

Interactive comment on “Aura OMI observations of regional SO₂ and NO₂ pollution changes from 2005 to 2014” by N. A. Krotkov et al.

Anonymous Referee #2

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General comments

The paper deals with changes in NO₂ and SO₂ levels in several regions using satellite-based observations. It includes accurate reference to different emission sources and processes corresponding to different industrial and other human-related activities. The authors present also interesting information on the ratio between SO₂ and NO₂ content with interesting discussion about the changes in political and economical conditions. The paper is well written and the methodology appropriate. I recommend publication on ACP after addressing the following minor comments.

Specific comments

1) Section 2.3 You mention you select only clear sky conditions. Could you comment

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if/how this could affect your results?

2) P26567 L3 Schmidt et al. 2015 recently found that SO₂ emissions during Holuhraun volcanic eruption in September 2014 exceeded SO₂ emissions from all anthropogenic sources in Europe. Did you find any signature of this in your analysis?

3) P26569 L26-28 Here and in general elsewhere in the text: it is mentioned that trends in OMI columns match trends reported in emissions: I think should be at least roughly quantified. For example, what would be the expected reduction in SO₂ columns corresponding to the observed emission reduction in eastern US? Please check this for other regions too (if relevant).

4) P26572 L4 “SO₂ reduction” maybe should be specified reduction of what, e.g. emissions.

5) P26572 L6 “OMI detection limit” maybe you could remind the value here

6) P26573 L8-9 I think there is need for a reference here concerning the emission distribution.

Technical corrections

1) Fig. 3 and elsewhere is there a reason you use DU and molec./cm² for SO₂ and NO₂, respectively? Why not just use molec./cm² for both?

2) Fig. 4-7 The panels are quite small and a colorbar for each panel is not necessary. Could the colorbar be moved to the right side (vertical) of each row? So only 1 colorbar for 3 panels.

Schmidt, A., et al. (2015), Satellite detection, long-range transport, and air quality impacts of volcanic sulfur dioxide from the 2014–2015 flood lava eruption at Bárðarbunga (Iceland). J. Geophys. Res. Atmos., 120, doi:10.1002/2015JD023638.