1 **Supplementary Information:**

2 **Real-time measurements of gas-phase organic acids using SF_6^- chemical ionization**
3 **mass spectrometry**

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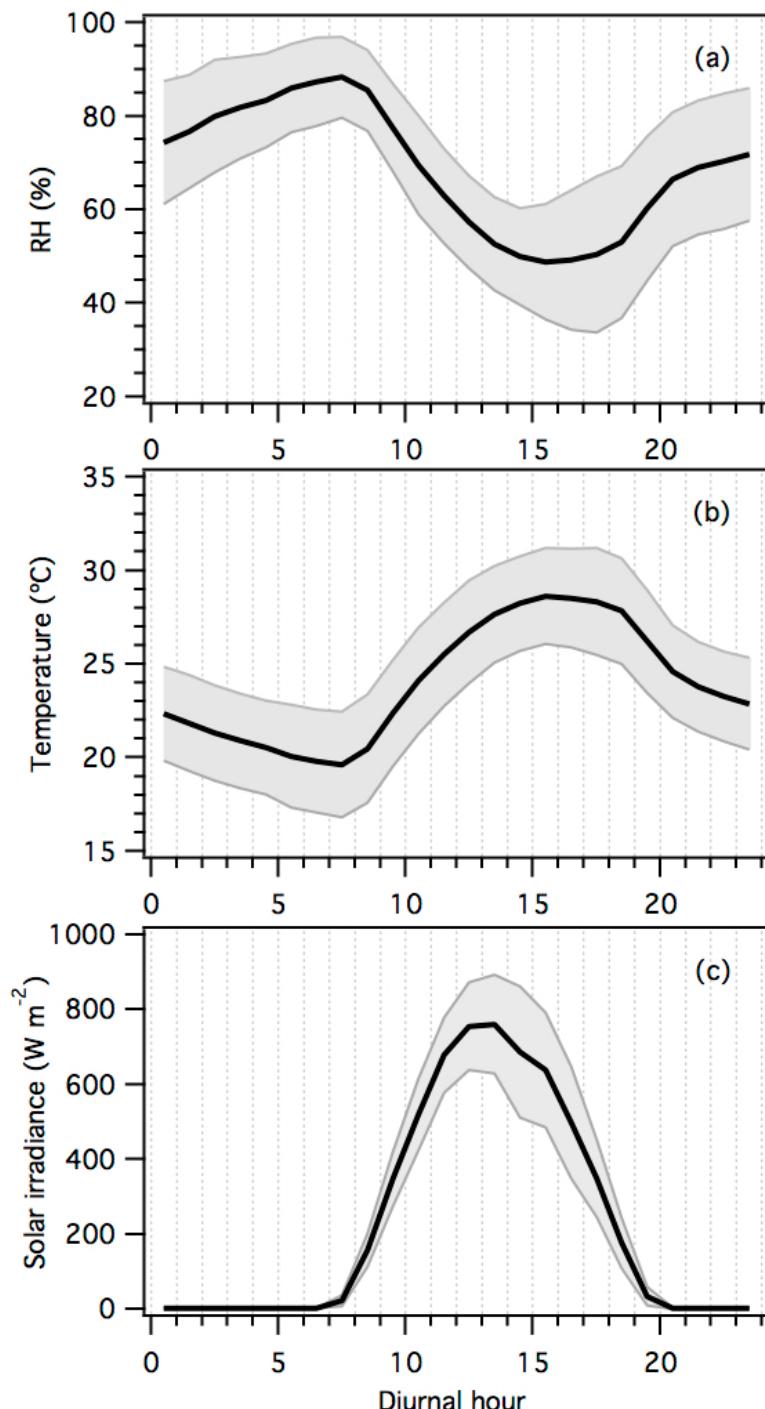
Figure S1: Diurnal trends of (a) relative humidity, (b) temperature, and (c) solar
radiance. The lines within the shaded area represents the average values. The upper and
lower boundaries of the shaded areas mark one standard deviation.

