

S1 Model Fit Statistics

Table S1. Model performance metrics by pollutant.

Pollutant	R ²		RMSE		MBE	
	Train	Test	Train	Test	Train	Test
Coarse PM (µg/m ³)	0.59	0.53	10.5	10.1	0	−0.09
NO ₂ (ppbv)	0.76	0.77	5.04	5.10	0	−0.01
PM _{2.5} (µg/m ³)	0.92	0.86	120	123	−0.0841	−15.7

S2 Peak Finding Approach Parameter Selection

Three parameters were used in implementing the peak-finding approach: distance, prominence, and relative height (rel_height). Modifying these parameters can have significant impacts on the results of decomposition of pollutant concentrations into background and local components. There is no universally optimal parameter selection, as it is dependent on the application, the pollutant being analyzed, and the characteristics of the dataset.

In all cases, a rel_height of 0.7 was used, meaning that the width of the peak was measured at 30% of the prominence instead of the default 50%. This allowed for a larger portion of the peak to be included when determining the local component. The selection of distance and prominence varied with each pollutant studied and is documented below.

S2.1 Colorado Dataset: Coarse PM

Many prominent peaks of coarse PM occur close together in time, as can be seen in Figure 9 of the main manuscript. For this reason, keeping distance low prevents the exclusion of peaks when determining the local contribution concentrations. This is reflected in Figure S1, where the number of peaks and percent of the total concentration attributed to the local component steeply decline with increasing distance. For these reasons, we used a distance of 2, meaning that the minimum time between peaks was 30 minutes.

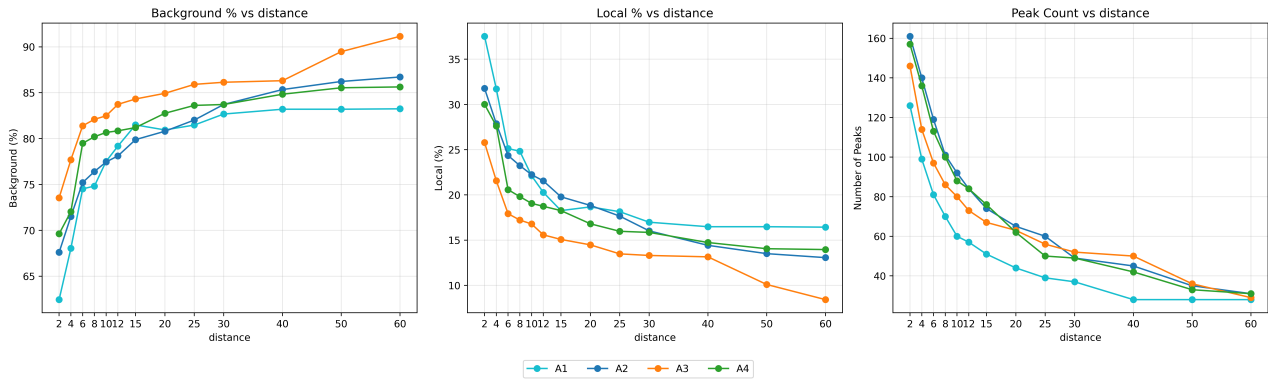


Figure S1. Sensitivity of coarse PM background percentage (left), local percentage (center), and peak count (right) to distance parameter.

Figure S2 shows that small changes in prominence do not have significant impacts on the partitioning of the signal into background and local components. However, as prominence is increased, the number of peaks captured decreases substantially. This led us to choose prominence of 8, where the change in the number of peaks with increasing prominence begins to plateau.

