Supplement of Spatially separate production of hydrogen oxides and nitric oxide in lightning

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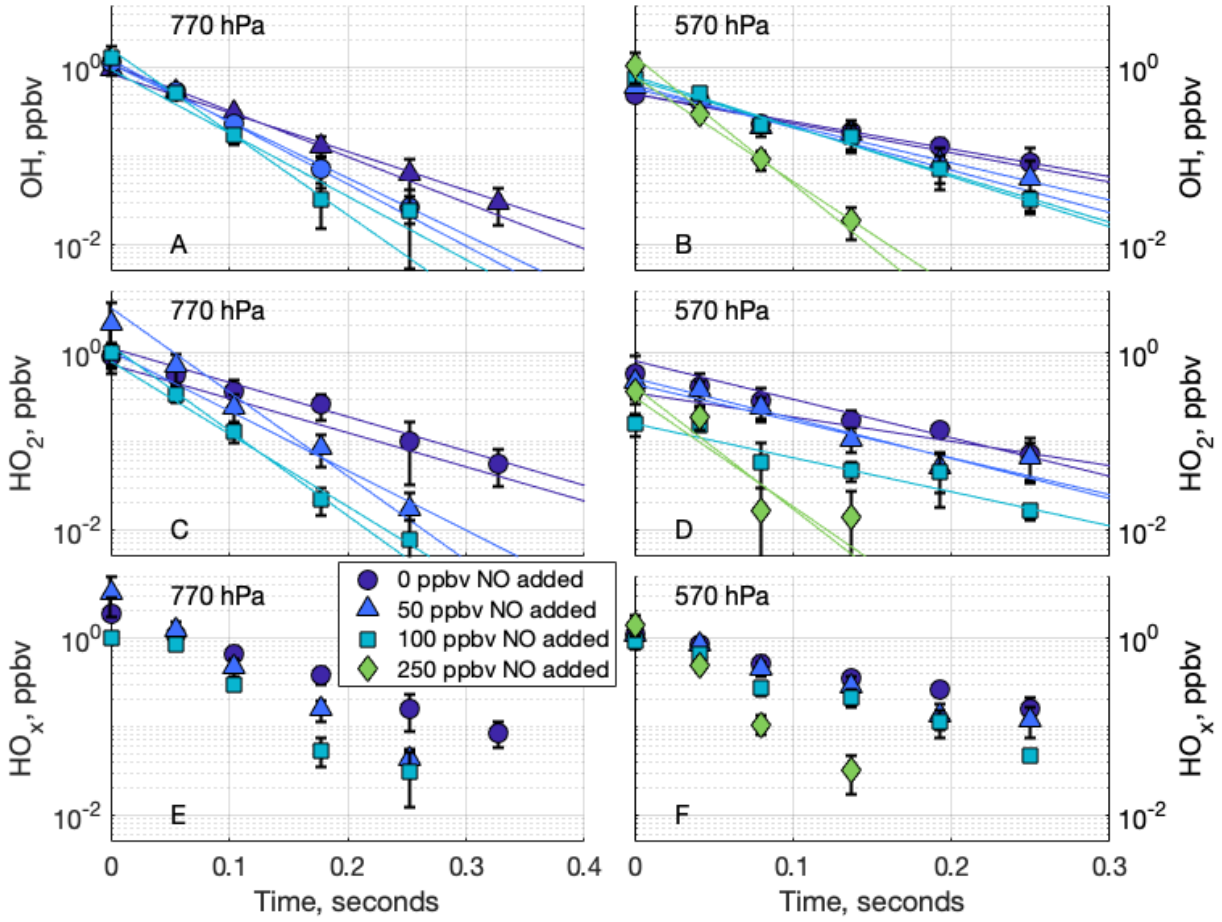

Figure S1. Laboratory decays of OH (A,B), HO_2 (C,D), and net HO_x (E,F) at 770 hPa (A,C,E) and 570 hPa (B,D,F). The markers are the averaged data points measured from 2 decays in the laboratory, with the markers at time zero the averaged extrapolated values from the decays. The lines on A,B,C,D are the linear fits to the individual decays. Error bars are the standard deviation from averaging multiple measurements.

