

Interactive comment on “Temperature climatology and trend estimates in the UTLs region as observed over a southern subtropical site, Durban, South Africa” by H. Bencherif et al.

Anonymous Referee #2

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The authors use a multivariate least square method, obtaining coefficients for annual, semi-annual cycles, QBO, ENSO and Solar cycle terms. The error analysis is primitive though and the confidence with which the authors can state the conclusions is therefore unfounded. Without considering autocorrelation or using the standard means of obtaining errors from a least squares analysis the authors understate (actually they do not describe the derivation of) their errors. Before this paper can be of publishable quality their error analysis must be reworked by the methods that are now standard in the simplest of trend derivations - but due to the authors nice data record, the under representation of such in the literature and the authors desire to draw strong conclusions

I strongly urge the authors to resubmit their paper with this change.

Without an adequate trend error description and autocorrelation consideration the trends that the authors provide have no physical meaning. Until the authors address this I do not consider this work to be of a quality that is sufficient for publication in ACP. Specific comments Pg 1302 line17 while temperature does influence ozone abundance as the authors note, vice versa is also true, that ozone abundance influences temperature (the reason for the stratification of the stratosphere) - add vice versa to the sentence.

Pg 1303 line 13 reference that the authors have overlooked - Bodeker 1998, southern hemisphere, Lauder, investigation of trends in ozone and temperature for another southern hemisphere.

Pg 1304 line 19 Extending the data set to include the morning soundings as (by still keeping them separate) would I hope also contain a similar message strengthening conclusions.

Pg 1305 Line 17, quantify the anti-correlation

Pg 1307 How is the variance of the trend term derived? Is the variance of the residual in time space used to define the error term for the trend? The authors do not provide the exact description of the method used to derive their trend error. For the trends to have any physical meaning the methodology used to derive the error must be described. More importantly to be a valid estimation of the trend error the autocorrelation of the residuals must be considered. How to include first order autocorrelation is now standard in trend determination and has been described by {Reinsel, 1987 #678}{Tiao, 1990 #592}{Weatherhead, 1998 #602} how the autocorrelation of the residual term is essential to prescribe the correct error to the trend term. Further, other authors have found that second order correlation provides the most accurate estimate of the trend error {Bodeker, 1998 #399}.

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Pg 1309 line 11. The authors might consider using a fourier transform expansion or a 12 term monthly expansion of the trend term and derive the seasonality of the trends as described by the above references. This would be a more rigorous approach and provide additional interesting information about this nice dataset.

Interactive comment on Atmos. Chem. Phys. Discuss., 6, 1301, 2006.

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