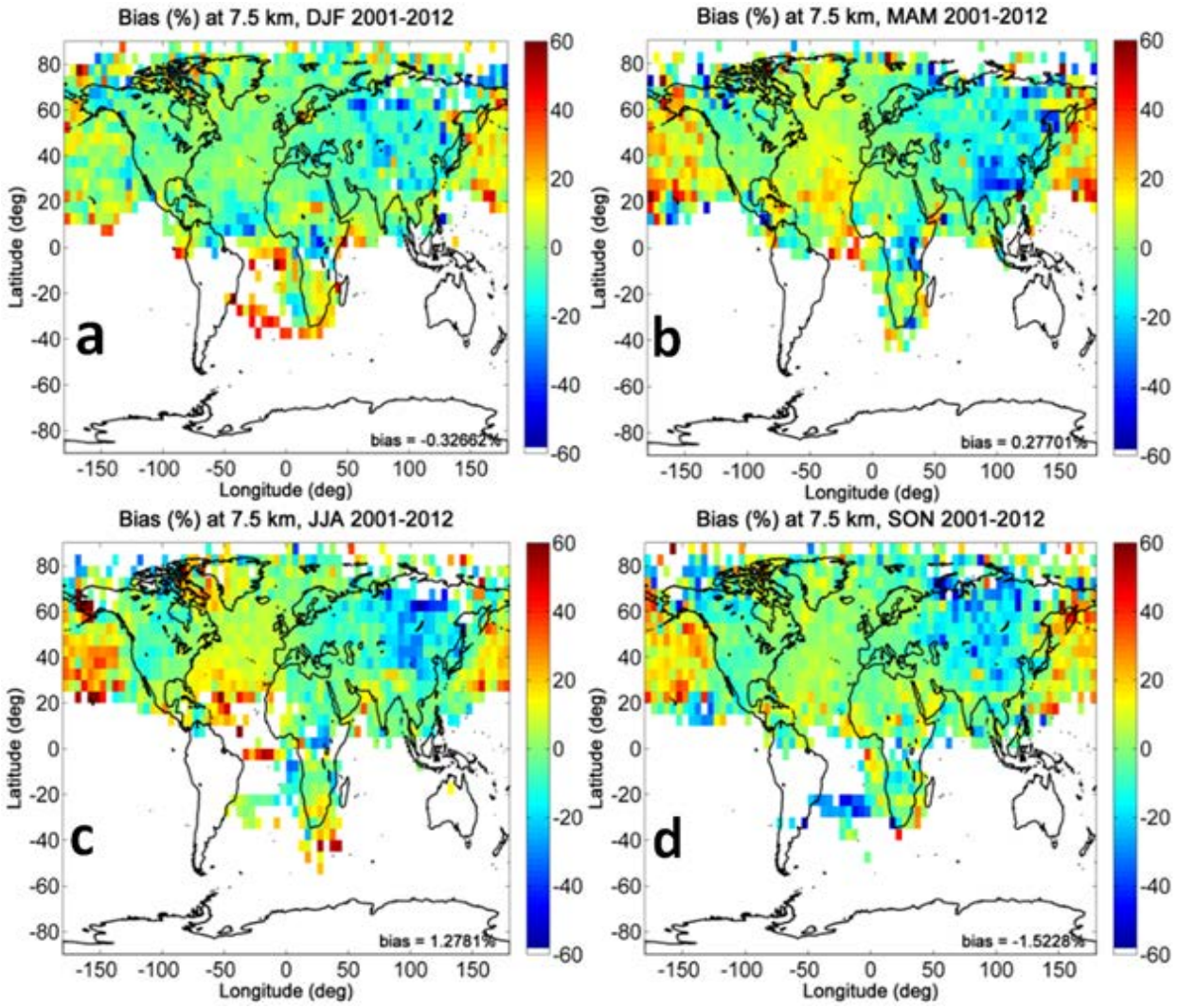

Fig. S1. Relative differences in % between the backward and forward trajectories for CO VMR values shown in Fig. 3. The panels a, b, c and d show the biases for December-February, March-May, June-July and September-November 2001-2012, respectively.

