Identification of spikes associated with local sources in continuous time series of atmospheric CO, CO$_2$ and CH$_4$

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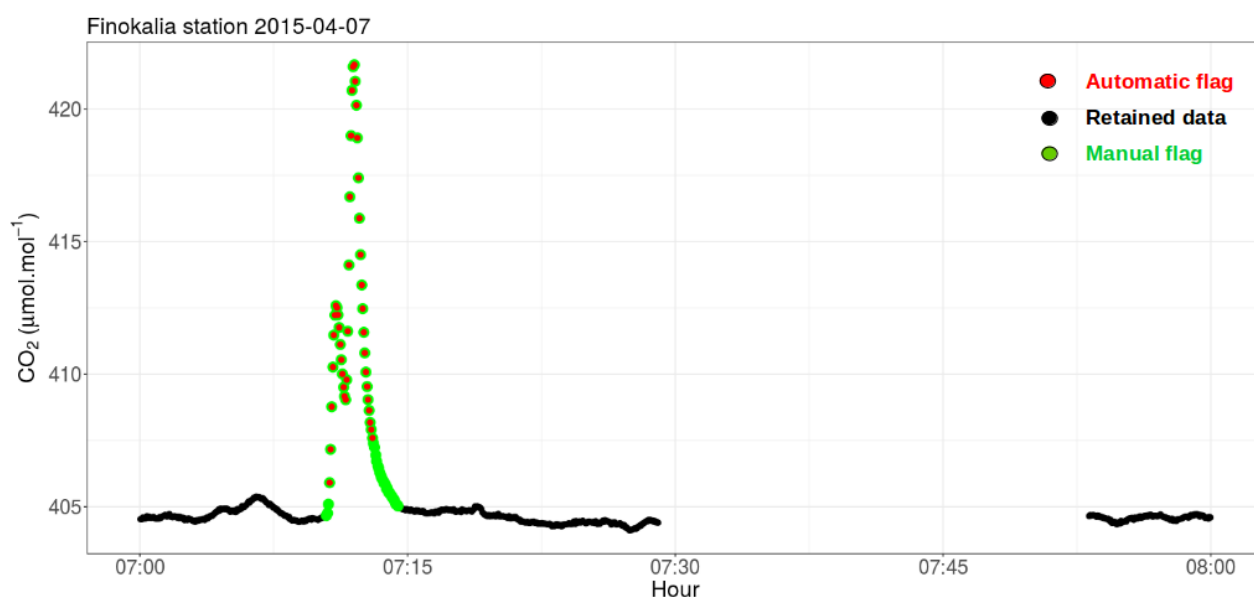
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Figure S1: Comparison between manual and automatic flagging (SD method), at Finokalia station. Green and red colors represent data flagged by manual and automatic flagging respectively, black color shows the retained data.

Finokalia station 2015-05-04   COV method

● **Flagged data**
● **Retained data**

CO (nmol.mol^{-1})

A

Data with COV > 99th pecentile +
2 data points before and after

Hour

Finokalia station 2015-05-04   SD method

● **Flagged data**
● **Retained data**

n=3

B

$$C_i \geq C_{unf} + \alpha * \sigma_b + \sqrt{n} * \sigma_b \qquad \alpha=3$$

Threshold

n=2

n=1

C$_{unf}$

CO (nmol.mol^{-1})

Hour

Finokalia station 2015-05-04   REBS method

● **Flagged data**
● **Retained data**
● **Baseline**

C

CO (nmol.mol^{-1})

