

## ***Interactive comment on “An “island” in the stratosphere – On the enhanced annual variation of water vapour in the middle and upper stratosphere in the southern tropics and subtropics” by Stefan Lossow et al.***

**Anonymous Referee #2**

Received and published: 6 June 2017

Based on both observations and simulation, this work highlights an isolated enhanced annual variation of stratospheric water vapor in the middle and upper stratosphere. The authors have clearly explained the mechanism of AO maximum primarily by the variation of deep BD circulation. This annual variation signature and its hemispheric asymmetry feature can be a useful diagnostic tool to validate models. The paper is well written and the materials sufficiently support the conclusions. I suggest publication only with a few minor revisions.

1. One concern is whether the location of the enhanced annual variation has some

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shifts from year to year based on MIPAS observation and EMAC? Although the author pointed out the averaged peak location is slightly lower in EMAC simulation than MIPAS, do they have similarity of inter-annual location shifts (or amplitude)?

2. As pointed out by the first reviewer, Figure 12 should be consistent with Figure 8 where the negative winds used dashed white lines.
3. In the last schematic figure, I am confused by the grey oval showing the NH enhanced AO. I suppose it should not be symmetric with SH one (black oval) like Fig. 1 or Fig. 7. Or, the authors just intend to show the corresponding NH location to SH enhanced AO?

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Interactive comment on *Atmos. Chem. Phys. Discuss.*, <https://doi.org/10.5194/acp-2017-392>, 2017.