</sup> emission to certain degrees?

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