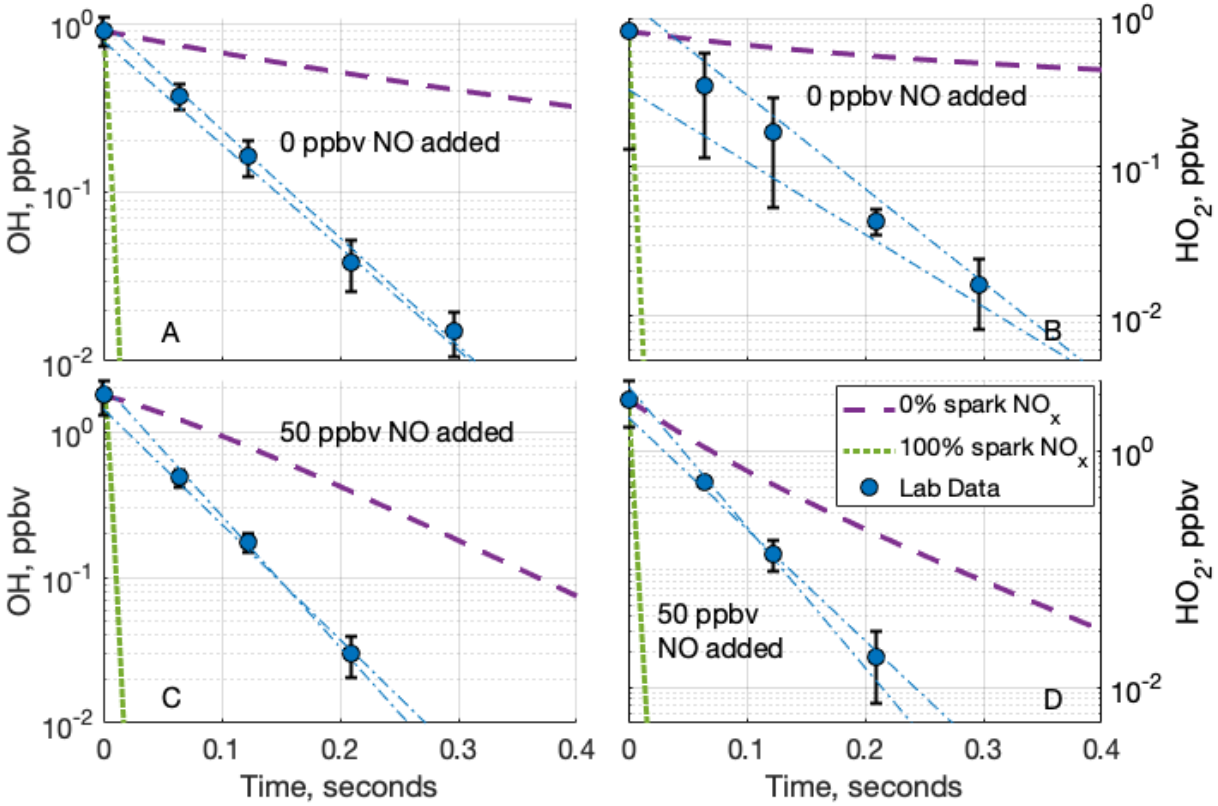

Figure S2. Comparison of measured OH (A,C) and HO_2 (B,D) laboratory decays and two model decays at 970 hPa and (A,B) 0 ppbv of added NO and (C,D) 50 ppbv of added NO. The dashed purple lines are the model decay with only the added NO, and includes no NO_x from the spark, and the dotted green lines are the model decay with the added NO and all of the spark NO_x. The blue circles are the average laboratory measurements and average extrapolated value at time zero, while the dashed-dotted blue lines are the individual extrapolated linear fits to the laboratory data. Error bars are the standard deviation from averaging multiple measurements.