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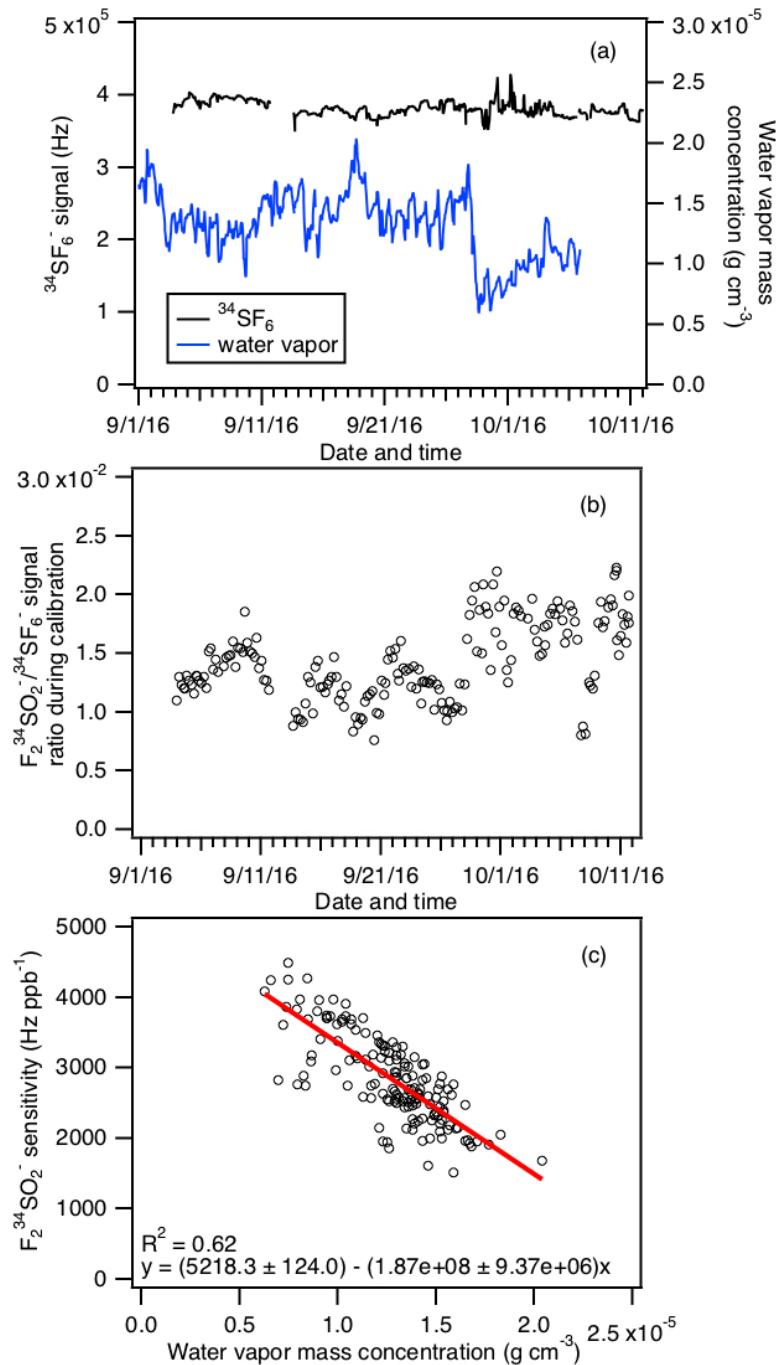
Figure S2: (a) Time series of $^{34}SF_6^-$ reagent ion signal and ambient water vapor concentration for the entire field study. The ambient water vapor mass concentrations are determined from ambient relative humidities and temperatures. (b) Time series of $F_2^{34}SO_2^-/^{34}SF_6^-$ ion signal ratio obtained during calibration measurements. (c) $F_2^{34}SO_2^-$ ion sensitivity obtained from calibration measurements as a function of ambient water vapor concentration. Data in panels (a) to (c) are displayed as 1-hour averages.

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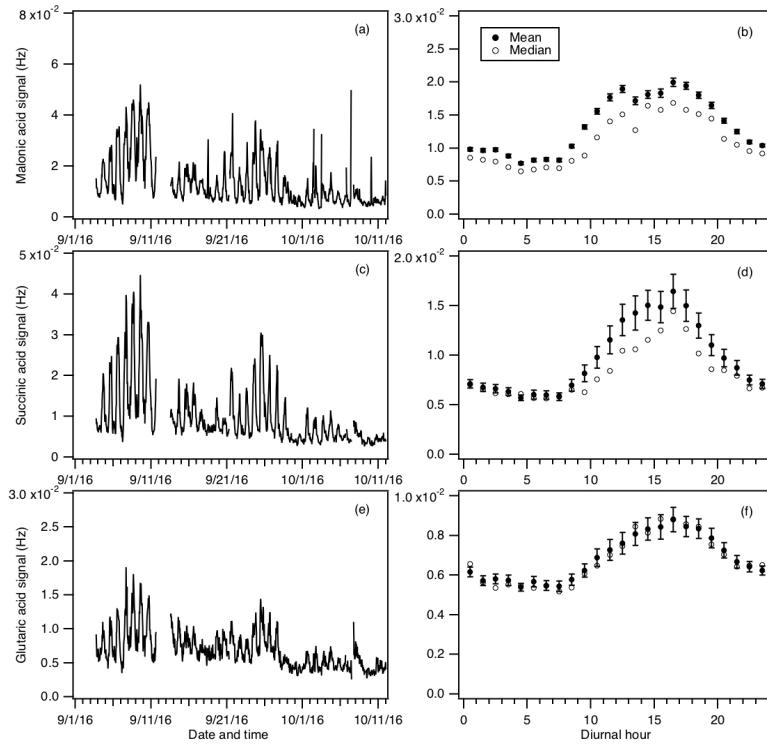
Figure S3: Time series of signals of (a) malonic, (c) succinic, and (e) glutaric acids measured during the field study. The data are displayed as 1-hour averages. Their corresponding diurnal profiles are shown in (b), (d) and (f), respectively. All the signals represent averages in 1-hour intervals and the standard errors are plotted as error bars. These organic acids were not calibrated so all the signals are presented here as Hz normalized by the instrument's sensitivity to $F_2{}^{34}SO_2$, which was the primary calibrant used in the field study.

