

Supplement of Atmos. Chem. Phys., 20, 12153–12161, 2020  
<https://doi.org/10.5194/acp-20-12153-2020-supplement>  
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*Supplement of*

## **Influence of convection on stratospheric water vapor in the North American monsoon region**

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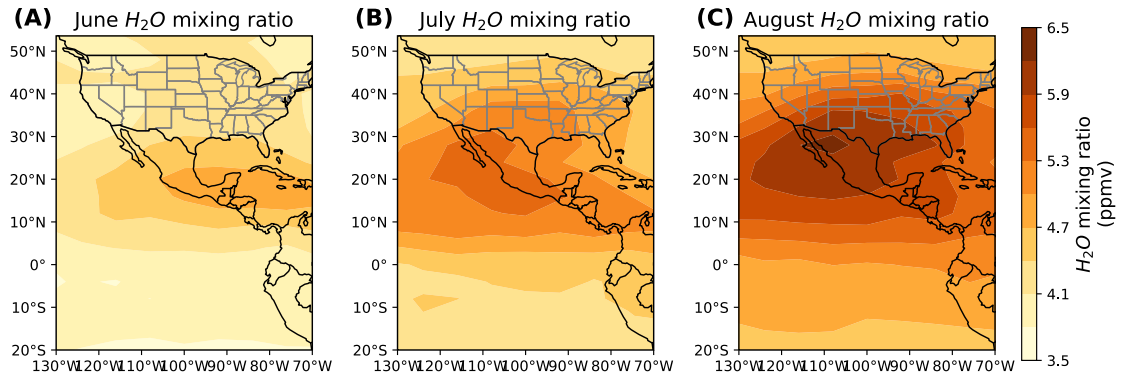


Figure S1. MLS 100-hPa water vapor mixing ratio during 2005-2016 (A) June, (B) July, and (C) August.

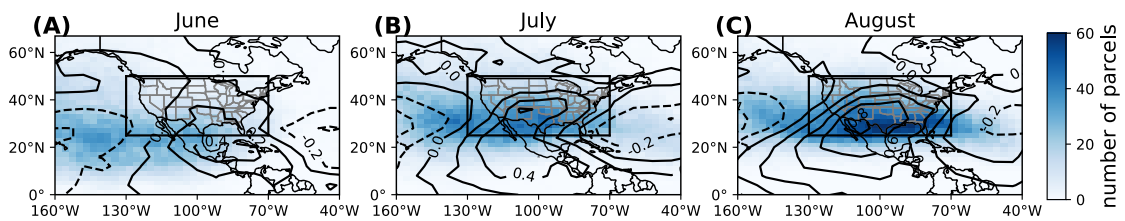


Figure S2. Number of the parcels in each  $2^{\circ} \times 2^{\circ}$  grid box after 10 days in the back trajectory model during 2005-2016 (A) June, (B) July and (C) August. In the back trajectory experiments, we initiate the parcels  $1^{\circ} \times 1^{\circ} \times 1^{\circ}$  grid over NA ( $25^{\circ}\text{N} - 50^{\circ}\text{N}$ ,  $70^{\circ}\text{W} - 130^{\circ}\text{W}$ ) every day during each month, and track back their position in 10 days. (Black contour) Geographical distribution of the MLS 100-hPa water vapor anomaly (after removal of the zonal mean).