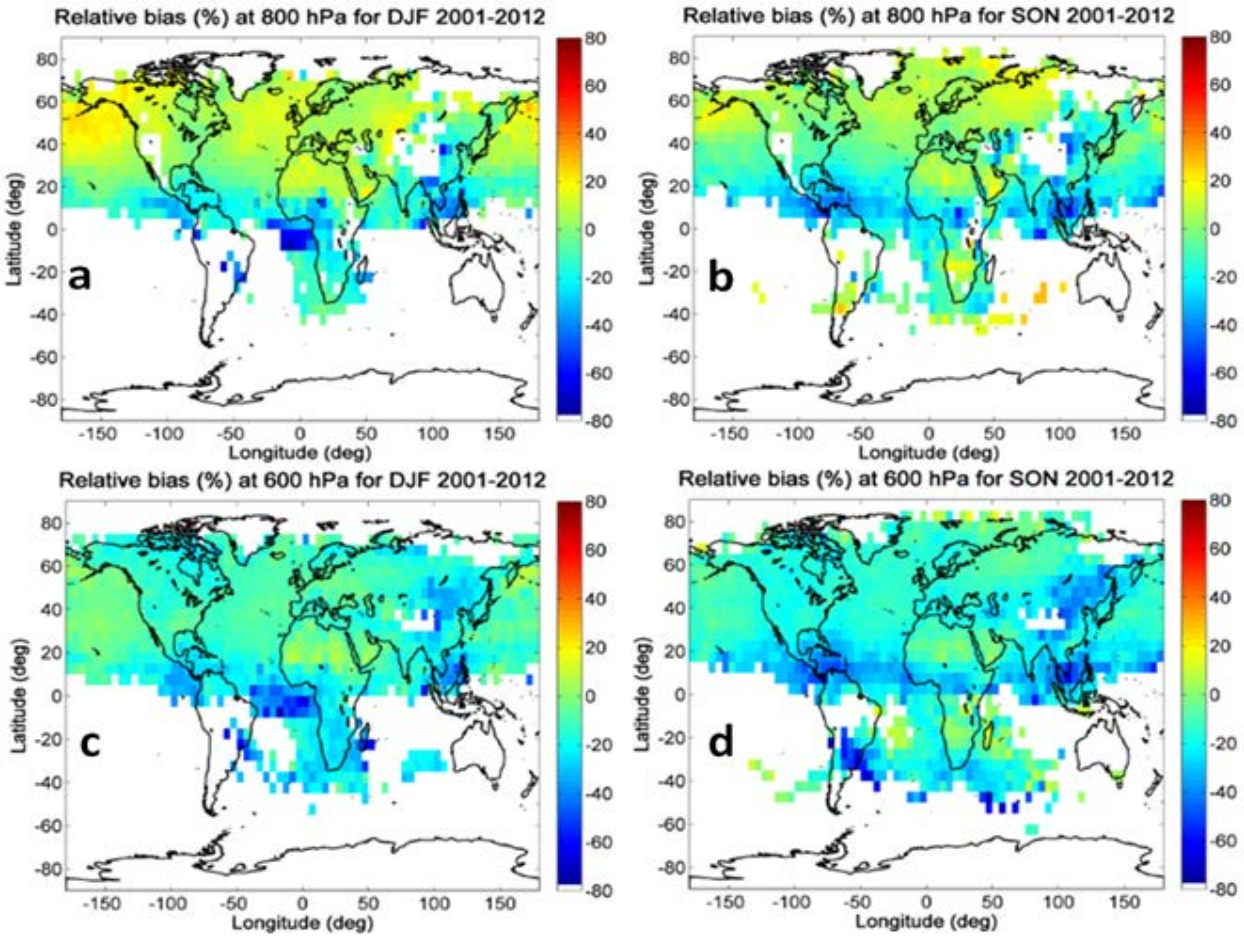

Fig. S2. Differences in %, [*2(MOPITT-Clim)/(MOPITT+Clim)*], at 800 and 600 hPa pressure levels for CO VMR values shown in Fig. 10. Panels a & b show the relative bias of trajectory-mapped and MOPITT CO at 800 hPa for DJF and SON 2001-2012, and c & d show the bias at 600 hPa for DJF and SON 2001-2012, respectively.