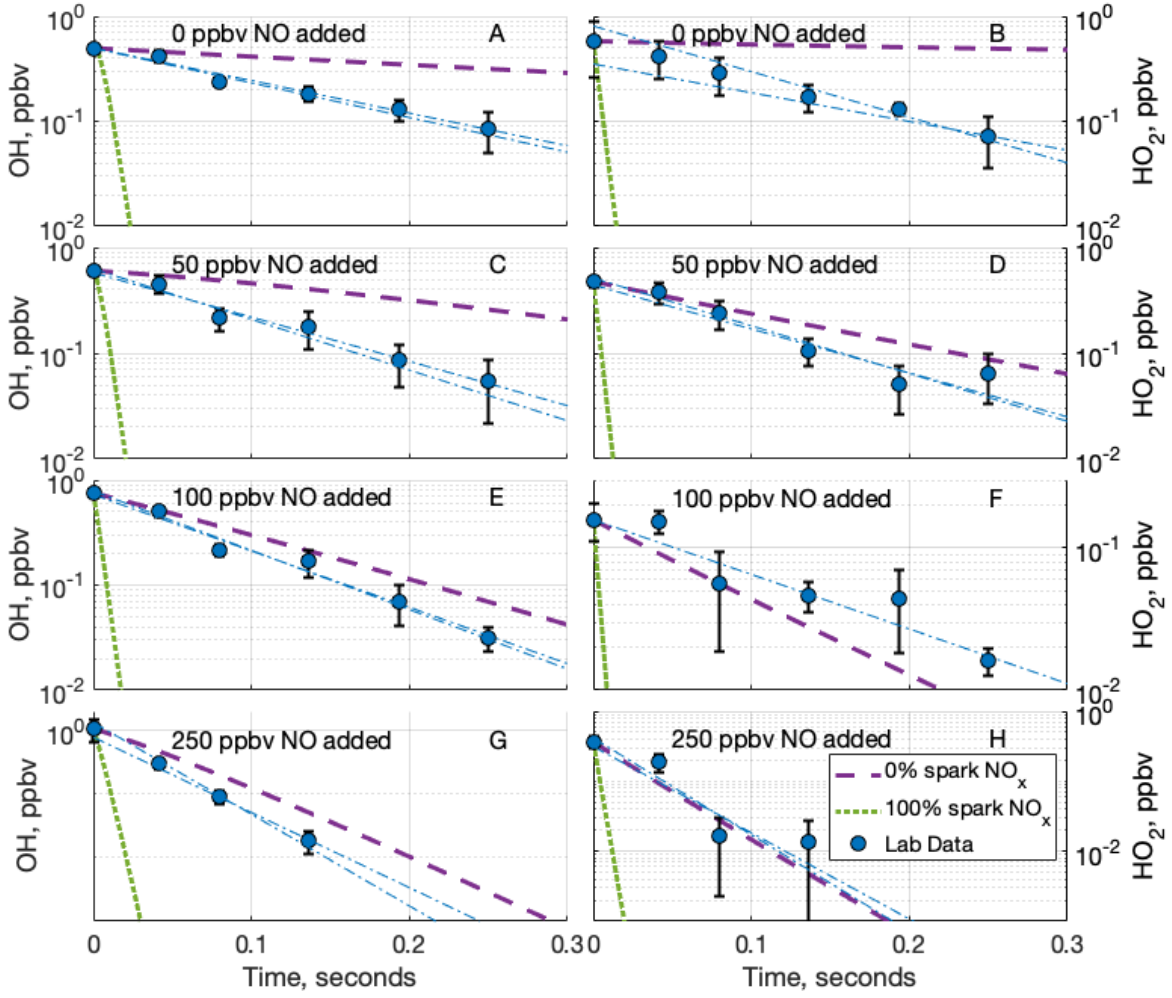

Figure S3. Comparison of measured OH (A,C,E,G) and HO_2 (B,D,F,H) laboratory decays and two model decays at 570 hPa and (A,B) 0 ppbv of added NO, (C,D) 50 ppbv of added NO, (E,F) 100 ppbv of added NO, and (G,H) 250 ppbv of added NO. The dashed purple lines are the model decay with only the added NO, and includes no NO_x from the spark, and the dotted green lines are the model decay with the added NO and all of the spark NO_x. The blue circles are the average laboratory measurements and average extrapolated value at time zero, while the dashed-dotted blue lines are the individual extrapolated linear fits to the laboratory data. Error bars are the standard deviation from averaging multiple measurements.

