

Interactive comment on “Influence of convection on stratospheric water vapor in the North American Monsoon region” by Wandu Yu et al.

Anonymous Referee #2

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The paper presents a hypothesis that deep overshooting convection over the great plains of north America moistens the lower stratosphere and is transported and trapped in the North American anticyclone. they use trajectory calculations to see if water vapor measurements from MLS encountered convection or not. They show that during July and August that the difference between convective and non convective trajectories is nearly 1 ppmv. In June it is much less. The take away message i get from this is that the establishment of the North American anticyclone is the dominant factor for having high lower stratospheric water vapor over North America. It completely dominates convective activity in the Junes of 2010 and 2011 where the former year is high with low NA convection and low the following year despite having more NA convection. i have difficulty believing that in 2010 before the anticyclone is set up that the convectively

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moistened air moves to the colder tropics where it gets freeze-dried first. It seems from looking at the figure 3 and figure 5 that the horizontal tape recorder signature of water transport is playing a big role here too. I certainly agree that deep convection over the NA plains is adding water but it might be a small perturbation on top of the large scale transport coming up from the tropics that is also becoming more moist during the summer months. I think this could be disentangled with some modelling studies where one could artificially hold the tropical tropopause temperature constant all year thus removing the tape recorder signatures from the tropics and seeing what NA enhancements occur just due to local convection.

minor recommendations page 1 line 18 replace sometimes as high as with exceeding ... MLS has seen higher values as has Anderson.

page 3 line 81 from NA the 100 to from the NA 100...

Throughout the manuscript lower case letters a, b, .. are used to refer to panels in the figures but the figures use upper case letters A, B, ... Please make this consistent.

page 5 line 135 I would write that sentence as As a result moistening from deep convection becomes less diluted by zonal mean flow later in the summer.

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