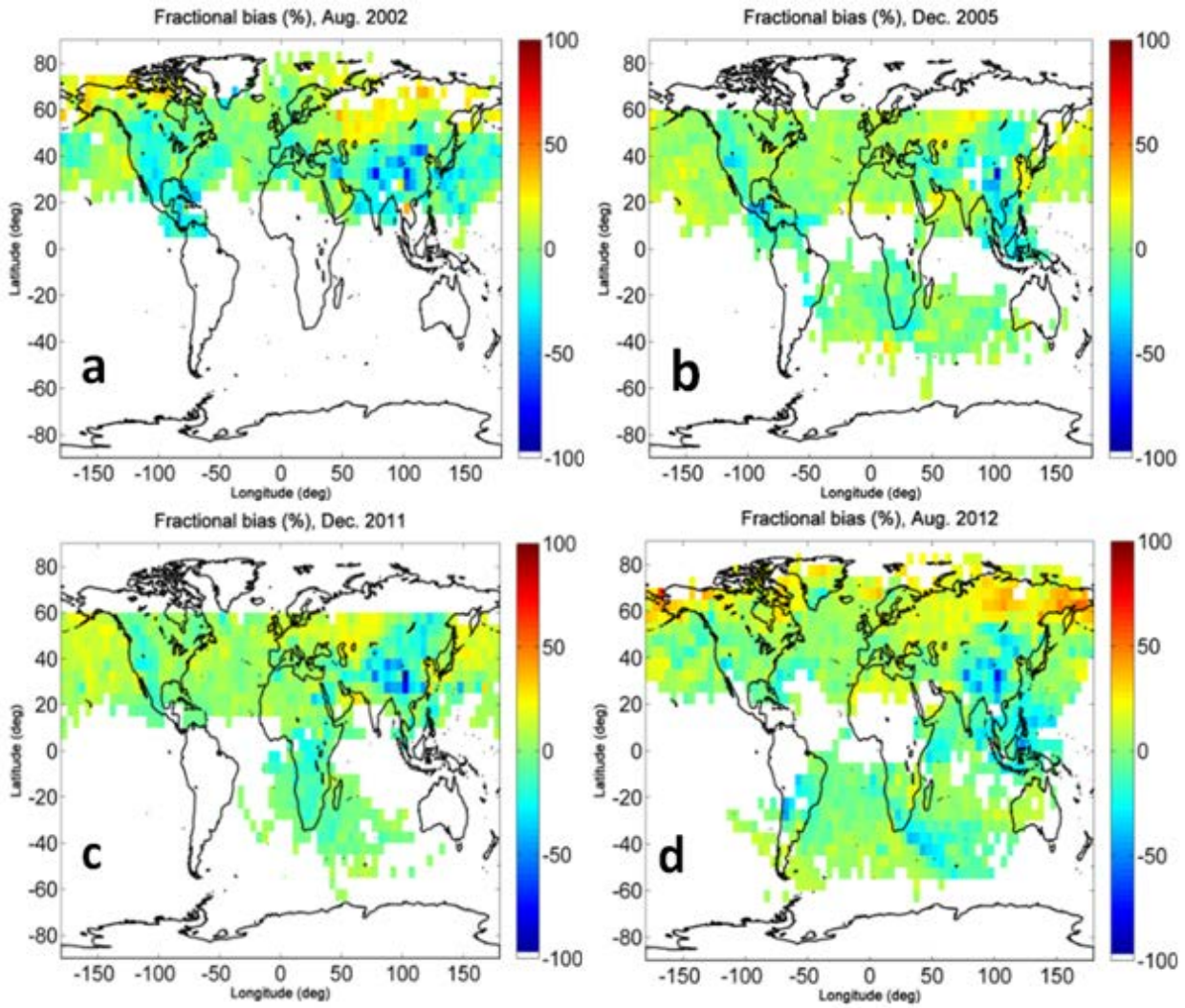

Fig. S3. Global fractional bias (%) between transformed trajectory-mapped MOZAIC-IAGOS CO climatology and MOPITT column retrievals for the CO maps shown Fig. 12. Colors indicate the mean difference in %, [*2(MOPITT-Clim)/(Clim+MOPITT)*], for each corresponding pixel. Data binned in 5^{o}x5^{o} latitude- longitude. Panels a, b, c and d show the biases for August 2002, December 2005, December 2011 and August 2012, respectively.