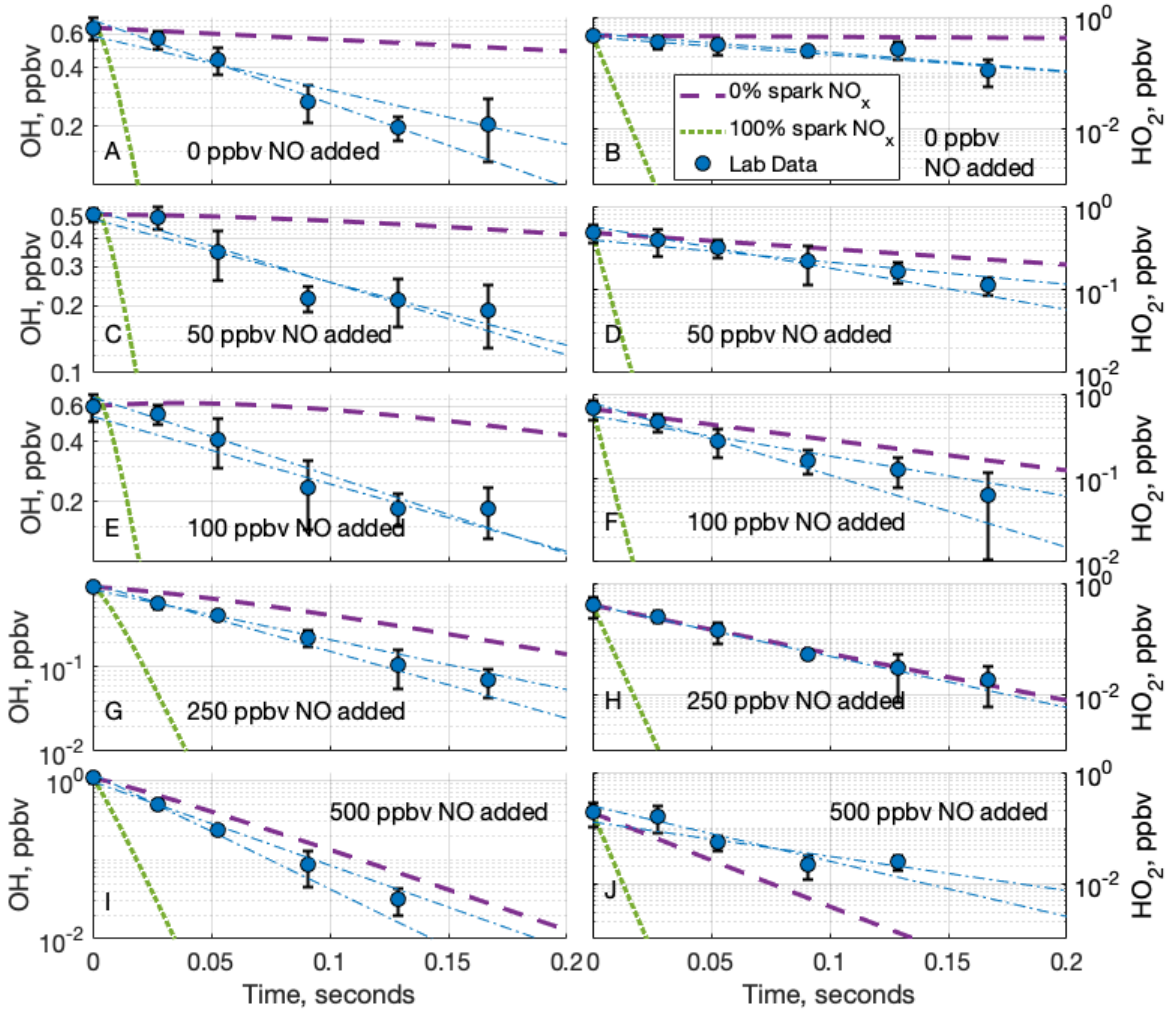

Figure S4. Comparison of measured OH (A,C,E,G,I) and HO_2 (B,D,F,H,J) laboratory decays and two model decays at 360 hPa and (A,B) 0 ppbv of added NO, (C,D) 50 ppbv of added NO, (E,F) 100 ppbv of added NO, (G,H) 250 ppbv of added NO, and (I,J) 250 ppbv of added NO. The dashed purple lines are the model decay with only the added NO, and includes no NO_x from the spark, and the dotted green lines are the model decay with the added NO and all of the spark NO_x. The blue circles are the average laboratory measurements and average extrapolated value at time zero, while the dashed-dotted blue lines are the individual extrapolated linear fits to the laboratory data. Error bars are the standard deviation from averaging multiple measurements.