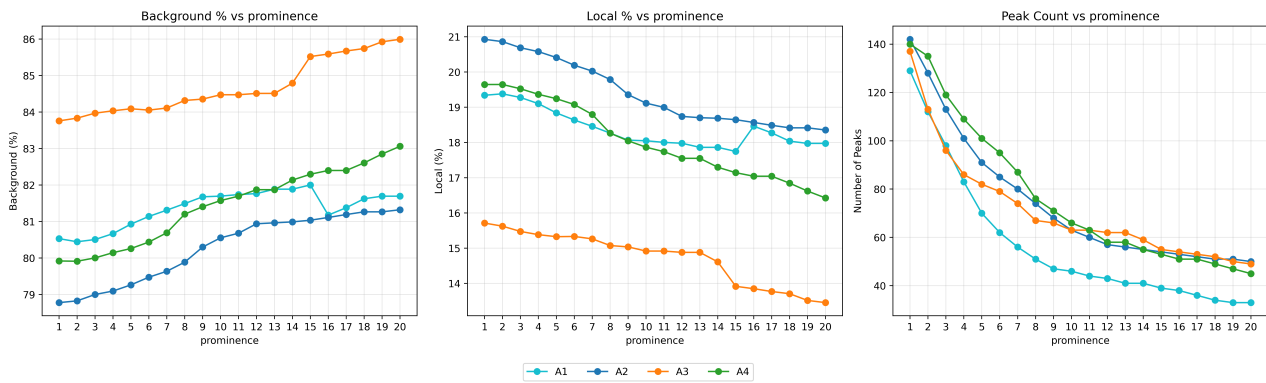


Figure S2. Sensitivity of coarse PM background percentage (left), local percentage (center), and peak count (right) to prominence parameter.

S2.2 CO Dataset: NO₂

For the majority of Pods, Figure S3 shows that distance has a small impact on contribution to concentration and number of peaks. These changes appear to diminish further at a distance of 12, the value used in our analysis.

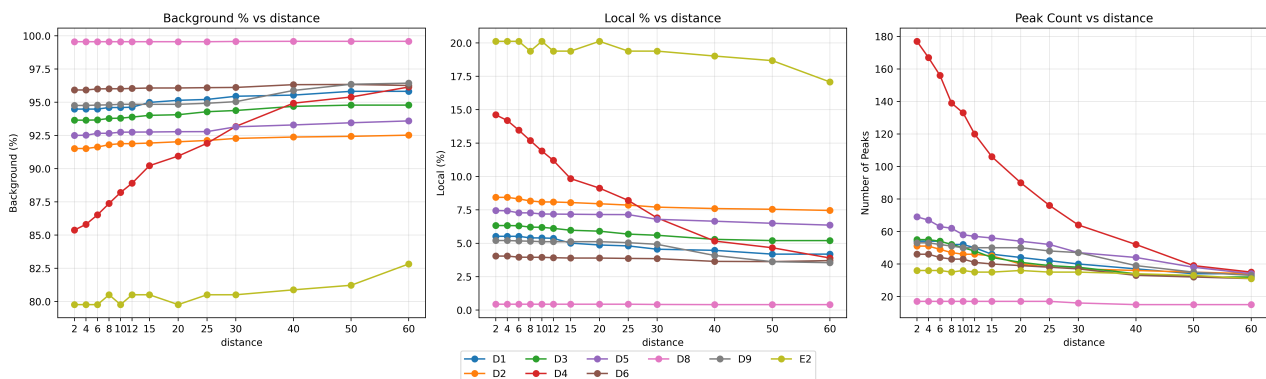


Figure S3. Sensitivity of NO₂ background percentage (left), local percentage (center), and peak count (right) to distance parameter.

The impact of prominence is minimal until larger values are reached (Figure S4). However, the exclusion of less prominent peaks may lead to the underestimation of the local component, leading us to select a smaller value of 4.

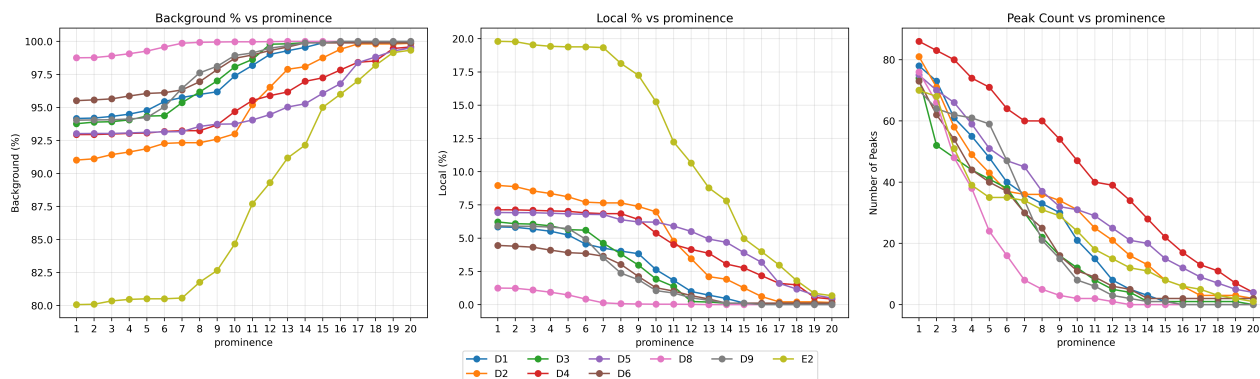


Figure S4. Sensitivity of NO₂ background percentage (left), local percentage (center), and peak count (right) to prominence parameter.