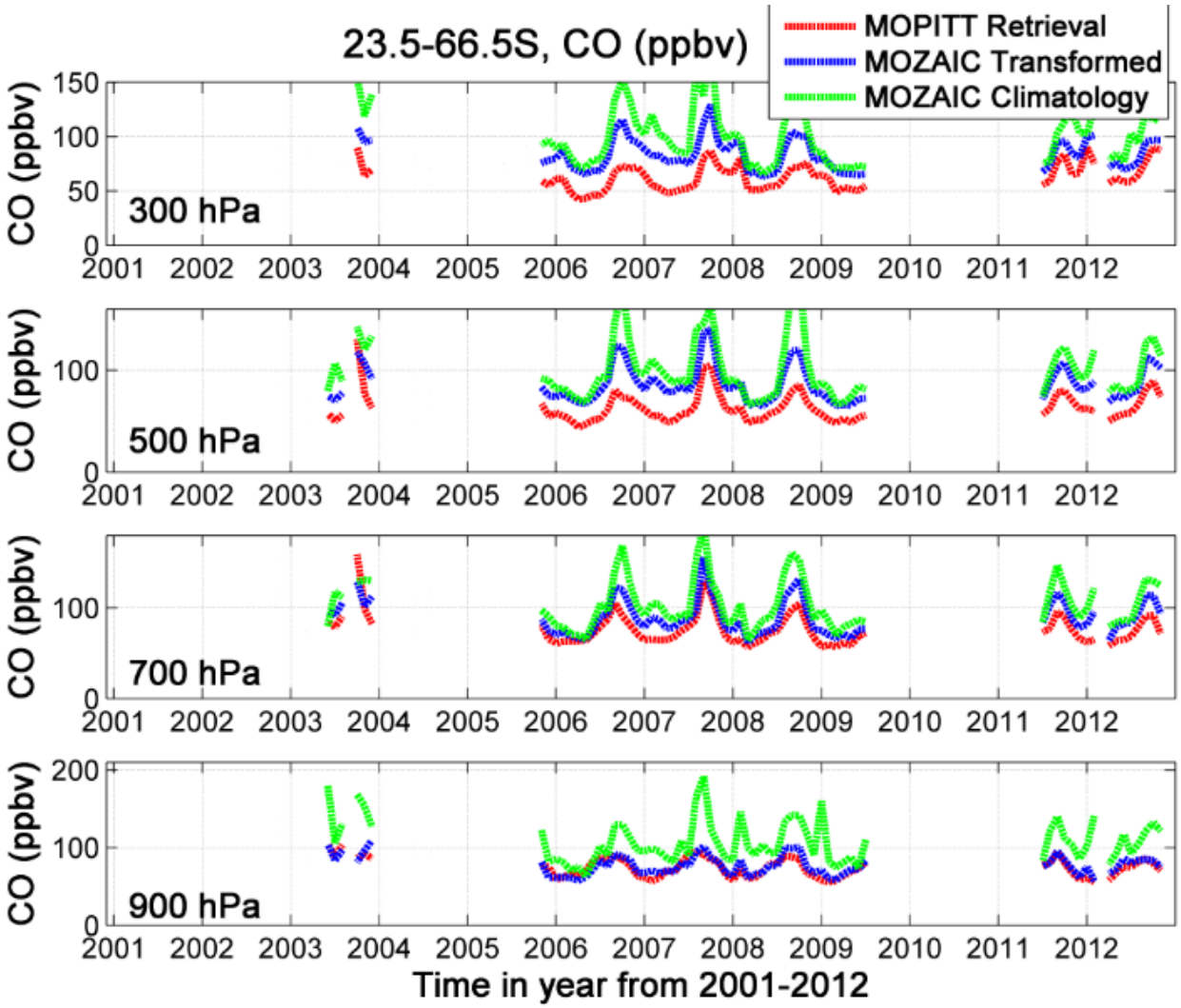

Fig. S4. Zonally averaged time series of monthly mean CO VMR as measured by MOPITT CO retrievals and the trajectory-mapped MOZAIC-IAGOS CO climatology (transformed and untransformed) using MOPITT`s averaging kernels for the SH extratropics (23.5^{o}-66.5^{o} S).