$Y(t_i) > \hat{g}(t_i) + \beta*\sigma$
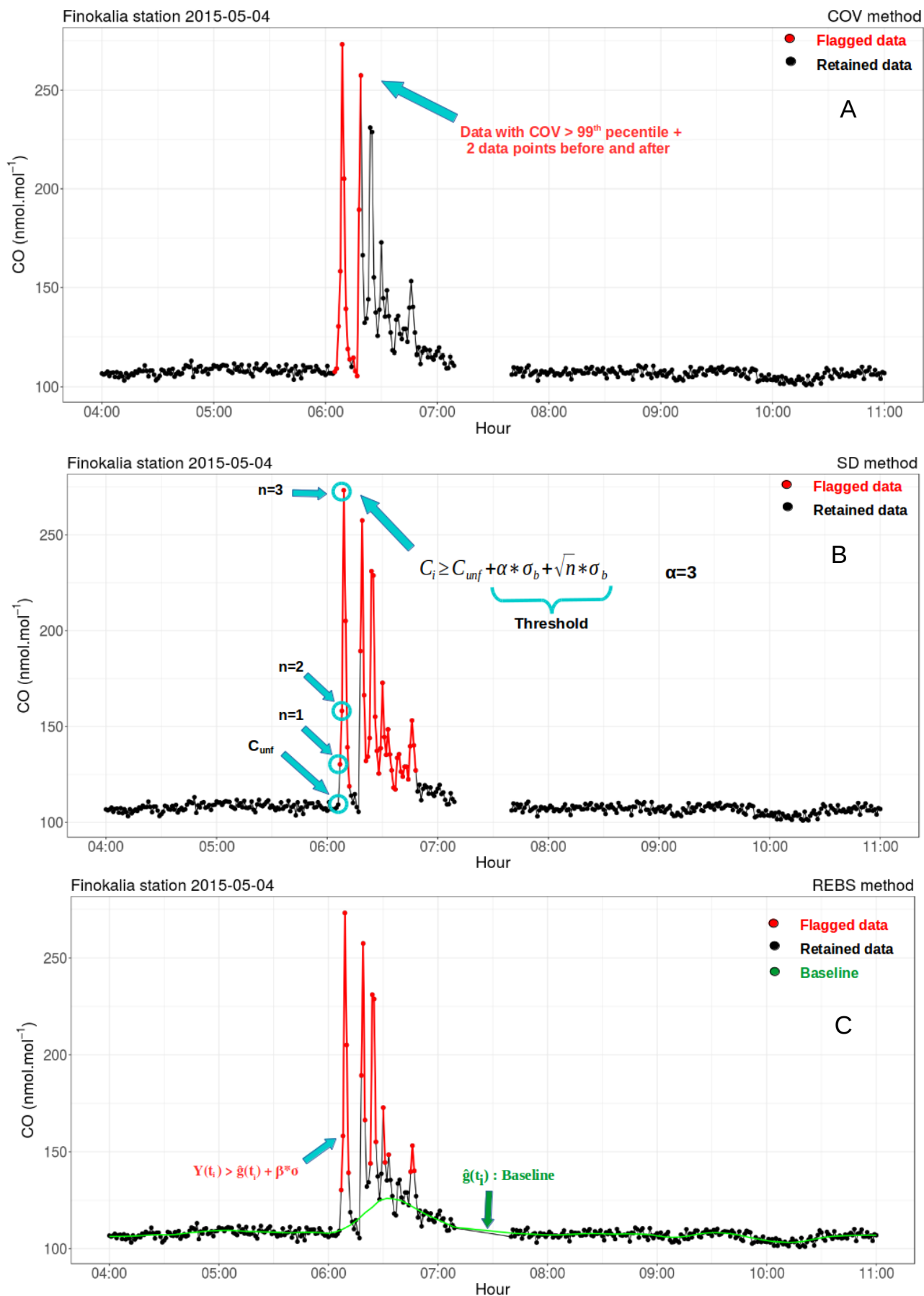
$\hat{g}(t_j)$: Baseline

