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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Trends in stratospheric ozone derived from merged SAGE II and Odin-OSIRIS satellite observations" *by* A. E. Bourassa et al.

Anonymous Referee #1

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1 Overall remarks

Based on a successful combination of SAGE II (1984 to 2005) and OSIRIS (2002 to 2013) ozone profile measurements, the paper analyzes main components of long-term and inter-annual ozone variations. In particular, the paper reports a signficant increase of ozone in the upper stratosphere over the last 15 years. This increase is expected from the beginning decline of ozone depletion substances. These new data now clearly demonstrate the success of the international Montreal Protocol for protecting the ozone layer, which has essentially stopped emissions of ozone depleting substances.

The paper is very well written, concise and good to read. It is definitely very well suited for publication in ACP. My only more substantial suggestion is to compare the presented results from the combined SAGE II - OSISRIS data set not only to results from the combined SAGE II - GOMOS data set (Kyrölä et al., 2013), but also include a comparison, both of trend patterns and trend magnitudes, to the ozone trends reported for SCIAMACHY (Gebhardt et al., 2014) and MIPAS (Eckert et al., 2014). This comparison should be added to Sections 4 and/or 5 of the paper.

Otherwise: Congratulations and publish.

2 Minor suggestions

page 7114, line 24: " and the improved" → ". Improved"

page 7115, line 2: ", and satellite" → ". Satellite"

page 7115, line 16: "allows" → "allow"

page 7115, lines 17 to 25: Please mention the spectral range used by OSIRIS for ozone measurements.

page 7118, lines 24/25: I do not understand that sentence. Maybe it should be omitted?

page 7119, line 11: Please state explicitly over which period these climatological means were computed. Was that 1984 to 2005 for SAGE II, and 2002 to 2013 for OSIRIS? Or was 2002 to 2005 used for both instruments? Using the shorter common time period results in a noisier climatological mean. Using the longer but different time periods adds the difficulty that the annual cycle has changed over time. Please be more explicit here.

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3 References

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Gebhardt, C., Rozanov, A., Hommel, R., Weber, M., Bovensmann, H., Burrows, J. P., Degenstein, D., Froidevaux, L., and Thompson, A. M.: Stratospheric ozone trends and variability as seen by SCIAMACHY from 2002 to 2012, Atmos. Chem. Phys., 14, 831-846, doi:10.5194/acp-14-831-2014, 2014.

Kyrölä, E., Laine, M., Sofieva, V., Tamminen, J., Päivärinta, S.-M., Tukiainen, S., Zawodny, J., and Thomason, L.: Combined SAGE II–GOMOS ozone profile data set for 1984–2011 and trend analysis of the vertical distribution of ozone, Atmos. Chem. Phys., 13, 10645-10658, doi:10.5194/acp-13-10645-2013, 2013.

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