Supplement to:

Examining the impact of heterogeneous nitryl chloride production on air quality across the **United States**

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Figure S1. September 2006 8-hr max O_3 mean bias (for days when obs > 70 ppbv) in the simulation without heterogeneous ClNO₂ formation (top) and change in absolute value of 8-hr max O_3 mean bias with the implementation of ClNO₂ chemistry (bottom). Negative values in bottom plot denote degradations in performance and positive values denote improvements in model performance.



Figure S2. TNO₃ mean observed concentration (top), TNO₃ mean bias in the simulation without heterogeneous $ClNO_2$ formation (middle) and change in absolute value of TNO_3 mean bias with the implementation of $ClNO_2$ chemistry (bottom). Negative values in bottom plot denote degradations in performance and positive values denote improvements in model performance. All plots show comparisons at CASTNet monitoring sites during the month of February 2006.



Figure S3. TNO₃ mean observed concentration (top), TNO₃ mean bias in the simulation without heterogeneous $ClNO_2$ formation (middle) and change in absolute value of TNO_3 mean bias with the implementation of $ClNO_2$ chemistry (bottom). Negative values in bottom plot denote degradations in performance and positive values denote improvements in model performance. All plots show comparisons at CASTNet monitoring sites during the month of September 2006.



Figure S4. Particulate NO_3 mean observed concentration (top), Particulate NO_3 mean bias in the simulation without heterogeneous $CINO_2$ formation (middle) and change in absolute value of Particulate NO_3 mean bias with the implementation of $CINO_2$ chemistry (bottom). Negative values in bottom plot denote degradations in performance and positive values denote improvements in model performance. All plots show comparisons at CASTNet, CSN, IMPROVE, and SEARCH monitoring sites during the month of February 2006.



Figure S5. Particulate NO₃ mean observed concentration (top), Particulate NO₃ mean bias in the simulation without heterogeneous ClNO₂ formation (middle) and change in absolute value of Particulate NO₃ mean bias with the implementation of ClNO₂ chemistry (bottom). Negative values in bottom plot denote degradations in performance and positive values denote improvements in model performance. All plots show comparisons at CASTNet, CSN, IMPROVE, and SEARCH monitoring sites during the month of September 2006.