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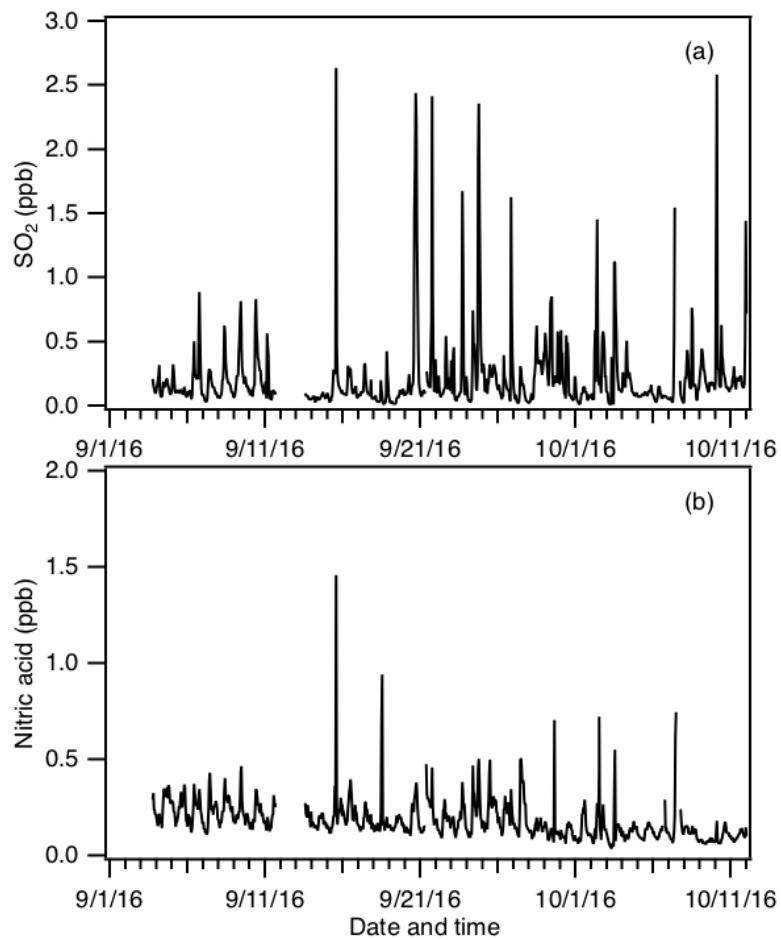
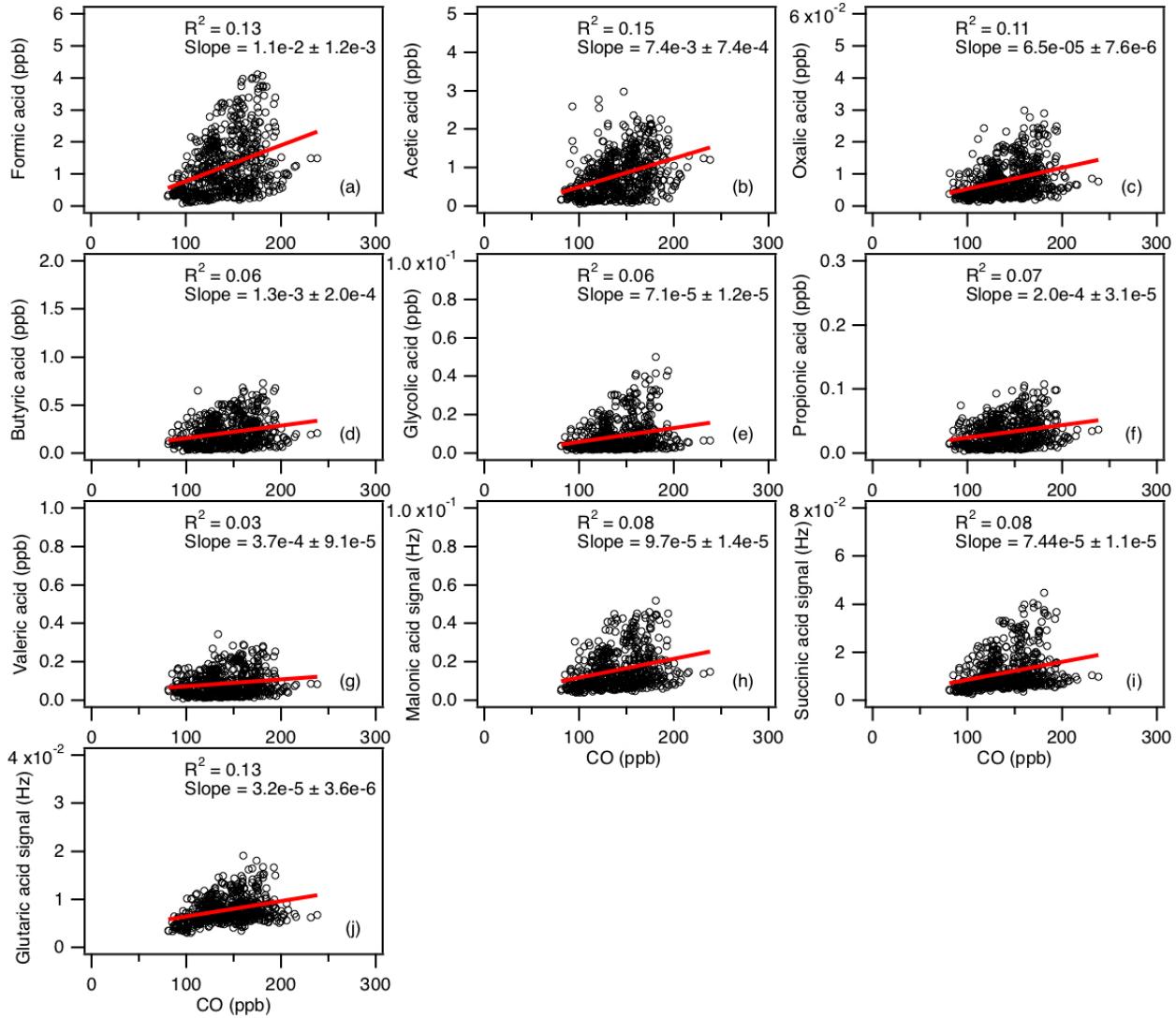


