

Review

Title: Improved retrieval of SO₂ from Ozone Monitoring Instrument: residual analysis and data noise correction

Authors: H. Yan, L. Chen, J. Tao, L. Su, and D. Han

The authors of this paper investigate the impacts to the OMI BRD SO₂ product due to the change in area size used in the sliding median residual correction approach developed Yang et. al. [2007]. The authors have found that by reducing the contributing area from 30-degree latitude band to 10-degree latitude band, some of the biases observed in the original product are reduced. The authors have show examples that the reduced area used in the sliding median correction yields spatial distributions with less biases, both the negative value in the background area and the positive value in the row anomaly area. This is a useful finding, suggesting that adjusting the contributing area used in the sliding median approach may optimize the bias removal effect. This finding may be publishable in AMT. However there are a number of issues in this paper that need to be taken care of before it is recommended for publication.

- 1) The introduction should focus more on the various correction approaches described in the literature. The current introduction is basically a list of paper related to SO₂ retrievals from BUV instruments.
- 2) In this paper, the authors mentioned that they used TOMRAD to compute residuals at four wavelengths, and then perform the BRD retrievals to derive the SO₂. If the authors have done the TOMRAD computations, they need to provide more details. For instance, how ozone values are derived or which ozone values are used for both inside and outside of row anomaly areas? What cloud pressures, surface pressures (both terrain and clouds), and other needed parameters is obtained for the forward computation. Please clarify how and what has actually been done to obtain the residuals presented in this paper.

Since the OMI SO₂ product (OMSO₂) contains all the information needed to perform modified sliding median correction, the authors need to provide justification for going through the TOMRAD computation.

- 3) The authors have confused 'noise' and 'bias' in this paper. The sliding median correction method removes some biases (NOT noises) in the data.
- 4) Statistical analysis of the modified approach needs to be conducted for greater amount of data (at least one year worth of data) to evaluate its effectiveness.
- 5) The English writing is poor and needs to be improved.