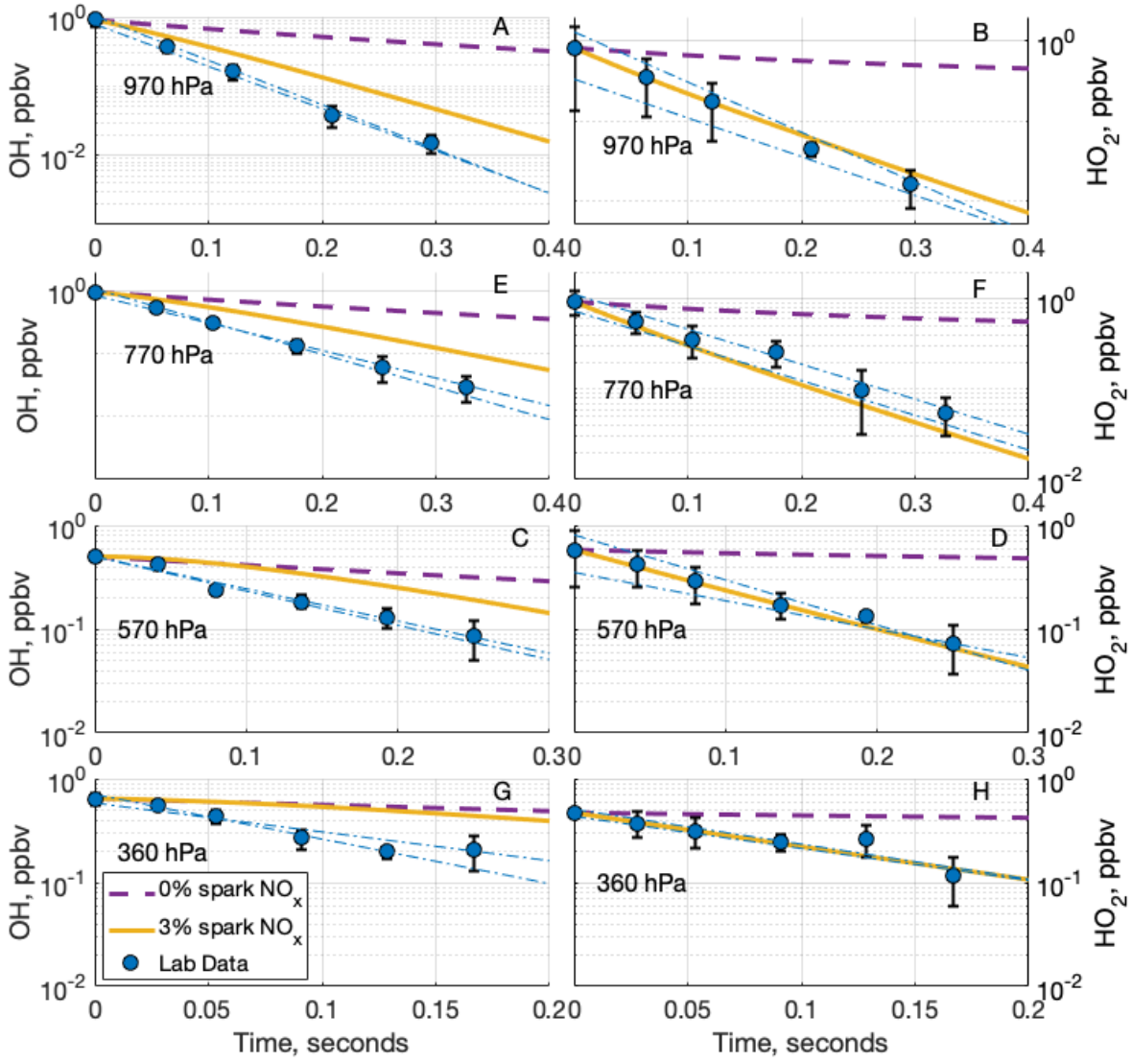

Figure S5. Comparison of measured OH (A,C,E,G) and HO_2 (B,D,F,H) laboratory decays and two model decays at (A,B) 970hP, (C,D) 770 hPa, (E,F) 570 hPa, and (G,H) 360 hPa. The dashed purple lines are the model decay including no NO_x from the spark, and the solid yellow lines are the model decay including 3% the spark NO_x. The blue circles are the average laboratory measurements and average extrapolated value at time zero, while the dashed-dotted blue lines are the individual extrapolated linear fits to the laboratory data. Error bars are the standard deviation from averaging multiple measurements.