Figure S4: Time series of (a) SO_2 and (b) HNO_3 concentrations measured during the

field study. All the data are displayed as 1-hour averages.

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36 **Figure S5:** Scatter plots of concentrations (or signals) of (a) formic, (b) acetic, (c) oxalic,

37 (d) butyric, (e) glycolic, (f) propionic, (g) valeric, (h) malonic, (i) succinic, and (j)

38 glutaric acids with CO concentration. All the data are displayed as 1-hour averages. The

39 data for malonic, succinic and glutaric acids are presented as Hz normalized by the

40 instrument's sensitivity to $F_2{}^{34}SO_2$ since these organic acids were not calibrated. Red

41 lines shown are linear fits to the data.

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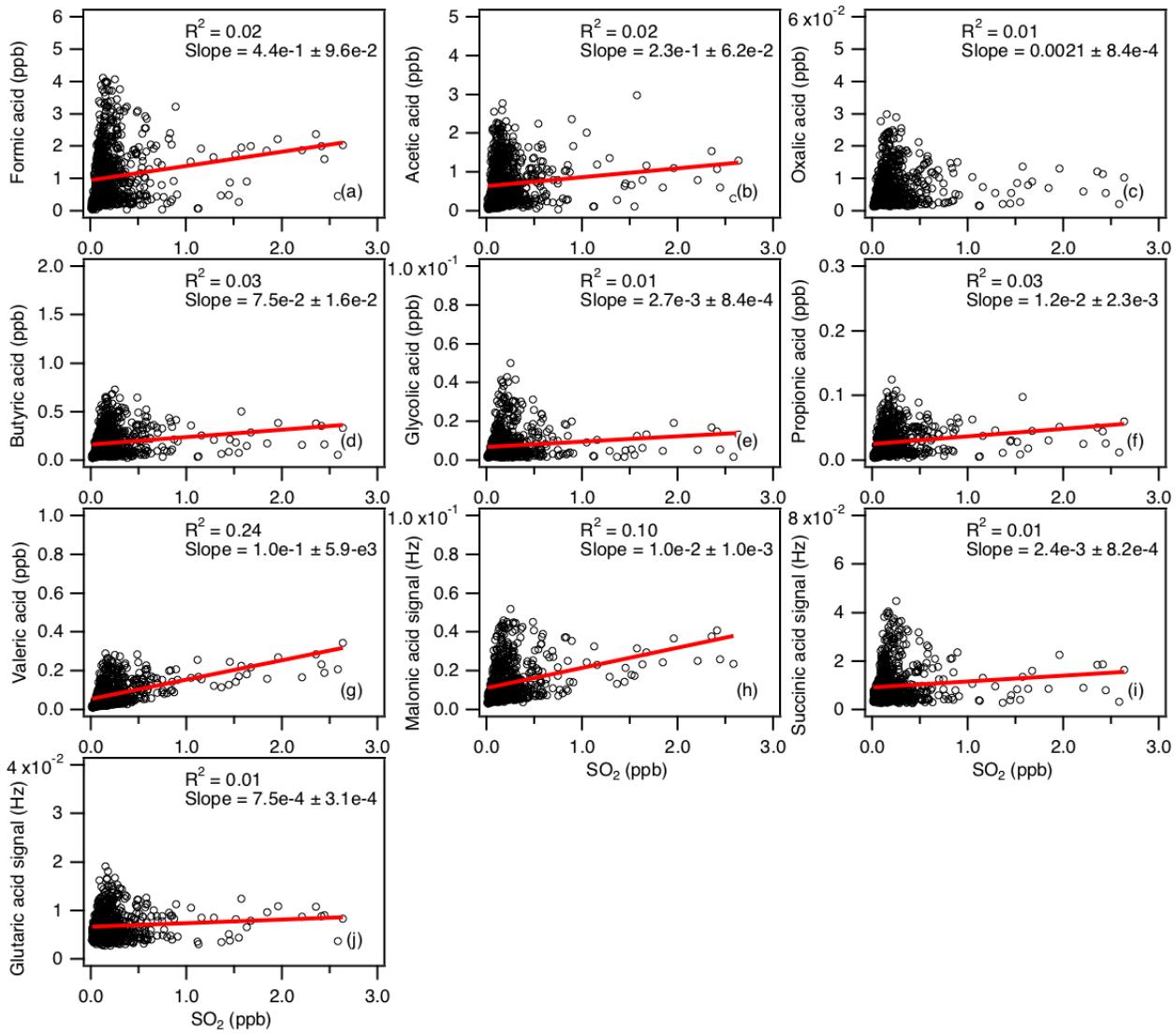
Figure S6: Scatter plots of concentrations (or signals) of (a) formic, (b) acetic, (c) oxalic, (d) butyric, (e) glycolic, (f) propionic, (g) valeric, (h) malonic, (i) succinic, and (j) glutaric acids with SO_2 concentration. All the data are displayed as 1-hour averages. The data for malonic, succinic and glutaric acids are presented as Hz normalized by the instrument's sensitivity to $F_2{}^{34}SO_2$ since these organic acids were not calibrated. Red lines shown are linear fits to the data.

