

Figure 1. Yearly and seasonal medians of the scaled stratospheric and tropospheric contributions in modeled total column biases at TCCON sites. The sites from left to right is North to South. The white bar denotes the tropospheric bias, the grey bar for the stratospheric bias. The scale factor for the model bias are the air column fractions  $P_t/1000$  (stratosphere) and  $(1-P_t/1000)$  (troposphere), where  $P_t$  is the thermal tropopause pressure. The error bar are the standard deviations of the model biases. The results are averaged for 2007-2011 when FTS measurements are available.

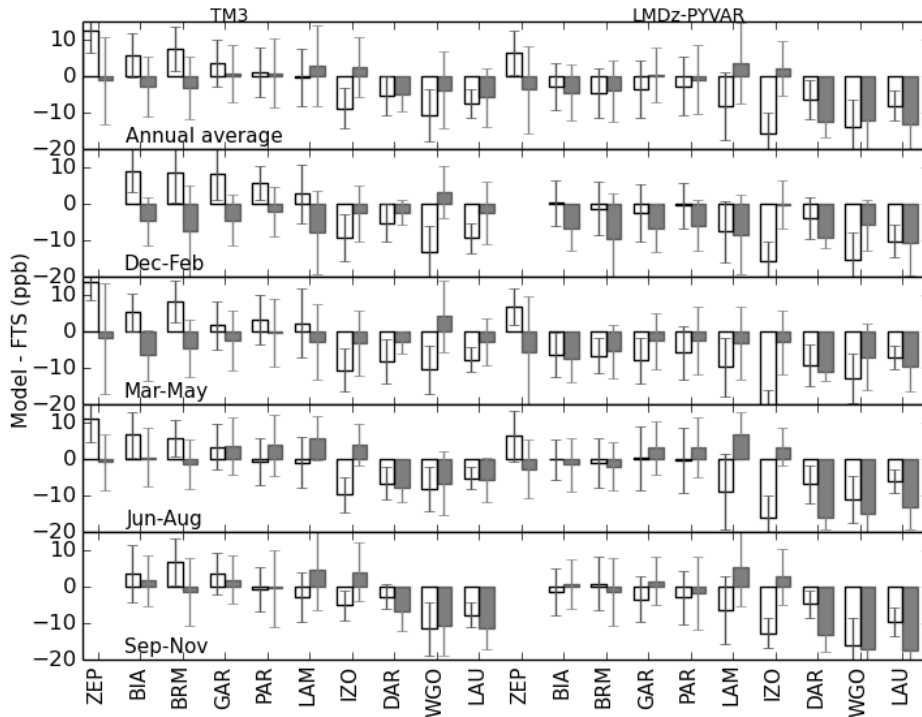
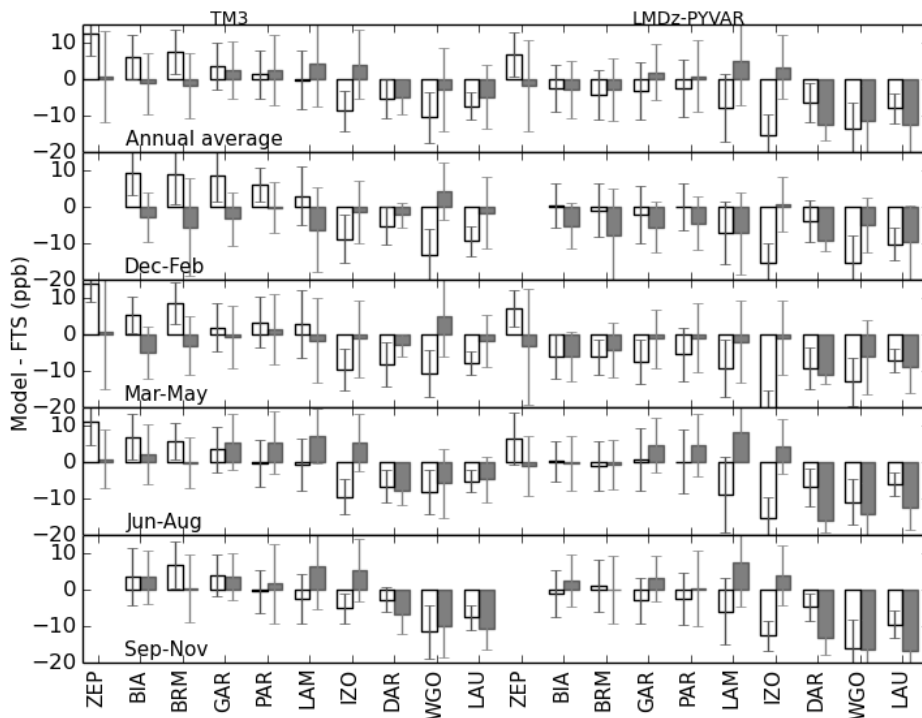


Figure 2. Same as Fig. 1 except for 4.0 PUV dynamical tropopause is applied.