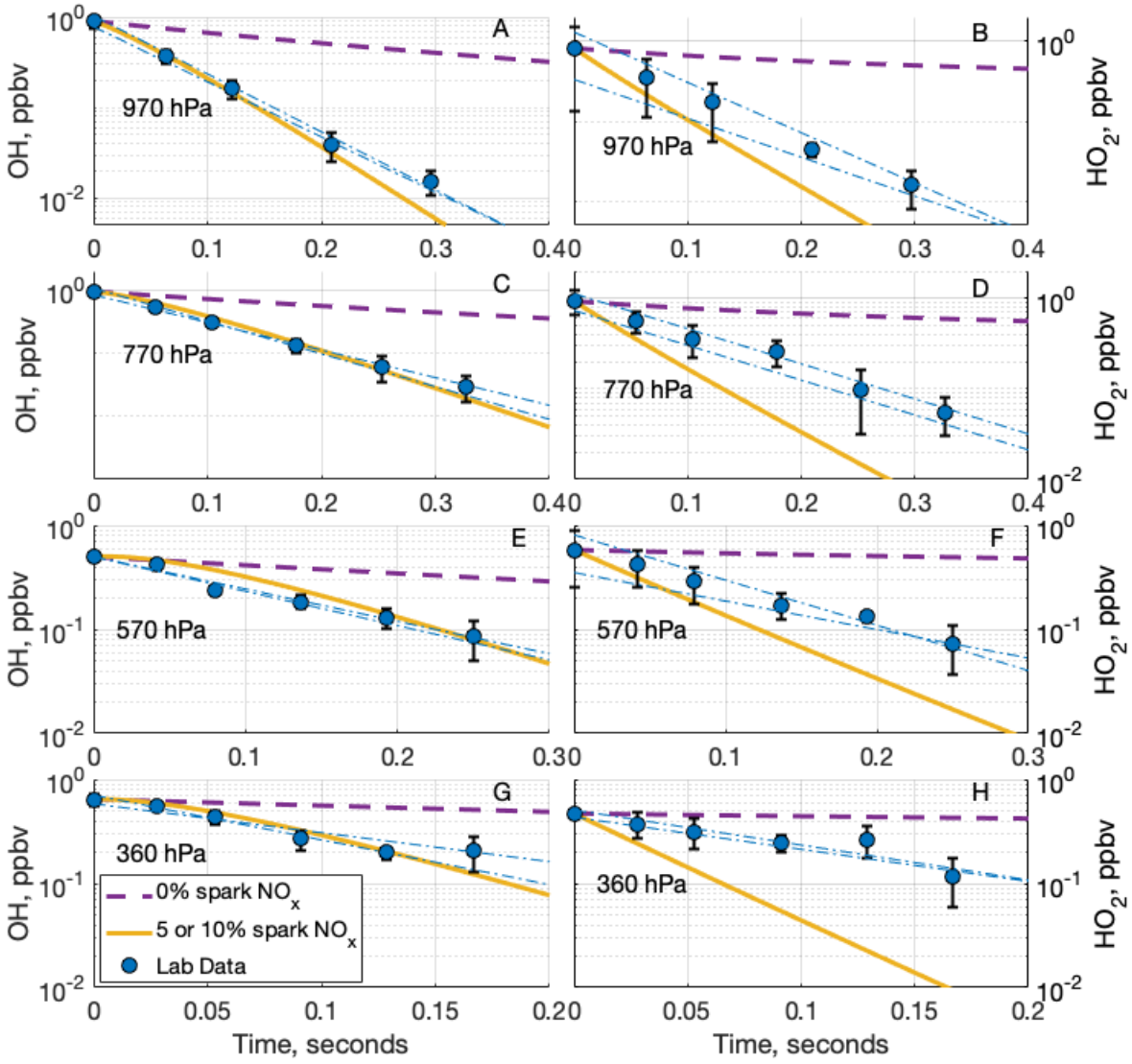

Figure S6. Comparison of measured OH (A,C,E,G) and HO_2 (B,D,F,H) laboratory decays and two model decays at (A,B) 970hP, (C,D) 770 hPa, (E,F) 570 hPa, and (G,H) 360 hPa. The dashed purple lines are the model decay including no NO_x from the spark, and the solid yellow lines are the model decay including 5% (970, 770, 570 hPa) or 10% (360 hPa) of spark NO_x. The blue circles are the average laboratory measurements and average extrapolated value at time zero, while the dashed-dotted blue lines are the individual extrapolated linear fits to the laboratory data. Error bars are the standard deviation from averaging multiple measurements.