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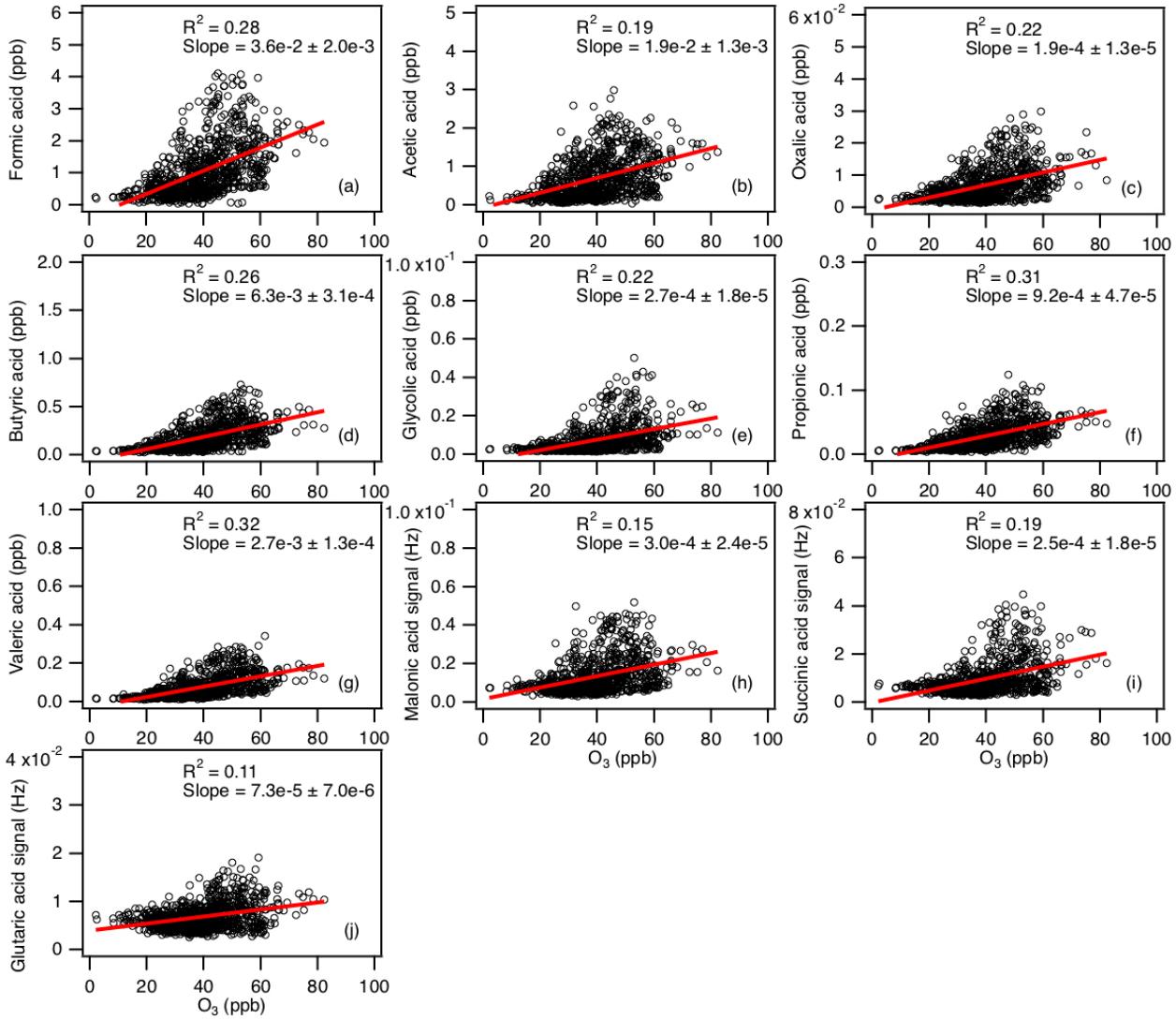
Figure S7: Scatter plots of concentrations (or signals) of (a) formic, (b) acetic, (c) oxalic, (d) butyric, (e) glycolic, (f) propionic, (g) valeric, (h) malonic, (i) succinic, and (j) glutaric acids with O_3 concentration. All the data are displayed as 1-hour averages. The data for malonic, succinic and glutaric acids are presented as Hz normalized by the instrument's sensitivity to $F_2{}^{34}SO_2$ since these organic acids were not calibrated. Red lines shown are linear fits to the data.