S2.3 LA Dataset - PM_{2.5}

As with the other pollutants, the choice of distance for PM_{2.5} was guided by the sensitivity analysis in Figure S5. However, background percentage, local percentage, and peak count continue to change substantially across distance values without a distinct plateau until large values are used. This led to us selecting a distance of 16 (4 hours between peaks) to avoid excluding a large portion of the peaks captured by the algorithm.

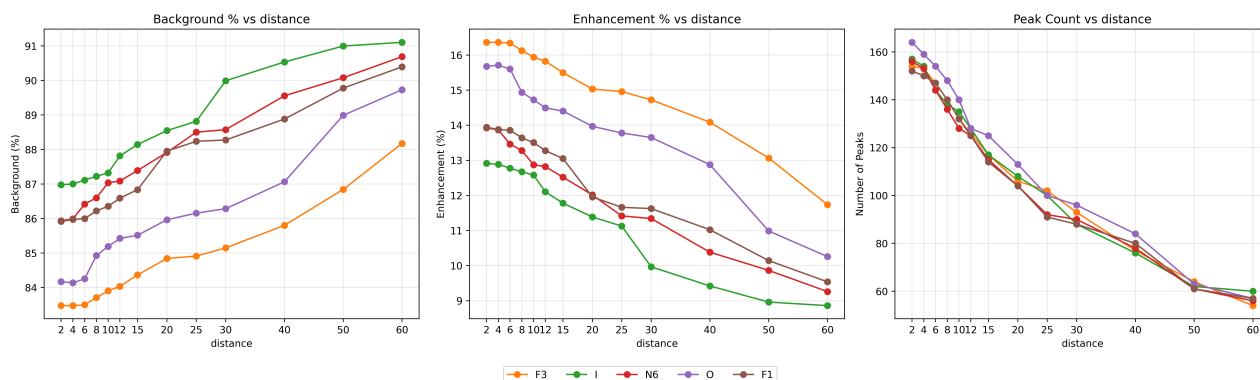


Figure S5. Sensitivity of PM_{2.5} background percentage (left), local percentage (center), and peak count (right) to distance parameter.

As seen with NO₂, the impact of prominence on PM_{2.5} is minimal until larger values are reached (Figure S6). To avoid underestimating the local component by excluding less prominent peaks, a prominence of 4 was used.

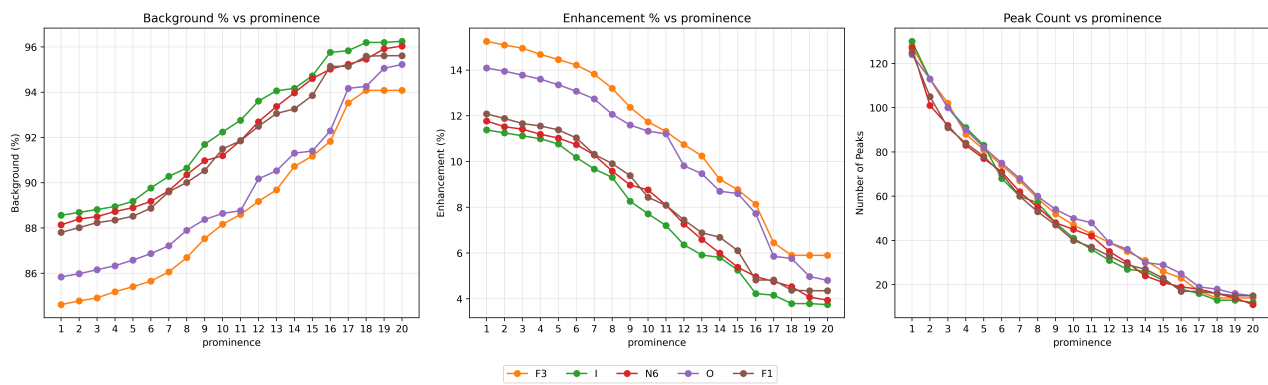


Figure S6. Sensitivity of PM_{2.5} background percentage (left), local percentage (center), and peak count (right) to prominence parameter.