Hour

Figure S2: Example of a known contamination episode (between 6:00 a.m and 7:00 a.m) for CO measurements detected by COV method (A), SD method (B), and REBS method (C)
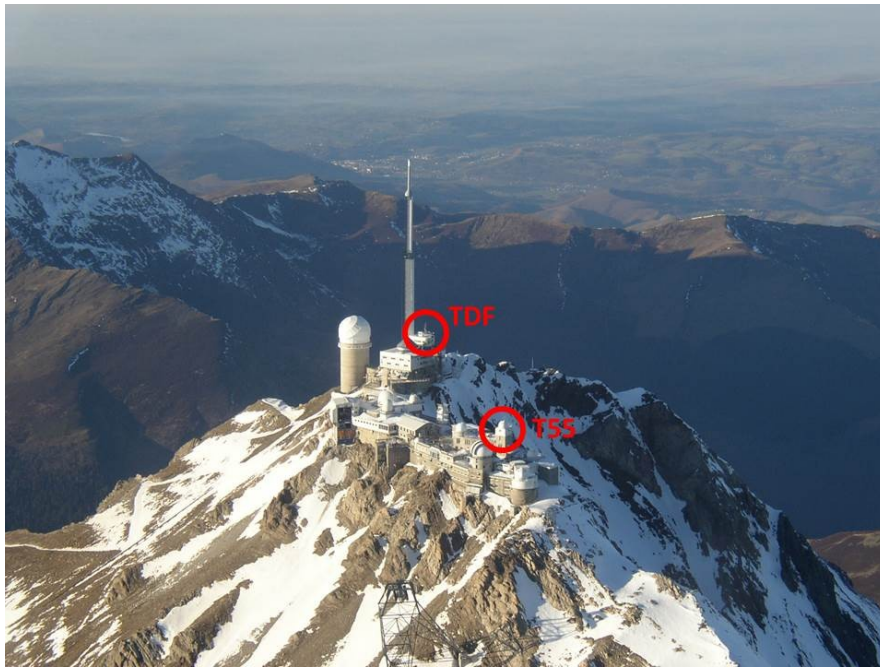
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Figure S3: Image of PDM station showing the location of AN-1 site (T55 building), and AN-2 (TDF building). 200 m separate the two buildings.
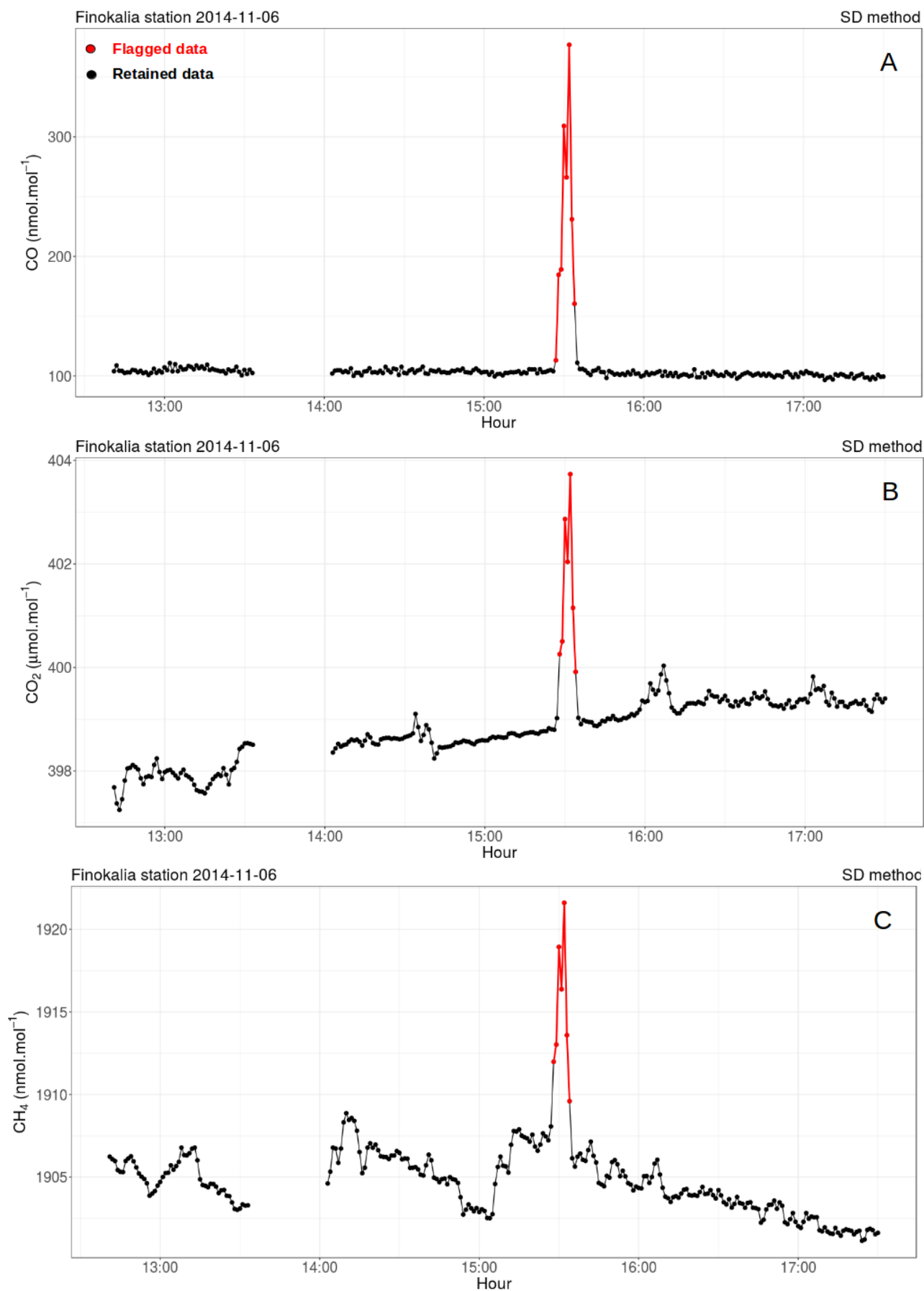
