

Interactive comment on “The Brewer-Dobson circulation and total ozone from seasonal to decadal time scales” by M. Weber et al.

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Summary:- This study shows the effects of the Brewer-Dobson circulation on seasonal (and long term) total ozone changes. Authors show that by combining data from both the hemispheres a compact linear relationship between the winter eddy heat flux at 100 hPa and the fall/spring time ozone ratio exists. This study is an extension of the earlier results from Weber et. al. (2003). They also show that this relationship is valid for two different CCMs (EMAC-FUB, DLR-E39C-A) indicating that the ozone transport in current models realistic. It is also shown that both the models show a positive trend in the eddy heat flux confirming earlier studies. Using model data, it is shown that it is possible to detect a shift in ozone-heat flux relationship related to past and future changes due to chlorine loading.

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The manuscript is well written and should be published in ACP with minor corrections

Minor Comments: -

1. For me stratospheric circulation is a combination of two parts.

a) A residual circulation in the middle upper stratosphere on longer time scale.

b) Mid-lower stratospheric transport due to eddies on shorter time scale. I think this transport is more relevant for this study. As shown in Weber et al, 2003 and present study (Fig. 4), increase in mid-high latitude ozone is quite fast in Sep 2002 (with in few days after wave breaking event). And as authors correctly point out (Page 8 → line 8 and Page 14 line 16), lower stratospheric ozone is the main contributor for the total ozone column. I feel authors should include this discussion in the introduction.

2. Page 11 → line 11- 14, "The turnaround latitudes" → → Again I think it is more about continuity equation in the eddy transport (more or less balance between transport from the tropics to the high latitudes)

3. Technical Corrections

a) Abstract, Page 2, line 16 - remove "climate"

b) Page 3, line 18→few months to years

c) Page 3, line 20 → Chemistry Climate Models (CCMs)

d) Page 7, line 10 → Major difference between these two CCMs

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