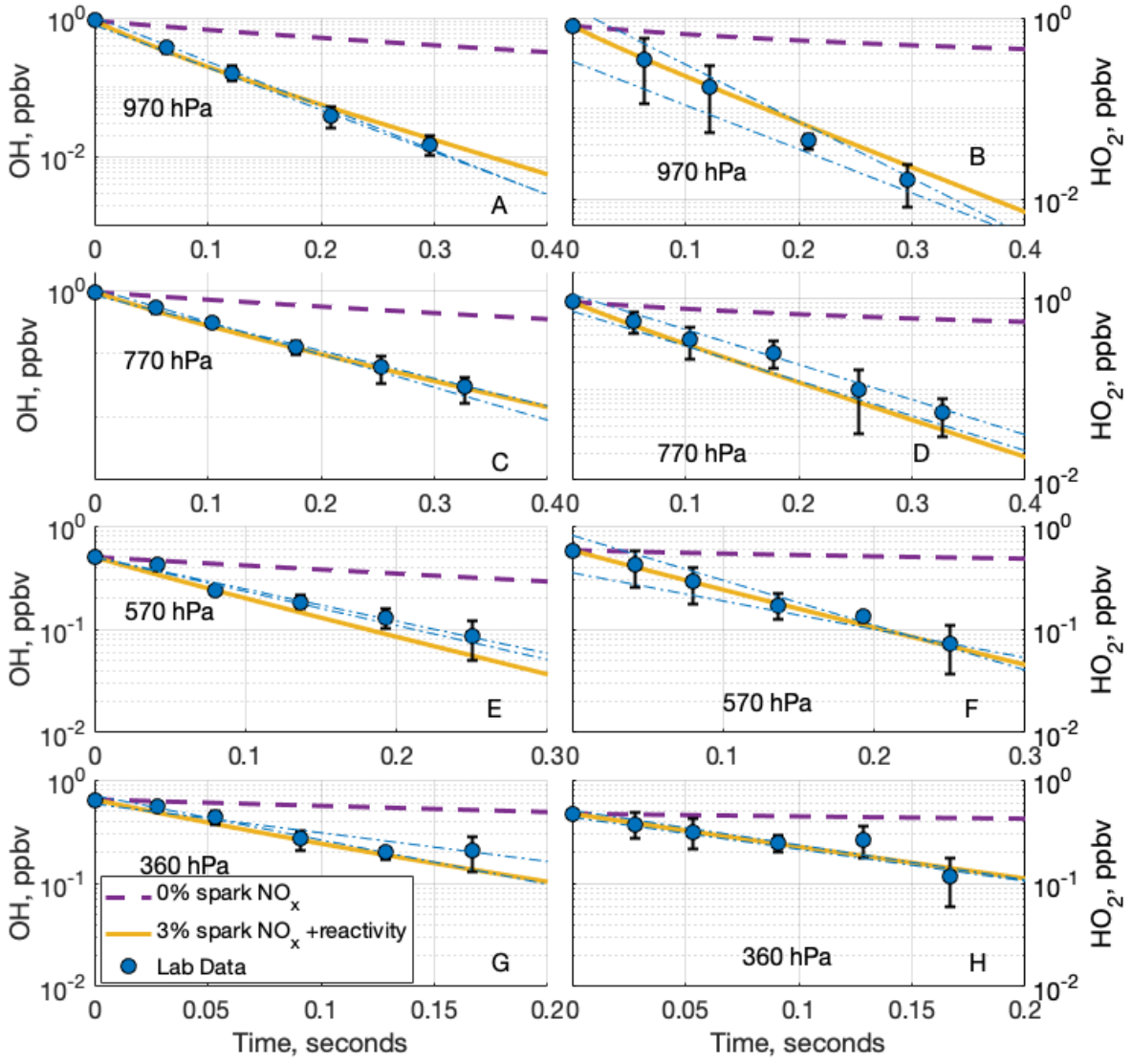

Figure S7. Comparison of measured OH (A,C,E,G) and HO_2 (B,D,F,H) laboratory decays and two model decays at (A,B) 970hP, (C,D) 770 hPa, (E,F) 570 hPa, and (G,H) 360 hPa. The dashed purple lines are the model decay including no NO_x from the spark, and the solid yellow lines are the model decay including 3% the spark NO_x and 10 s^{-1} of OH reactivity. The blue circles are the average laboratory measurements and average extrapolated value at time zero, while the dashed-dotted blue lines are the individual extrapolated linear fits to the laboratory data. Error bars are the standard deviation from averaging multiple measurements.