

We thank the reviewers for their careful review of our manuscript. The comments and suggestions greatly improve our manuscript. Following is our point to point responses to the comments:

Table 1 still needs a better layout. I suggest to use different line spacing to better group the data which belong together.

Response: Thank you for the comment. Table 1 has been revised as follows:

**Table 1. The concentration of phenol and nitrated phenols (NPs) in different sampling sites and their site categories, sampling time and analytical methods (ng m<sup>-3</sup>).**

Sampling site	Site category	Sampling time	Method	phenol	NP	DNP	MNP	DMNP	NC	MDNP	MNC	References
Strasbourg area, France	urban and rural sites	annual mean	GC-MS	0.4-58.7	0.01-2.2	5.6	2.6			0.1-0.3 <sup>a</sup>		1
Rome, Italy	downtown	winter-spring	GC-MS		14.3		13.9	2.0 (1.0) <sup>b</sup>				2
Great Dun Fell, England	remote site	spring	GC-MS	14-70	2-41 <sup>c</sup>	0.1-8.5				0.2-6.6		3
Beijing, China	regional site	spring	LC-MS		<i>143-566<sup>d</sup></i>		<i>7.1-62<sup>e</sup></i>		<i>0.06-0.79<sup>f</sup></i>		<i>0.017<sup>g</sup></i>	4
Milan, Italy	polluted urban site	summer	HPLC	400	300							5
northern Sweden	dairy farms	autumn-winter	TD-GC	3000-50000								6
Manchester, UK	with Bonfire Plume	autumn-winter	ToF-CIMS		780		630					7
Ottawa, Canada	Removed selected dwellings sites	winter	TD-GC-MS	10-1410								8
Santa Catarina, Brazil	near a coal-fired power station	winter	GC-FID	980-1600								9
Switzerland	urban site	winter	GC-MS	40	350 <sup>h</sup>		250 <sup>i</sup>			50 <sup>j</sup>		10
Manchester, UK	measured during the bonfire night	winter	ToF-CIMS		3700		3600					7
Detling, United Kingdom	rural site	winter	MOVI-HR ToF-CIMS		0.02	3	5		2.5		8.2	11
Beijing, China (this study)	urban site	winter	ToF-CIMS	<i>63<sup>k</sup></i> <i>1013<sup>l</sup></i>	<i>606.3</i> <i>(511.1)</i>	<i>243.5</i> <i>(339.6)</i>	<i>203.5</i> <i>(156.6)</i>	<i>46.2</i> <i>(32.6)</i>	<i>22.1</i> <i>(12.4)</i>	<i>26.0</i> <i>(25.8)</i>	<i>10.4</i> <i>(6.3)</i>	

The estimated concentrations were displayed in the *italic* script. Standard variations were displayed in brackets. Nitrated phenols investigated in this study referred to nitrophenol (NP), dinitrophenol (DNP), methyl-nitrophenol (MNP), dimethyl-nitrophenol (DMNP), nitrocatechol (NC), methyl-dinitrophenol (MDNP) and methyl-nitrocatechol (MNC).

**Symbols:** <sup>a</sup> gas+particle phase; <sup>b</sup> 2,6-Dimethyl-4-nitrophenol; <sup>c</sup> 2/4-Nitrophenol; <sup>d</sup> 4NP, estimated; <sup>e</sup> 2M4NP+3M4NP, estimated; <sup>f</sup> 4NC, estimated; <sup>g</sup> 3M6NC+3M5NC+4M5NC, estimated; <sup>h</sup> 2-Nitrophenol; <sup>i</sup> 3M2NP+4M2NP; <sup>j</sup> 2,4-Dinitro-6-methyl phenol; <sup>k</sup> estimated by 0.3NO<sub>y</sub>; <sup>l</sup> estimated by 0.4CO

**References:** <sup>1</sup> (Delhomme et al., 2010); <sup>2</sup> (Cecinato et al., 2005); <sup>3</sup> (Lüttke et al., 1997); <sup>4</sup> (Wang et al., 2019b); <sup>5</sup> (Belloli et al., 1999); <sup>6</sup> (Sunesson et al., 2001); <sup>7</sup> (Priestley et al., 2018); <sup>8</sup> (Zhu et al., 2005); <sup>9</sup> (Moreira Dos Santos et al., 2004); <sup>10</sup> (Leuenberger et al., 1988); <sup>11</sup> (Mohr et al., 2013).

line 93/94: I suggest to clarify: "The chemical formula compositions .... were detected by TOF-MS  
The chemical structures cannot be derived from simple MS, they were derived by aids of  
chromatography methods.

And: The results of high resolution peak fits of reagent ions and NPs can be found in Figure S1 in  
line 9.

Response: Thank you for the comment. The sentence was clarified as follows (line 92-93): "The  
chemical formula compositions of these NPs were detected by ToF-MS. See more detail in Figure  
S1".

line 225: "We noticed that the C<sub>6</sub>H<sub>5</sub>O-NO<sub>2</sub> reaction was the only formation pathway of nitrophenol  
(Berndt and Böge, 2003)."

Did the authors really notice that, or do they want to remark, that Berndt and Böge suggested that? In  
the latter case the sentence needs to be rephrased.

Response: Thank you for the comment. The sentence was revised as follows (line 223-225): "During  
the heavy pollution episode, 46.7% of phenol lost from the pathway of OH-reaction which caused  
the production of phenoxy radical (C<sub>6</sub>H<sub>5</sub>O). C<sub>6</sub>H<sub>5</sub>O then reacted with NO<sub>2</sub> and formed nitrophenol  
(Berndt and Böge, 2003)".