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# ***Interactive comment on “Is tropospheric ozone over southern Africa really increasing? Evidence from sonde and aircraft profiles” by A. M. Thompson et al.***

## **Anonymous Referee #2**

Received and published: 20 May 2014

This paper presents an analysis of free tropospheric ozone trends over the southern Africa area between about the early 1990s to the early 2010s. It is based on ozone vertical soundings made at Irene and Reunion island sometimes completed by MOZAIC observations. A statistical multivariate regression model is applied to derived trends from these observations. A significant positive trend is observed both at Irene and Reunion island occurring mainly during the winter season between 5 and 11 km height. An analysis is also conducted to try to explain the reasons of these trends but no real explanations of these trends are actually found. It is also mentioned by authors that such analysis is not exactly new, it is a kind of update of the work of Clain et al (2009)

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but with new data added (MOZAIC) and trends at Irene corrected from launch times. This updated data set for South African troposphere and associated trends are key observations for our knowledge of tropospheric ozone trends of the southern hemisphere. Although, it is a bit disappointing that no clear reasons are found to explain these clear positive trends, this paper probably deserve to be published in ACP. Nevertheless, some minor revisions have to be addressed before publication:

Abstract :

The way the abstract begin with results of Clain et al (2009) seems a bit confusing to me. I suggest to reformulate the beginning of the abstract.

Introduction: ok

Chapter 2:

The discussion of the differences between climatologies on figure 2 would have been easier if maps of differences were presented on figure 2. Page 10173 Line 28 and Page 10174 Line 2: quantify the differences instead of using the term “appear”, it is too vague.

Page 10173 Line 16 and following: It seems that there is an inversion between figure 3 and 4 within the text.

Page 10173 Line 22-25 : What kind of information do we get from the comparisons of total columns (here with SAOZ) ? Do we have more direct information on measurement accuracy within the troposphere ?

Chapter 3:

Page 10179 Line 3: “ . . . perhaps suggestive of more subsidence than in the 1990s . . . ”  
Could you not verify this objectively with meteorological fields analysis ?

Page 10179 Line 4: How can we see what's happen above 11km with figure 7 ?

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Page 10179 Line 5-11: Could you precise what is the link between convection and ozone ? It seems to me too much implicit as it is.

Page 10179 Line 16-19: I think you must more explicitly explain how you are calculating the sensitivity to a change in 330 K PV.

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Interactive comment on Atmos. Chem. Phys. Discuss., 14, 10167, 2014.

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