

## ***Interactive comment on “A new global anthropogenic SO<sub>2</sub> emission inventory for the last decade: A mosaic of satellite-derived and bottom-up emissions” by Fei Liu et al.***

### **Anonymous Referee #1**

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This manuscript developed a new global SO<sub>2</sub> emission inventory by integration of bottom-up inventory and satellite observations. Satellite-based observations have been widely used in providing top-down constraints on surface emissions; however, top-down inventories are difficult to be used in due to lack of bottom-up information such as sectoral contribution. This work developed a harmonization approach that integrated OMI-inferred emission information into HTAP global emission inventory, and the new inventory has been proved to improve the model agreement with observations. The new method developed from this work has large potential in improving and timely updating bottom-up inventories. This is a very timely work for the emission inventory community. It's novel, and relevant to ACP readership. This manuscript is clearly struc-

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tured and generally well written. It could be published in ACP after addressing the following minor issues.

1. A direct comparison (scatter plots) between OMI-based estimates and bottom-up inventory should be provided over the locations where OMI estimates are available;
2. Uncertainties of OMI-based estimates should be discussed comprehensively and compared with bottom-up inventories;
3. It would be nice if the authors could provide some insights of using this approach for other pollutants such as NO<sub>x</sub>.

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