

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

Anonymous Referee #1

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Reviewer Opinion:

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Title: Stratospheric Aerosol Climatology over Ethiopia and Retrieval of its Size Distribution
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The research reported in the paper is based on incorrect direct cause effect relation between stratospheric aerosols and human-industrial generated aerosols at the surface in Ethiopia. It has been well established from the first IPCC report (IPCC, 1990) that the main contribution of the aerosols generated at the surface (anthropogenic and industrial) is to the aerosols in the troposphere.

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The authors also ignore that the main contribution to the aerosols in the stratosphere during the studied period (October 1984 to September 2005) came from volcanic eruptions. If a climatology of the stratospheric aerosols in any region of the planet wants to be produced it should analyze separated the periods of volcanic activity and the non-volcanic period (called stratospheric aerosols background, because of the low amount of aerosols during this periods).

The paper is plagued of inconsistent and non-sense mixture of stratospheric and tropospheric aerosols citations.

If the authors want to study stratospheric aerosols, they should study first the Assessment of Stratospheric Aerosol Properties Report (SPARC, 2006) and its most recent update (Kremser et al., 2016). There they will find all the main information and scientific conclusions (and also the pending and new scientific questions) about stratospheric aerosols. Among the references in both documents are the leading papers on stratospheric aerosols climatology, size distributions determination, etc.

For the authors to conduct a research on the contribution to the industrial boom in Ethiopia to the increase of tropospheric aerosols they cannot use SAGE II aerosols profiles. Instead, they may use AOD from MODIS instruments measurements (TERRA from 2001 to the present and AQUA from 2002 to the present).

The paper should not be accepted.

References:

IPCC, 1990: Climate Change: The IPCC Scientific Assessment [J. T. Houghton, G. J. Jenkins and J. J. Ephraums (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 212 pp.

Kremser, S., et al., 2016: Stratospheric aerosol observations, processes, and impact on climate, *Rev. Geophys.*, 54, doi:10.1002/2015RG000511.

SPARC, 2006: Assessment of Stratospheric Aerosol Properties (ASAP), WCRP-124,



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