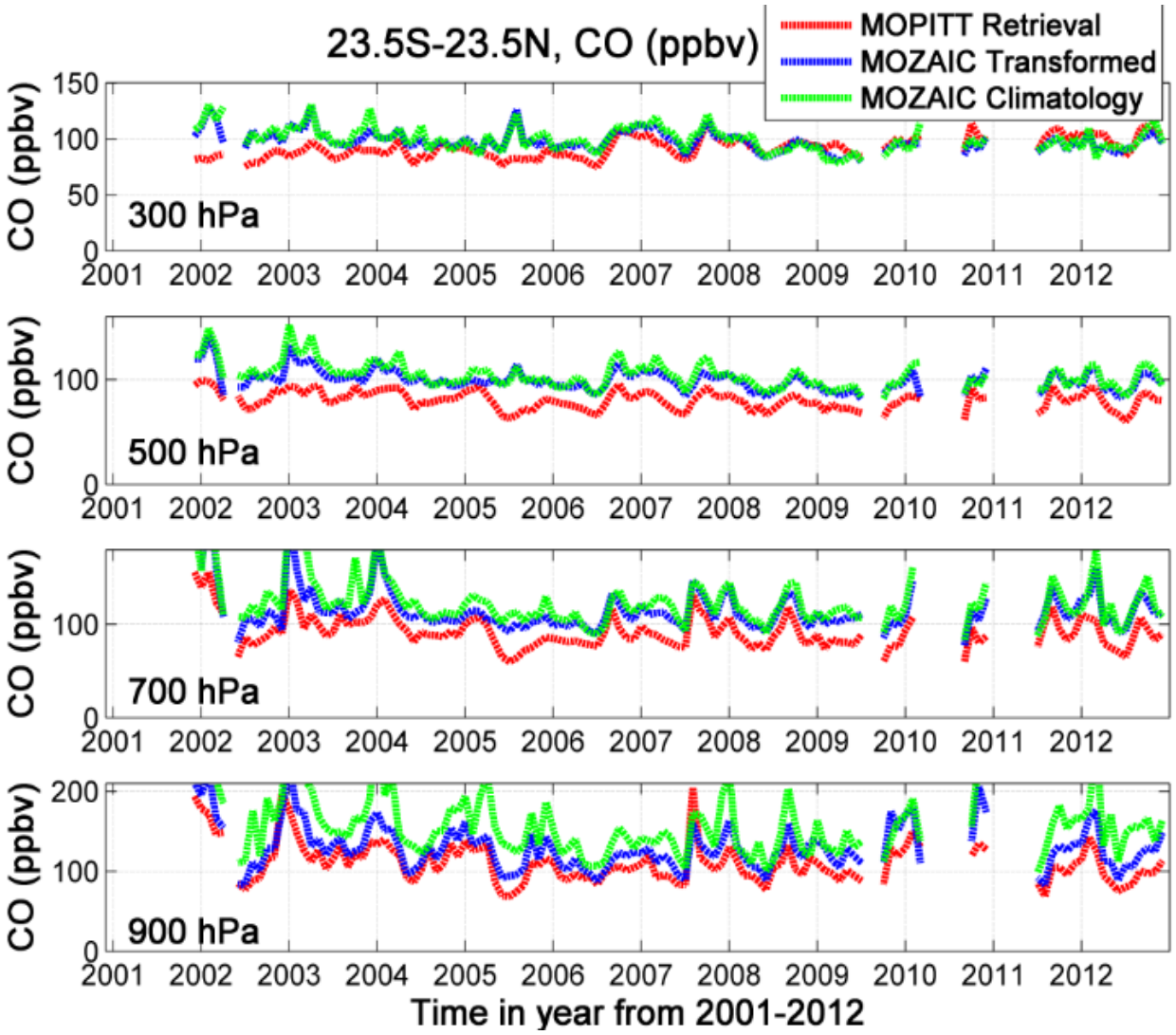

Fig. S5. Same as Fig. S4 but for the tropics (23.5^{o} S-23.5^{o} N).