Figure S4: CO, CO$_2$ and CH$_4$ (A, B, and C) measurements during a waste burning episode (red points) at Finokalia from 1 p.m. to 5:30 p.m. on the 6th of November 2014.
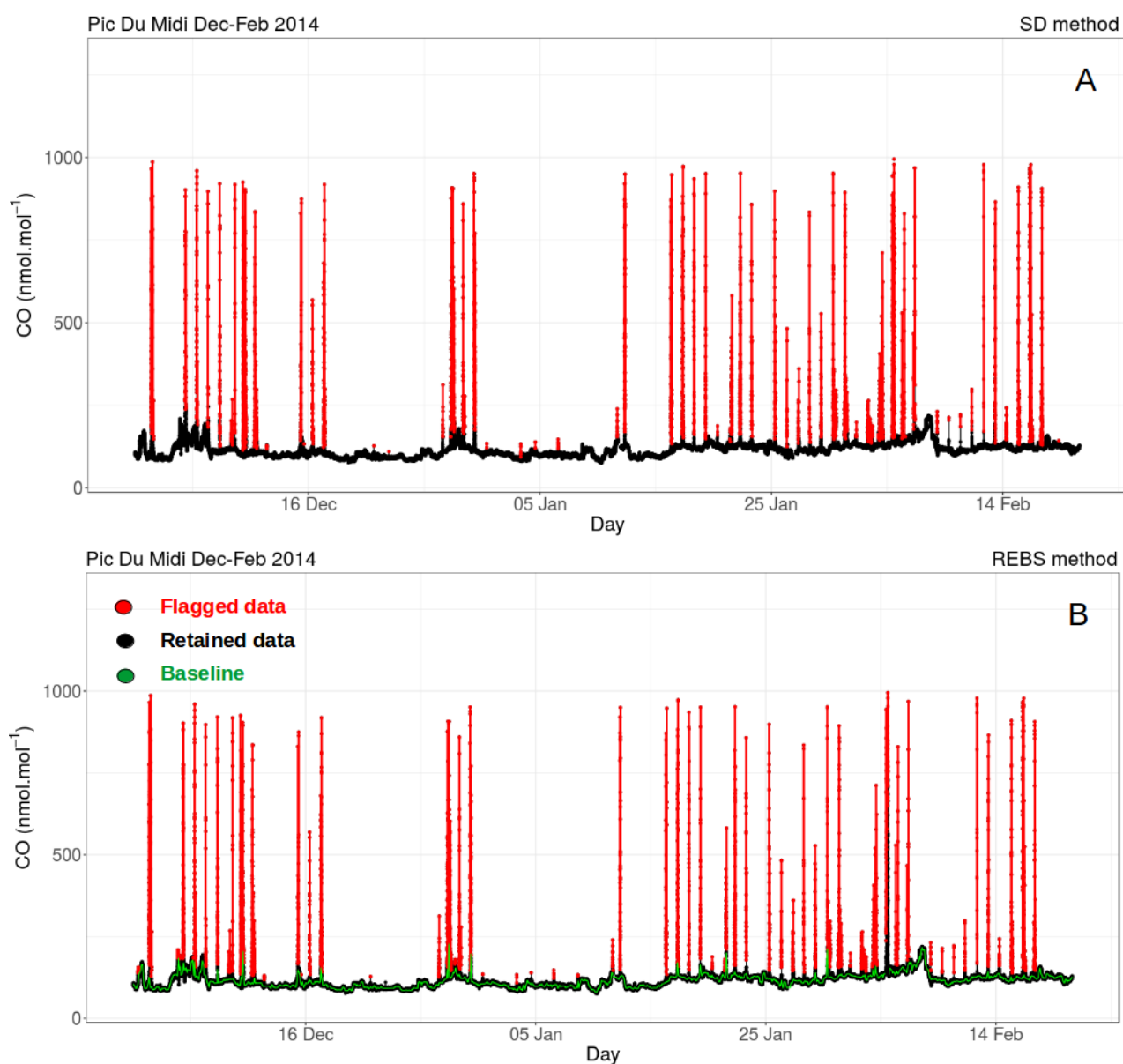
Figure S5: CO measurements from December to February 2014 at Pic Du Midi. Black (red) data points are the retained (flagged) measurements detected by SD method (A), and REBS method (B). The contaminated data linked to the snow