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Comment on acp-2022-565

Anonymous Referee #2

Referee comment on "Measurement report: The 4-year variability and influence of the Winter Olympics and other special events on air quality in urban Beijing during wintertime" by Yishuo Guo et al., Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2022-565-RC2, 2022

This study presents results of a comprehensive measurement campaign for gaseous and particulate atmospheric compositions during wintertime in Beijing, China. Data and information presented in this study would be useful for the reader. I appreciate the authors for providing such an important data to be available to open public. Since the manuscript type of this paper is Measurement Reports, I respect the interpretation made by authors as much as possible. I recommend this manuscript for publication after the reasonable revision.

(1) Please mention whether any precipitation/rain events occurred or not during the observation periods, since such events have significant impact on the compositions of gaseous and particulate atmospheric compositions.

(2) L79-80, Needed appropriate citations for this sentence. I guess that annual Chinese New Year celebrations did not always result in reductions in air pollution.

(3) L81-87, In context of the impact of special event such as the Olympic Games on the air quality in Beijing, I think several previous studies regarding the effect of the 2008 Beijing Olympic Games should be cited.
Fan, S.-B. et al. (2009) Road fugitive dust emission characteristics in Beijing during Olympics Game 2008 in Beijing, China, Atmos. Environ., 43, 6003-6010, doi:10.1016/j.atmosenv.2009.08.028
Okuda, T. et al. (2011) The impact of the pollution control measures for the 2008 Beijing Olympic Games on the chemical composition of aerosols, Atmos. Environ., 45, 2789-2794, doi:10.1016/j.atmosenv.2011.01.053
Schleicher, N. et al. (2012) Efficiency of mitigation measures to reduce particulate air pollution-A case study during the Olympic Summer Games 2008 in Beijing, China, Sci. Total Environ. 427-428, 146-158, doi:10.1016/j.scitotenv.2012.04.004

(4) L250-256, I'm curious that the N1-3 decreased with the increasing PM2.5 levels while sub-2 nm ions showed relatively constant concentrations. The diffusion coefficient of sub-2 nm ions is larger than that of N1-3; therefore sub-2 nm ions be possibly scavenged by surrounding aerosol particles, but reality was not. Please add some comments on this.

(5) L280-283, This is just a comment, but I think that this sentence is only valid in wintertime. In summer, the intensity of solar radiation would have significant impact on sulfate concentration.

(6) L349-351, As mentioned in L409-410, it is possible that particle concentration would increase during CNY due to fireworks, but I'm suspicious that it is applicable to SO2 concentration.