Anonymous Referee #1

The manuscript by Shakya et al. presents near-road measurements of PM2.5 and BC concentrations along with chemical composition analysis for filter samples collected in Kathmandu Valley, Nepal. The data were collected by traffic polices using portable instrument packages. Concentrations and chemical compositions measured in two different seasons were compared (spring vs. monsoon). Possible sources of atmospheric particulate matter were analyzed. The reported results can represent personal exposure of aerosol pollutions for traffic personnel in a heavily polluted South Asian city. The dataset can be valuable for assessment of health effects. In general, I found the topic is interesting and the manuscript is clearly written. I would recommend publication in ACP once the authors address the following comments.

Major concerns:

1. PM2.5 concentrations were measured using portable scattering nephelometers. This type of instruments can significantly overestimate PM concentrations at high relative humidity (RH) conditions due to the hygroscopic growth of aerosol particles. Were the data corrected for RH? What were the typical RH values during the study periods? Did the continuous measurements for PM2.5 in general agree with the concentrations derived from filter measurements?

> The pDR-1500 has relative humidity sensors and measures relative humidity. The data is corrected for relative humidity by the instrument and an additional manual correction for relative humidity is not required. Relative humidity measured at a monitoring station (Davis Automatic Weather Station) was 73.2% and 88.0% during dry and wet seasons, respectively. PM2.5 concentrations were derived from only continuous measurements, and were not determined from gravimetric analysis.
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> The following sentences were added in the manuscript:
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> Lines 134-135
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> The pDR-1500 measures relative humidity and makes a calibrated correction for relative humidity to compute $PM_{2.5}$ concentrations.
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> Lines 242-246
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> The average temperature and relative humidity (Davis Automated Weather Station) at a monitoring station at Bode, Bhaktapur in the Kathmandu Valley was 14.8 ^{o}C and 73.2%, respectively, during the dry season, and 23.6 ^{o}C and 88.0%, respectively during the monsoon (rainy) season. The total precipitation during the dry and monsoon season was 50.47 mm and 266.6 mm, respectively.

2. The measurements were carried out by mobile personnel. Do their daily activities (e.g., indoor during sleeping and outdoor during working) influence the measured diurnal variations (as shown in Fig. 3 and Fig. 4)? The author should mention some caveats.

> Following sentences are added to the manuscript:

Lines 217-223

Early morning to late evening measurements were collected outdoors while six traffic personnel were working at one of six different locations within a distance of about 2 km of their work station. Nighttime measurements were based on indoor measurements in the traffic officer's dormitory, which was located within a few hundred meters of their on-street duty location. Spikes in concentration during the daytime could be affected by their specific work location such as whether the traffic personnel were working at busy intersections or at roadside locations with lighter traffic.

Minor comments:

1. I suggest the authors also report the climatic meteorological conditions (temperature and RH) for the two seasons. This information can be helpful in several aspects, e.g., formation of secondary inorganic species, artifacts of PM2.5 measurements, etc.

Meteorological conditions have been added to the manuscript:

Lines 242-246

Average temperature and relative humidity (Davis Automated Weather Station) at a monitoring station at Bode, Bhaktapur in the Kathmandu Valley was 14.8 ^{o}C and 73.2% during dry season, respectively and 23.6 ^{o}C and 88.0%, respectively during monsoon (rainy) season. The total precipitation during dry and monsoon season was 50.47 mm and 266.6 mm, respectively.

2. Section 3.6: please specify how COD is calculated.

Equation for COD is added to the manuscript:

Lines 529-532.

COD is expressed as (Wilson et al., 2005):

$$COD_{jk} = \sqrt{\frac{1}{p}\sum_{i=1}^{p}\left[\frac{(S_{ij} - S_{ik})}{(S_{ij} + S_{ik})}\right]^2}$$

where S_{ij} and S_{jk} are the concentrations (of $PM_{2.5}$ or other parameters) for sampling day i for individual traffic personnel working at j and k locations; p represents the number of observations.

3. Table 1: the information “n=70 for Phase 2” for carbonaceous seems redundant because these samples were contaminated and not usable.

“n=70 for Phase 2” is removed from Table 1.