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Interactive comment on "Multidecadal trend analysis of aerosol radiative properties at a global scale" *by* Martine Collaud Coen et al.

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Studying long time series is important part of atmospheric research and this work has significant potential to increase our knowledge on evolution of aerosol parameters affecting climate change. However, I see some methodological details that should be addressed before drawing final conclusions from the data.

My comments:

Using a pre-whitening method always loses information from the data and because there is no information on the applied method (Collaud Coen et al., in preparation), it is impossible to see how much information is lost. Thus, results of this work cannot be evaluated before the method is available for inspection.

There exists time series analysis methods which do not require pre-whitening, why the authors are not considering them? For example, dynamic linear models (DLM) have been shown to be good tools for atmospheric data e.g. in Laine et al. (2014), Dunne et al. (2015) and Mikkonen et al. (2015). with DLM, it is possible to model time-varying trends in measured time series and at the same time take account structural dependencies, e.g. seasonality and autocorrelation, in the data.

In addition, it shows from Figure 3 that the trends in the data cannot be described with one linear slope. With DLM the shape of the trend is not limited to straight line but the trend can change its value continuously and it can be analyzed directly if the time series contains changepoints and where they most likely are.

DLM method is nicely described in Laine (2020) and supported by freely distributed Matlab toolbox in https://mjlaine.github.io/dlm/index.html

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