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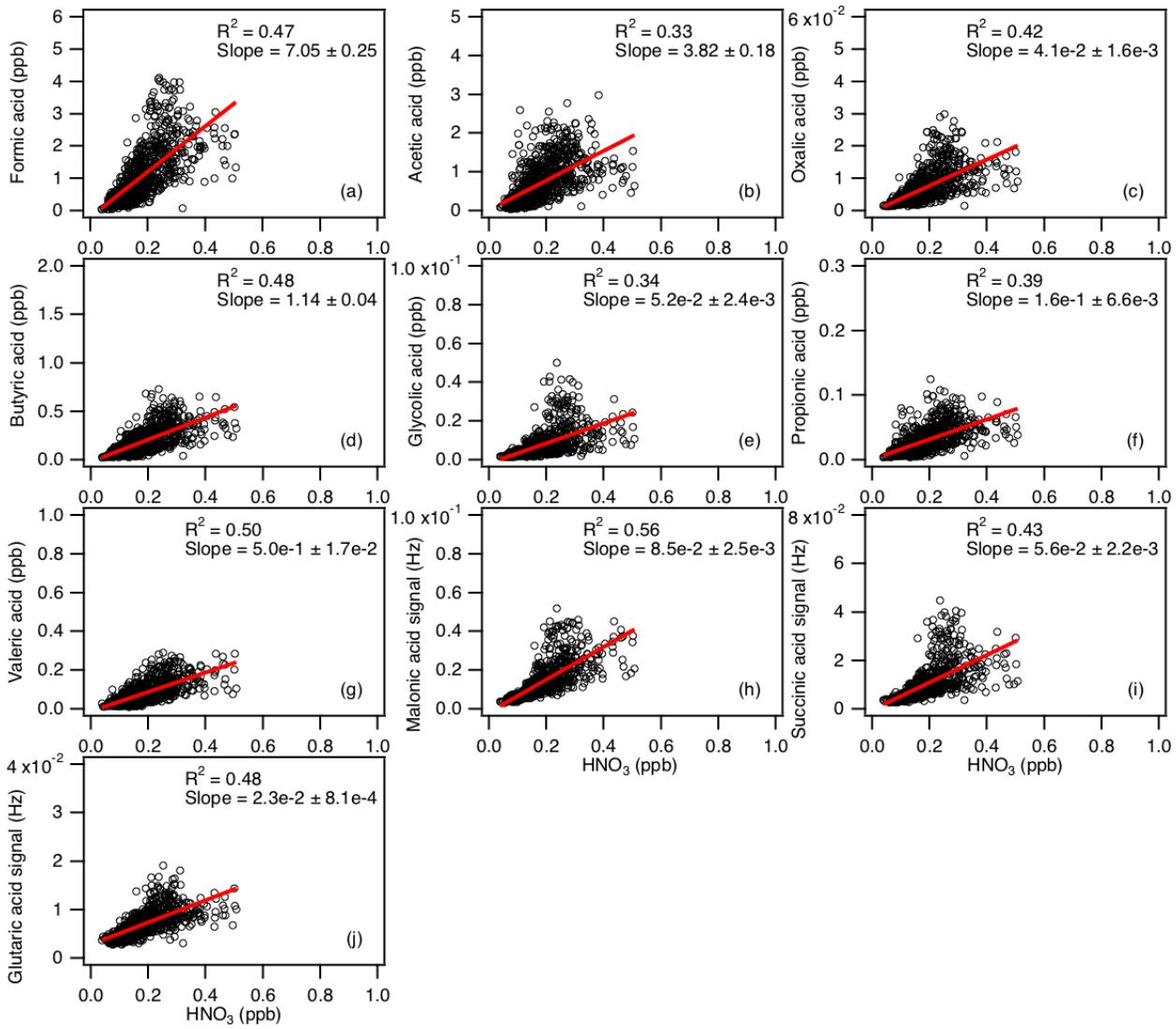
Figure S8: Scatter plots of concentrations (or signals) of (a) formic, (b) acetic, (c) oxalic, (d) butyric, (e) glycolic, (f) propionic, (g) valeric, (h) malonic, (i) succinic, and (j) glutaric acids with HNO_3 concentration. To exclude periods when the site was affected by urban or power plant emissions, data where $HNO_3 > 0.5$ ppb are excluded from these scatter