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Interactive comment on "Simulation of O_3 and NO_X in Sao Paulo street urban canyons with VEIN (v0.2.2) and MUNICH (v1.0)" *by* Mario E. Gavidia-Calderón et al.

Anonymous Referee #1

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The paper assumes that the pollutant concentration is mainly contributed by the local sources, not regional sources. In a lot of cases, just the local emission amount may not be accurate. What about regional emission? In particular, O3 typically is a regional source that can be transported from a far way. Without quantifying the ratio between local and regional sources, it is difficult to evaluate the reliability of the model.

2.2 VEIN emission model Line 140-142: "Therefore, if we consider the mean emission-factor ratio times the mentioned traffic flow ratio results that the NOX emissions should be approximately 2.37 higher." Is the suggested ratio of 2.37 considering contributions from both light vehicles and heavy vehicles?

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Discussion paper

Line 145: “We choose Wednesday emission as a typical weekday and Saturday emission for the weekend.” How much difference between typical Saturday and Sunday traffic in SPMA?

2.3.3 Building height and street width Line 176 “Building height is retrieved from the World Urban Database and Access Portal Tools project (WUDAPT) for SPMA (Fig. 3).” How well is WUDAPT describing building height? Especially, LCZ1, “compact high-rise”, is having a description of “height of roughness elements >25m”. It is also mentioned in line 226 that “Paulista Avenue domain is more uniform, presenting urban canyons with a mean building height of 45 meters (LCZ1 - Compact high rise).”, how is the value of 45 meters obtained? How sensitive is the model to these building height values?

2.3.4 Background concentration Line 195-198 “With that in mind, by using the mean wind field from WRF simulation for the study period, we select Ibirapuera AQS (83 shown in Fig. 4) measurement as background concentration, which, according to the wind field, advect pollutants to Pinheiros station (99) and Cerqueira Cesar (83) as can be seen in Fig. 4.”

Is the difference of wind direction from mean during the study period justifying the choice of a single AQS at upwind to provide background concentration. Surely, that single station cannot be upwind for all year round?

Figure 4 Minor: in figure Cerqueira Cesar (red diamond) has number 91 instead of 83 as in line 197 and caption. Typo?

2.5 Model set up Line 215 “VEIN calculates the emissions for the whole SPMA” Line 219-220 “The red lines are the street links used by VEIN to calculate the emissions, and the yellow rectangle the urban canyon selected for comparison against observation.” I am not quite sure what this means. Are red lines in figure 5(a), (b) all street links in the domain? If there are street links that are not used by VEIN to calculate the emission? If so, how is their emission calculated?

3.2 Emission adjustment Line 263-264 “We ran different scenarios with increased NOX and VOCs emission from VEIN. The best results were produced when doubled the NOX and VOC emissions. This scenario is called MUNICH-Emiss.” If there is any reason picking 2x as the adjusted emission? Would it perform better if higher emission, e.g., 2.5x, is used?

4 Discussion and conclusions Line 396 “calibrated emissions.” What does this mean? Is it the MUNICH-Emiss? Or is it calibrated in some way?

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