5 Figure 3. Same as Fig. 1 except for 3.5 PUV dynamical tropopause is applied.

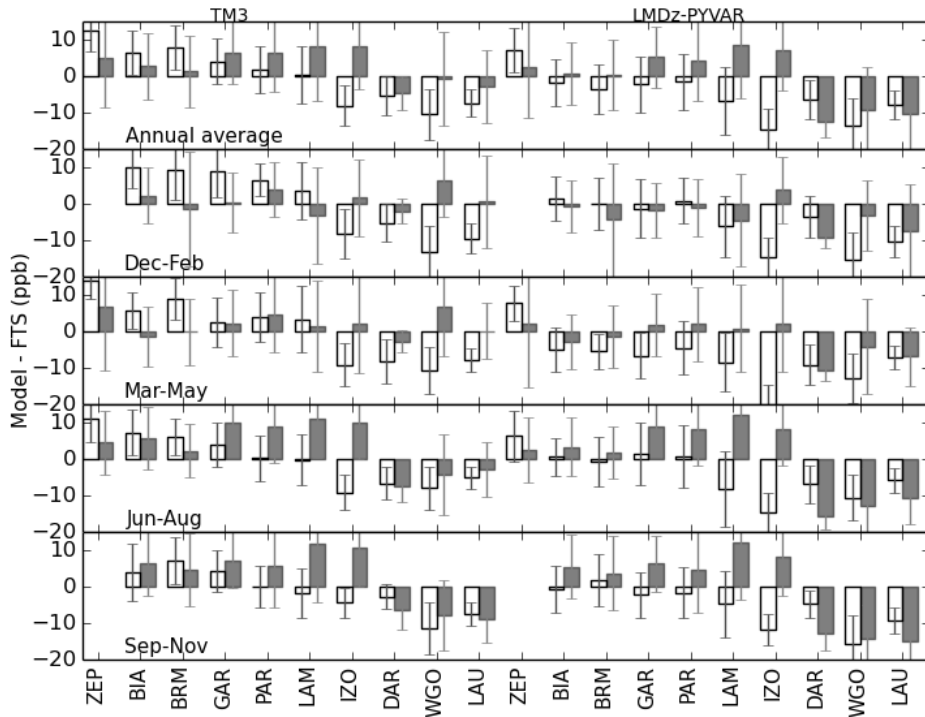
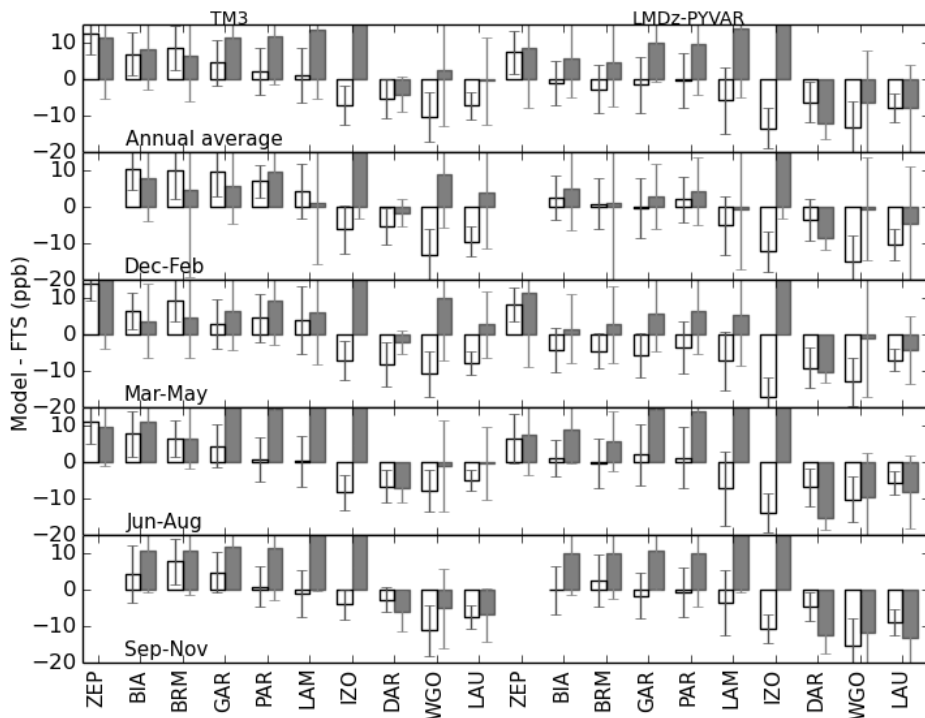


Figure 4. Same as Fig. 1 except for 2.5 PUV dynamical tropopause is applied.



5 Figure 5. Same as Fig. 1 except for 1.5 PUV dynamical tropopause is applied.