plots. All the data are displayed as 1-hour averages. The data for malonic, succinic and glutaric acids are presented as Hz normalized by the instrument's sensitivity to $F_2{}^{34}SO_2$ since these organic acids were not calibrated. Red lines shown are linear fits to the data.

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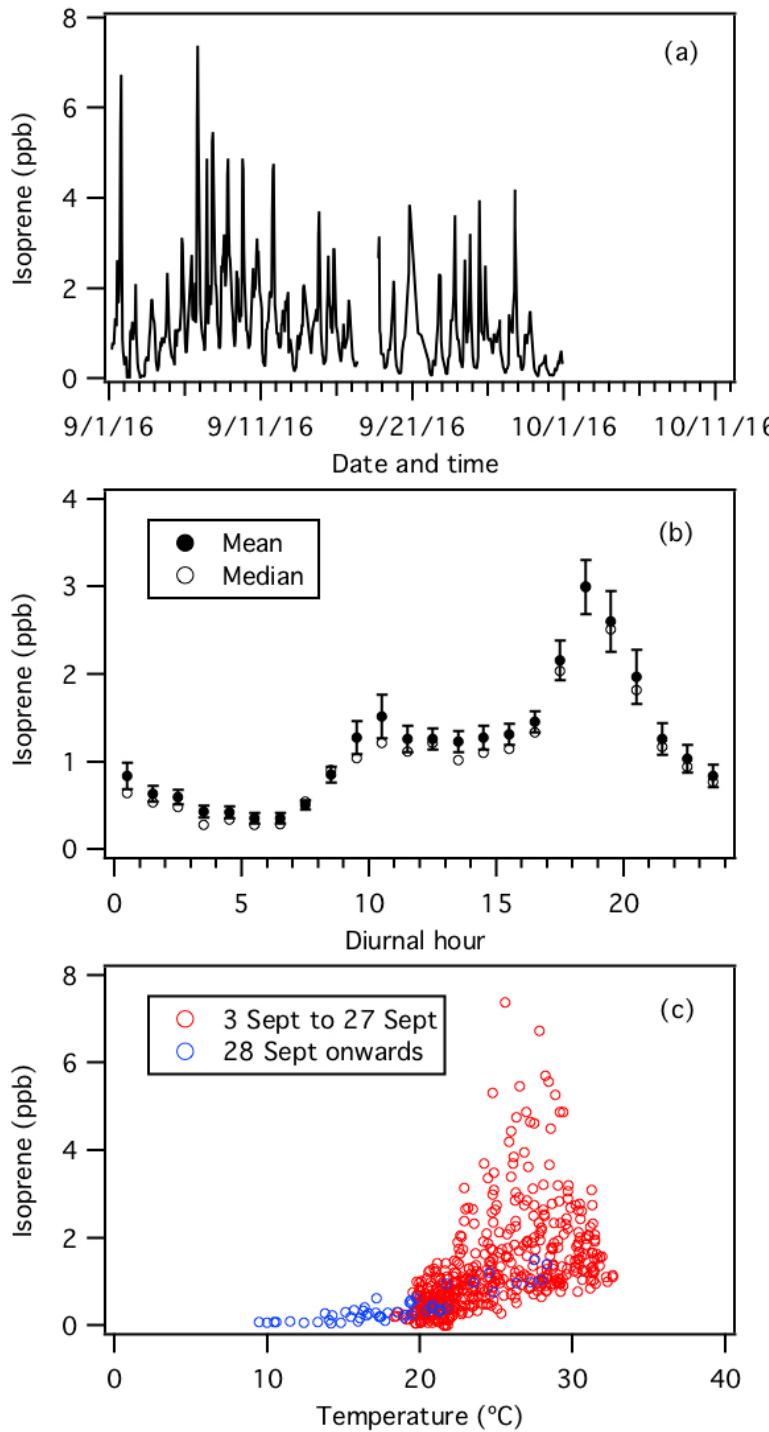
Figure S9: (a) Time series of isoprene concentration during the field study. (b) Diurnal

