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## ***Interactive comment on “Modeling the Frozen-In Anticyclone in the 2005 Arctic summer stratosphere” by D. R. Allen et al.***

### **Anonymous Referee #1**

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The subject of the paper is suitable for publication in ACP. The paper analyses the imprint of a frozen-in anticyclone on N<sub>2</sub>O in the spring-to-summer NH stratosphere. The paper is a nicely written qualitative comparison between observations of N<sub>2</sub>O with up-to three different models. There are no major problems with this paper, as it relies on well published earlier results (in particular Manney et al., 2006). The new perspective added is the use of "newer" transport models and re-analyses data sets. The paper should be published with some revisions detailed below. One general comment: I find the number of figures (and their complexity/number of panels) too generous and would encourage the authors to review if every figure/panel is necessary. My answer would be no!

p4403, l19: It would be good if the authors could clarify how the earlier study (M06)

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was done. I assume the wind analyses was only available every 24 hours as an instantaneous field? If this is true, it would be good to distinguish the quality of the wind analyses and the information gained by using 6 hourly data (could be done on p4406 and should be mentioned in the context of p4419, l6-l9).

Abstract and summary: Generally, I have the impression that the VITA scheme is given a too positive judgement. Some features seem to be numerical artefacts (e.g. Fig. 5 and 7) and should be assessed more critically; p4420, l26 is a good starting point.

Figure 4: Too many plots; are more than two dates really needed to make the point?

Figure 7: Too many levels - pick 3 ...

Figure 10: as Figure 4

Figure 11: I am confused, is this plot just showing the benefit of reinitialising VITA on 1st April (p4420, l22) whereas the other runs are continuous? Please clarify.

Figure 15: the point made with this figure does not require 24 plots, I am afraid.

Minor: p4404, l14: avoid "shocking"; colloquial p4405, l15: insert "the" before "van" p4418, l14: replace "destructive" with "eroding"

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 4399, 2011.

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