Atmos. Chem. Phys. Discuss.,
doi:10.5194/acp-2016-89-RC2, 2016

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Spatial Distribution of the Persistent Organic Pollutants across the Tibetan Plateau and Its Linkage with the Climate Systems: Five Year Air Monitoring Study" *by* Xiaoping Wang et al.

Anonymous Referee #2

Received and published: 5 April 2016

General comments

Tibetan Plateau (TP) has been an idea platform for studying environmental fate of persistent organic pollutants (POPs). As it is lack from local contamination source for POPs in TP, the levels of different POPs can be significantly influenced by both Indian Monsoon air masses and European air masses. Thus, several Chinese national or international research groups have been engaging on TP for POPs study since a decade. In this work, a few classic OCPs and selected PCB congeners have been monitored across the TP from 2007 to 2012 based on an atmospheric POPs monitoring

program. The temporal trends of atmospheric POPs concentrations during this 5-year period have been discussed, and the spatial POPs patterns have been elucidated with the role of various climate systems as well. Overall, this manuscript is well written and the methods used sounds good. The findings are helpful to explore the environmental fate of POPs in TP. I recommend its acceptance after some revision.

Specific comments

One of the most significant developments in air sampling technology in recent years is the evolution of passive samplers. So far, there are several type of PASs have been developed for POPs study, such as PUF disk, PUF/XAD-4 combination, and XAD-2 cartridge. Have the authors already done any comparison, for example XAD-2 vs. PUF disk, before you chose XAD-2 for a five years program?

XAD-2 based PAS has been deployed at 16 background sites across TP for 5 years or even long. Although PAS has several advantages for spatial and long-term trends monitoring, the data quality have been always a concern for long-term deployment. The authors should be able to control or compare the PAS data with active sampler at one of these 16 stations. If there any data from an high-volume air sampler available, you may show them in the manuscript in order to prove the data quality generated from XAD-2 based PAS.

"The following compounds were measured and quantified: PCB 28, 52, 101, 138, 153 and 180; HCB; o,p'-DDE, p,p'-DDE, o,p'-DDT and p,p'-DDT; α-HCH, β-HCH, γ-HCH and δ-HCH" in this work, I am wondering how you selected these OCP species and PCB congeners. Are these compounds mostly partitioning in vapor phase or particle phase?

In the section of QA/QC, you reported that "Duplicate PAS were deployed to check the repeatability and the results showed the average relative deviation of concentrations between duplicates is generally low, which ranged from 9% to 18% for different compounds (Table S4). Uncertainties for chemical analysis were in the range of 25–35%

and reasons for the uncertainties were discussed in Text S3." I am wondering how you can achieve a 9% to 18% relative deviation for duplicate PAS when the uncertainties of analytical method ranging from 25-35%. Frankly, I may trust the data when you report relative deviation even higher than 50%, but it is a surprise that you achieved such good results for duplicate PAS.

In the section "3.1 Concentrations of POPs in the Atmosphere of TP" the authors used ng/sample for POPs concentration, while the unit was change to pg/m3 in the section "3.2 Spatial Distribution of POPs across the TP". I will suggest using the same unit to avoid any confusing understanding.

In the section, "3.3 Dose the soil-air exchange (secondary source) affect the spatial pattern?" the authors calculated air-soil fugacity for selected substance to evaluate that regional re-evaporation from soil can be an important vector for atmospheric POPs. Generally, atmospheric POPs data generated from PAS might be with very high uncertainties more than what we can expect. Fugacity calculated based on such data set is very hard to guaranty the model results. Moreover, as it is a five-year program, it will be very helpful if the authors have collected the soil samples from 16 monitoring sites, and then they use the data from paired air/soil samples for fugacity calculation.

Both Figure 1 and 2 should be improved for publication.

Interactive comment on Atmos. Chem. Phys. Discuss., doi:10.5194/acp-2016-89, 2016.