profile of isoprene. All the concentrations represent averages in 1-hour intervals and the

standard errors are plotted as error bars. (c) Scatter plot of isoprene concentration with

ambient temperature. All the data are displayed as 1-hour averages.

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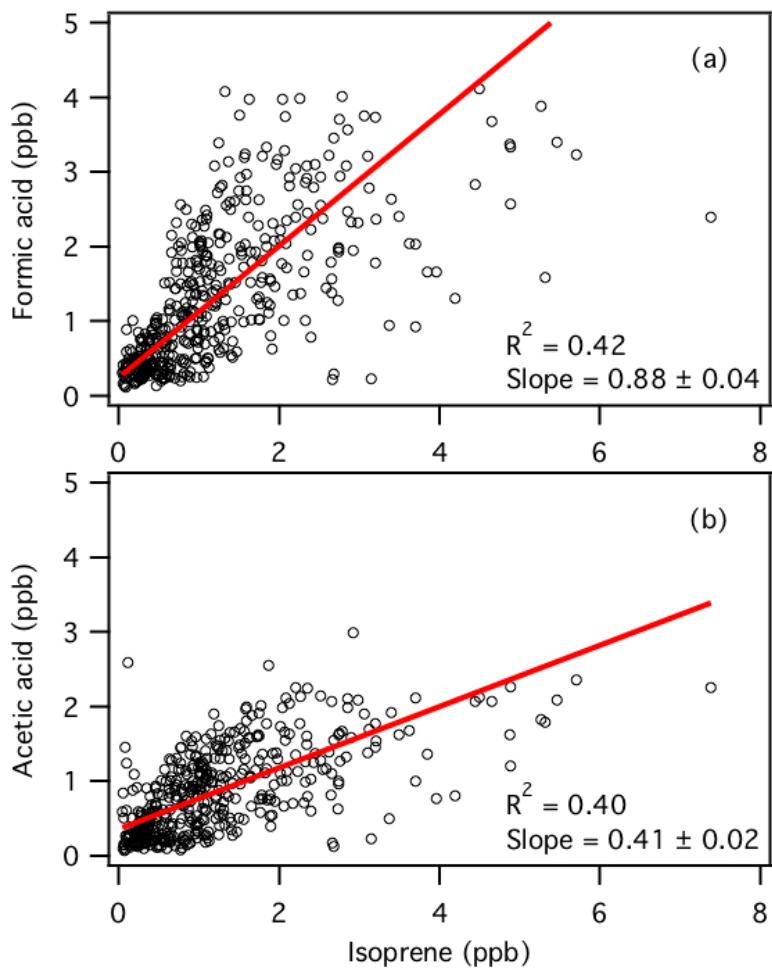
Figure S10: Scatter plots of concentrations of (a) formic and (b) acetic acids with
isoprene concentration. All the data are displayed as 1-hour averages. Red lines shown
are linear fits to the data.