

Interactive comment on “A review of the ozone hole from 2008 to 2010 as observed by IASI” by C. Scannell et al.

S. Dhomse (Referee)

s.dhomse@see.leeds.ac.uk

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A review for “A review of the ozone hole from 2008 to 2010 as observed by IASI” By Scannell et al,

This study present results from Atmospheric Sounding Interferometer (IASI) on-board MetOp-A satellite. This is interesting study highlighting the capability of infra-red instrument to provide ozone distribution during polar night.

Overall scientific results are well presented and I think the paper should be published in IMT with some minor corrections.

My major concern is that authors use only GOME-2 data to validate their total ozone
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product. What about ground based stations (Brewer/Dobson spectrometers)? So that reader will get overall review.

I think authors are also confused with the definition of the ozone hole, polar vortex, and edge of the polar vortex. Terms like polar vortex, edge of the polar vortex and outside the vortex are used define dynamical boundaries whereas ozone hole, outside the ozone hole are used to define chemical boundaries. Another important issue is the scientific writing. As a non-native English speaker, I can understand the difficulties in writing, however senior co-authors should help to improve the manuscript.

Minor comments.

1.Title:- I think it can be reworded as “Antarctic ozone hole as observed by Atmospheric Sounding Interferometer (IASI) for 2008-2010.”

2.Affiliation for 4, typo “Royal”

3.Page 4718 - Abstract should be abstract, so remove first couple of sentences.

4.line 14-15- Ozone hole region and period? Confusing. remove “for the ozone hole region and period”

5.line 15- “Total ozone column from IASI and GOME-2. . .”

6.line 17 – “ On average IASI. . .”

7.line 21- I think you meant to say “ The vertical structure of the ozone profile during ozone hole”

8.Page 4719- line 10, use either noticeable or severe. other IR instruments.

9.line 10-14- very long and inconsistent sentence . Reword it...

line 21-23 :- There is difference between NO_x, HO_x and halogen related ozone destruction. Inside the polar vortex ozone loss due Chlorine activation only because there is less NO_x or HO_x. So you can reword it as “It is thought that inside the polar vortex

approximately 60 %”

10.line 23- also add “(Feng et al, 2011)”

11.line 25- polar vortex forms over Antarctic or in the Antarctic stratosphere.

12.line 27- “when the temperatures reach below 195 K and 188 K”. If possible also discuss the effects of the PSCs on IASI retrieval.

13.Page 4720 –line 13, In general observations provide very good constraints in understanding our understanding about various chemical and dynamical process on ozone. Satellite data is widely used to validate Chemical transport Models (CTMs) as well as Chemistry Climate Models (CCMs), which are used to predict future ozone changes (See chapter 6 from SPARC 2010 and for Antarctic ozone changes see Austin et al 2010).

14.line 15 – Please reword it as ozone measurements started well before discovery of the ozone hole.

15.TOMS is no longer operational. So why not SCIAMACHY (Bovensmann et al. 1999)

16.Page 4721 – line 1, what about other IR instruments POAM,HIRDLES

17.line 6 – remove “ with a small footprint” – high spatial resolution is self explanatory

18.line 10- remove “then”

19.line 17- plaX2?

20.page 4722, line 6, Remove the brackets from the reference. It should be either cite or citealt .

21.line 7-8, remove .., “which areobservation”

22. line 15- “is needed”. Remove “needs to be applied”.

23.I think you need not to define residual.

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24.line 30- why do you need fast delivery? For long term ozone monitoring we accurate retrieval.

25.Page 4723- line 2- again remove the brackets for the reference.

26.line 5- “were considered”

27.Page 7-11- very long sentence. Divide it.

28.Page 11- Boynard et al (2009), found that

29.line 14- They also found that

30.line 16- To allow (remove “ In order”)

31. line 18- remove “continuously”

32.line 23- delete “when usign the FORLI-O3 scheme.

33.Page 4724-line 8 – confusing. “which is used (Wan, 2008).

34.line 27- Infra-red.

35.Page 4725- line 4- it should ozone sondes.

36.line 21-25- ozone plots or maps plots.. Confusing. why not total ozone values

37.line 25-26- reword. Largest and greatest are confusing words.

38.Page 4726- line 16-20, confusing.. Austin et. al 2010 should be better reference.

39.Page 4727- line 8-9- ozone hole period is repeated. It is already mentioned in earlier sentence.

40.line 16- replace below with “south of”

41. line 19- replace how with “that”

42.line 21- “ depletion of polar stratospheric clouds?” not correct

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43.line 20-21 – expand the discussion about meteorology or (dynamical) during this period .This is caused by enhanced planetary wave activity during this period. For Antarctic year 2002 see Weber et al, 2003, von Savigny et al. 2005. Enhanced wave activity leads to increase in ozone transport from tropics to mid-high latitudes.

44.line 28- “this is mainly due to”

45. Page 4728, line 8, add comma after studied.

46.Page 4729, line 16- I think you meant “edge of the polar vortex”

47.Page 4730, page 4- which previous studies? 48.line 5- and may (spacing)

49.Page 4731- line 11 – long-form first and then short form in bracket (WODUC).

50.page 4732- line 13, remove space after kernels,

51.line 27- profiles measured

52.Page 4733, line 2- IASI slightly overestimates

53.page 4734- line 3, “this is in line with”

54.Page 4735- line 21, Sweden

55.Page 4739 WMO report references, be consistent.

56. Page 4740- Figure 1, Improve the quality of the figure, Also give the title.

57.Caption, remove intense.

58.Page 4741, Figure 2, color bar. replace 04-06 September 2009 to total ozone (DU)

59.Page 4742, Figure 3, Also add the date.

60.Page 4743, Figure 4, Better label the figures as A, B and C. Remove “ as shown in this figure” from the caption.

61.Page 4744, Figure 5, move Weekly Ozone Distributions on the top. In caption

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“retrieved using the FORLI-O3...”

62.Figure 6- Give title at the top of the Figure. And I don't understand why it is necessary to plot all the versions. Why not only Version 3 and 4.

63.Figure 7- Again move the titles on the top of the Figure.

64.Figure 8. Add the title on the top

65.Figure 9. Captions should be used to write description of the Figure. Authors have tendency to write discussion part in the caption. Please remove the last sentence from the caption.

66.Figure 11, what is in the associated polar vortex?

67.Figure 12, how many IASI profiles are used? Please add.

68.Figure 13. What is ozone hole vortex? Where is other panel?

References

Austin et al, 2010, J. Geophys. Res., 115, pp.D00M11. doi:10.1029/2009JD013577

Weber et al. 2003, Geophysical Research Letters, 30, pp.1583. doi:10.1029/2002GL016799

Bovensmann et al 1999, J. Atmos. Sci., 56, 127–150.

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