removal are characterized by very high CO concentrations up to 1000 nmol.mol⁻¹.
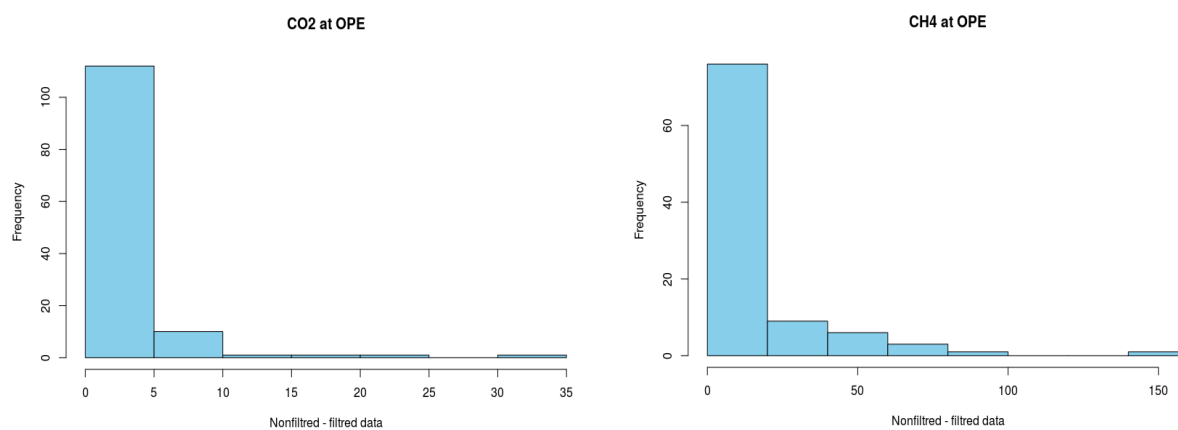
Figure S6: Histograms of differences between filtered and the non-filtered time-series averaged at a hourly scale at OPE. The x axis represents the value of differences in (µmol.mol⁻¹) for CO2 and (nmol.mol⁻¹) for CH4. The y axis represents the number of impacted hours.

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