GENERAL COMMENTS

The authors present a valuable dataset on the content of harmful nitro(poly)aromatic pollutants in snow precipitation. The results of field samples analyses are compared with the theoretically predicted particulate mass fractions based on substance gas-particle partitioning constants and driving forces of semi-volatile organic compounds scavenging by the atmospheric condensed phases (particulate and liquid) are discussed. Sampling, sample preparation and handling, and the subsequent analytical procedures were well-planned. I find a few shortcomings in the data analysis and/or presentation (see specific comments). Phase partitioning is addressed at the end of the manuscript, however for the sake of clarity I would like to see its indication already in the Introduction section. When considering PM with a water layer, there are two interphases with the corresponding partitioning/equilibria that have to be taken into account – gas-liquid and solid-liquid. To avoid confusion, the experimental system needs to be defined at the beginning of the manuscript. Overall, presentation of the data is superficial, confusing and even unclear in some parts, and this aspect of the manuscript should be substantially improved before publication (see specific comments). I also encourage the authors to edit the language of the manuscript thoroughly. I think this is a very important dataset that should be delivered to the atmospheric science community, however the presentation and discussion should be improved; I suggest a major revision of the manuscript before publication.

SPECIFIC COMMENTS

I was confused with the introduction of particle scavenging and gas scavenging in the Introduction section. Can you correlate c_p and c_{pp}? From my point of understanding it should be the same value for low-solubility compounds (NPAH and OPAH). For water soluble compounds (NMAH), $c_{pp}+c_{pd}$ value should be equal (for high θ) or bigger (for low θ) than c_p. Additional explanation would help understand the investigated multiphase system.

Please rephrase the sentence on P3L16-18 starting with 'However, it is not known if this concept also applies to hydrophilic SOCs which may also demonstrate high θ,…' – I would say it can be speculated or is expected that water solubility plays a role in wet scavenging rather than 'not known' as stated above.

I want to comment on the LOQ and the precision of the reported data. First of all, it seems that your LOQ was lower than the lowest concentration used for the calibration curve. This is a bad practice. Whenever one estimates LOQ from IDL, this should be verified with the calibration curve. Then, I could only calculate ambient concentrations from the sample concentrations for N/OPAH as no final sample volume is reported for NMAH. Please add it and verify the LOQ you set. Second, you don't report on the precision of the analytical procedure/measurement. Please add the level of confidence to the data and report the concentrations accordingly (so far almost all concentrations ranging from 0.09 to thousands are reported with 2 decimal places, which is hard to believe it).

The advantage of air mass trajectories is not clear to me. You don't use them in the discussion of source apportionment, which is a bit superficial in general. I am aware that this was not the main scope of the study, but if you discuss possible sources of particular pollutants, you should combine

the knowledge with the estimated air mass trajectories and this should bring you some conclusions. If you don't want to go deeper here, I would shorten the source apportionment parts in the Results and discussion section (P8L15-23 and P8L31-P9L3). I also don't know what this means: 'The snowfalls leading to samples Ub1, Ub3, Rr1, and Rr5 followed immediately frontal passages with advection from westerly directions (Fig. S2), unlike in the other precipitation events.' Could you add an explanation?

I would move the last paragraph of the Results and discussion to the beginning of the section (to start with less sophisticated samples). I am also not sure if there is a need to report all values here, as they are also shown in Fig. 1. The same applies to the next section (NMAH) and Fig. 2.

The acronym SOC in not intuitive for me, I would rather suggest the use of SVOC for Semi Volatile Organic Compounds.

P1L9: You use *ng L^{-1}* for ΣNPAH and *µg L*-1 for ΣOPAH, which is misleading. Unify the units all over the manuscript.

P1L14: 'The lowest levels of ΣOPAHs and ΣNMAHs were found at the remote site (9.2 and 390.5 ng L-1, respectively).' – what about NPAHs? You should comment on their concentrations as well in the abstract.

P1L18-19: 'interplay between gas-particle partitioning in the aerosol, particle mass size distribution, and dissolution during in- or below-cloud scavenging.' – particle mass size distribution was not clear for me, maybe 'PM size-dependent mass distribution'? The same applies to P13L3.

P2L12: 'NPAHs are also formed through reactions in the aerosol condensed phase (Keyte et al., 2013; Jariyasopit et al., 2014).' – why didn't you measure them in the dissolved phase? Please comment.

P5L10: As no other glassware was pre-baked, I wonder if there is a reason why pre-baked glass inserts were used.

P5L23: 'internal method' – do you mean internal standard method?

P6L23: '(NH4)2SO4 and NaCl (the last two represent secondary inorganic aerosols)' – why NaCl secondary?

P8L4-14: I suppose this paragraph reports only the values for dissolved phase. This is not clear from the sentence starting in L7 on. Please clarify.

P9L11-12: Reference is missing.

P10L8-11: in some samples 4-NG was not detected; start the sentence with 'When detected,…'

P10L35-P11L1: this is not true – nitro group is strongly e-withdrawing (acceptor), therefore lower e-density on the aromatic ring (lower e-donor ability) and weaker π-interactions. Additional NO$_2$ group on the aromatic ring increases the number of possible hydrogen bonds. However, as you conclude correctly, intramolecular H-bond between adjacent -OH and -NO$_2$ opposes, which results in lesser interactions with the surrounding molecules for DNP in comparison to NP.

P11L5-12: Comment also low predicted θ values of 1,4-O$_2$NAP, 1-NNAP, 2-NNAP, 5-NACE, 2-NFLN.

P11L15: define W_T

P11L23-25: Can you definitely exclude post-sampling dissolution of water-soluble compounds in the liquid phase?

DATA PRESENTATION

There is a long list of measured compounds, but not so many are shown in the graphs. It took me quite some time to compare Table 2 (compound name & abbreviation), Fig. 1 (measured concentration in each fraction – denoted with abbreviations) and Table S4A (measured sum concentrations – denoted with long names). I would suggest adding a column or two in Table 2 and mark whether the compound was detected in particulate, dissolved, or both phases; or if it was not detected at all. Besides, 2-Nitro-9-fluorenone is listed among OPAHs in Table 2 – is this on purpose?

Table S1: In the fifth column you report 'Total NMAHs', but then you use superscripts TOT, P, D within the table. This should be clarified and explain the superscripts.

Abbreviations should also be introduced in the SI – maybe add them to Table S2.

Table S4A and B: add confidence intervals and report the data accordingly.

Table S4B: how did you convert c_{pd+pp} (ng l^{-1}) into c_{pd+pp} (ng m^{-3})? Explain θ in the footnote.

TECHNICAL CORRECTIONS

Only a few technical shortcomings are mentioned here. I suggest a thorough English-proofing before publication.

P1L3: 'Their precipitation cycling has hardly been studied.' – wet deposition by precipitation is a part of environmental cycling, I don't understand the meaning of *precipitation cycling*, please correct.

P1L10: 'snow dissolved and particulate phase' – 's' is missing in phases.

P3L22: 'dinitrophenols (2,4-dinitrophenol (2,4-DNP) and 2-methyl-4,6-dinitrophenol (i.e. dinitro-ortho-cresol, DNOC) were the most frequently measured nitrophenols…' – end-bracket is missing after DNOC) ant present perfect should be used afterwards (i.e. DNOC)) have been…).

P5L15: 30m – space is missing

P5L17: 15 °C – erase the space

P7L1: 'fOM (the mixing ratio of total organic matter in PM) × 0.60 and fOM×0.40' – all spaces or no spaces between the symbol, ×, and the number

P7L5: use past tense in the sentence starting with 'The individual partitioning…'