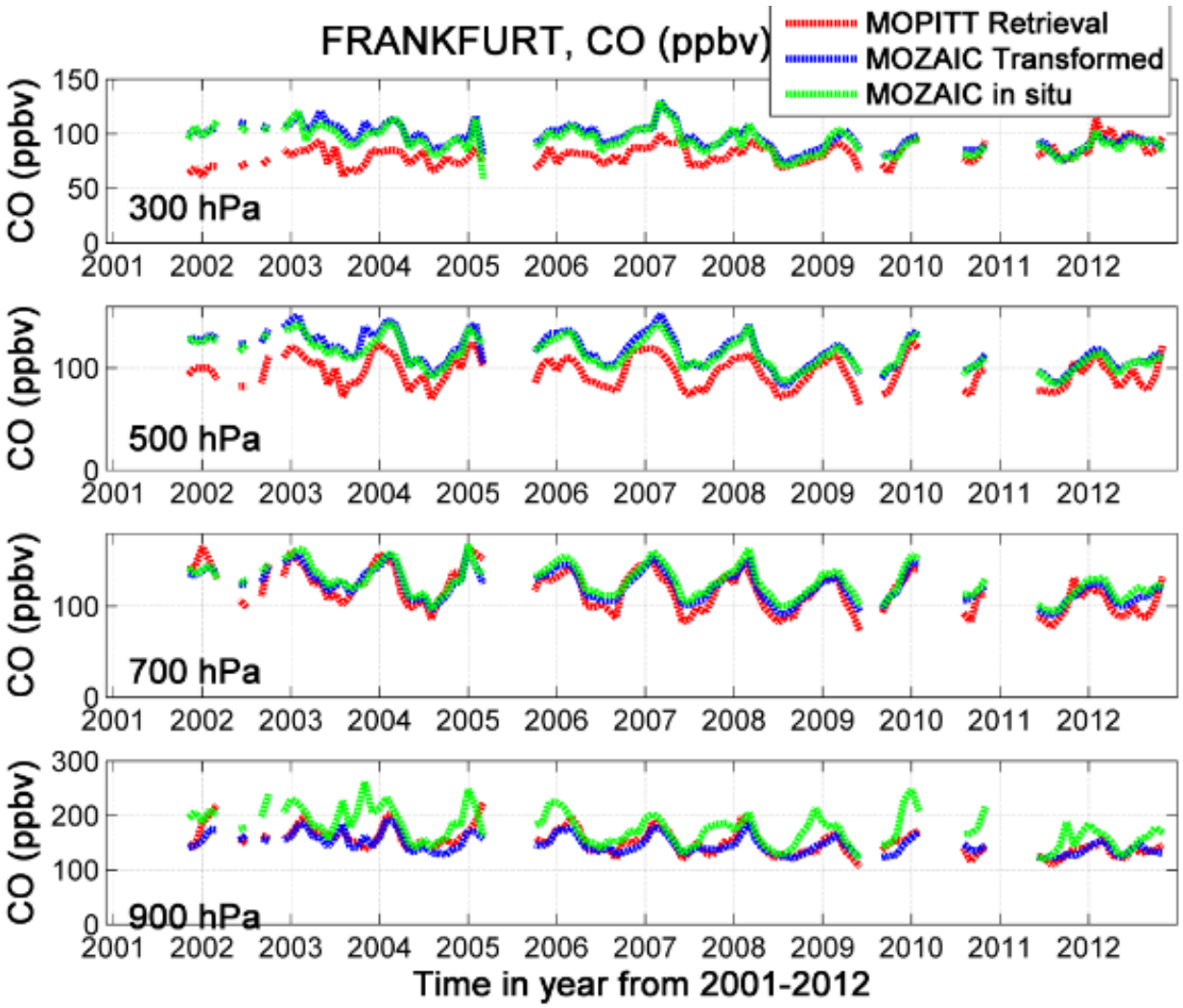

Fig. S6. Same as Fig. S4 but for Frankfurt (Germany) airport for the period from 2001-2012. The MOZAIC-IAGOS in situ monthly mean CO values (MOZAIC in situ) have been transformed using the MOPITT averaging kernels and a priori data (MOZAIC Transformed).