

## ***Interactive comment on “Stratospheric Aerosol Climatology over Ethiopia and Retrieval of its Size Distribution” by Milkessa Gebeyehu Homa et al.***

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Response to Anonymous Referee

General Response.

The objective of the paper is to report the stratospheric aerosol climatology over Ethiopian sky (in tropics) and characterizing in terms of its physical and optical properties. As the stratosphere level over the region is above 15 km, we have discussed the vertical distribution of aerosols in this region as presented in Figures 3, 5, 7 and 9. The reason we refer troposphere (usual the upper troposphere) in different parts of the paper is that in our region the tropopause level is a bit higher than 15 km and we considered the region below ~17 km as upper troposphere.

C1

The stratospheric aerosol trend before and after the 1991 (Mt. Pinatubo) volcanic eruption is discussed in terms of its reaction rate at 525 nm, and reveals that the period from 1992 to 2005 is relatively volcanically quiescent period as confirmed by (Thomason L.W. et al 2007)

Response to Anonymous Referee #2

1. Stratospheric aerosols are smaller in size and have longer life time in the atmosphere (Israel H. and Israel, G.H (1974)). Lower stratospheric and upper tropopause regions have almost similar chemical composition (SPARC, 2006). The transport of aerosols formed in the troposphere to stratosphere is mentioned in the review made by Kremser et.al 2016 (page 3 line #9) though the type is not specified.

2. The tropospheric aerosols are not our main focus, but mentioned on the way discussing the stratosphere. It is to mention the lower stratosphere and we will correct it.

3. Sufficient emphasis was given to volcanic eruption as a source of stratospheric aerosols as mentioned on different lines of the article on the discussion paper, mentioned below:

page 2: line 31-33

page 9: line 9-9

page 10: line 9-12

line 16-17

page 11: line 19-21

4. The tropospheric citations were not used directly to stratospheric aerosol discussions. They are used for common aerosol properties undifferentiated.

References

C2

1. Thomason L. et al. (2007). Report on the Assessment of Stratospheric Aerosol Properties: New Data Record, but no Trend.
2. Israel H. and Israel G.W. (1974). Trace Elements in the Atmosphere. Ann Arbor, Michigan.
3. SPARC, 2006: Assessment of Stratospheric Aerosol Properties (ASAP), WCRP-124, WMO/TD No. 1295, SPARC Rep. 4, 348 pp.
4. Kremser, S., et al., 2016: Stratospheric aerosol-Observations, processes, and impact on climate, Rev. Geophys., 54, doi:10.1002/2015RG000511.

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-133>, 2017.