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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Distribution and sources of bioaccumulative air pollutants at Mezquital Valley, Mexico, as reflected by the atmospheric plant *Tillandsia recurvata* L." *by* A. Zambrano García et al.

Anonymous Referee #2

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General comments

This paper reports biomonitoring measurements of metals, polycyclic aromatic hydrocarbons (PAHs), delta C-13 ratios, and delta N-15 ratios in an agricultural and industrial region outside of Mexico City. The use of plants as air pollution monitors is a very interesting concept. The sample collection and analytical methods are carefully described, and the research is presented in a clear, concise, well motivated manner. Major results include the spatial correlation of pollutants with sources and identification of sources using factor analysis. A few minor revisions, suggested below, will help strengthen the

paper.

Specific comments

1. (pp. 5811-5813) The introduction presents useful background on the region of the field study, the biomonitoring species used, and the pollutants analyzed, but it does not explicitly state the objectives of the research. Rather, it reads, "We report results. . ." (p. 5811, line 15) and summarizes what was done (p. 5813, lines 12-14). It would be useful to state the objectives, which seem to be to describe spatial patterns in concentrations of unregulated pollutants and to detect the major regional emission sources.

2. (p. 5812, lines 4-6) Interpretation of the results would be aided if this paragraph also mentioned what fraction of metals and other pollutants in this species have been shown to originate via uptake from the air versus uptake from water through the roots, if any.

3. (p. 5815, lines 5-7) "Prior chemical analyses, plant dead parts and extraneous materials like insects, feathers and spider webs were removed manually." What are "prior chemical analyses" that would need to be removed from the plants?

4. (p. 5819, line 22) In the description of Figure 2, which shows biomonitoring versus geological source concentrations of various metals, there is no explanation of why the fitted curve for agriculture soils is an exponential while it is a line for igneous rocks and limestone. Thus, comparison of the goodness-of-fit seems unfair.

5. (p. 5820, lines 9-12) The explanation of different MV:OC ratios < 1.0 is confusing. The other countries included more urban sites and should therefore have higher concentrations of anthropogenic elements.

6. (p. 5820, lines 23-25) The lower amount of high molecular weight PAHs is easily explained by their lower emission factors from sources and lower ambient concentrations compared to low and medium molecular weight PAHs. There are many papers in the literature that the authors can reference on this point.

7. (p. 5822, line 16) Indeed, delta C-13 and the Ni/V ratio are correlated. The authors should provide an explanation of why Ni/V is chosen for comparison and why it should be correlated with delta C-13.

8. (p. 5824, lines 20-22) The coefficients of variation in the text do not agree with those in Table 2.

9. (p. 5825, lines 8-9) It is unclear why the distance of Mixquiahauala is given as both 37 km and -37 km.

10. (p. 5827, line 29) Is it also possible that Factor 5, if it reflects large amounts of N compounds such as ammonium and nitrate, could be associated with secondary aerosol?

11. (p. 5840, Table 5) The column showing mean PAH concentrations in Mezquital Valley repeats information shown in Table 4 and is not needed.

12. (p. 5841, Table 6) The p-level should appear in its own column or should be associated with the difference, rather than with the south mean.

13. (p. 5842, Table 7) The numbers in this table contain an excessive amount of significant figures.

Technical corrections

14. (p. 5813, line 20) The population of “500 thousand” is more easily interpreted as “500,000.”

15. (p. 5814, line 12) “tiers” appears where “tires” is intended.

16. (pp. 5816-5817) Minor corrections to the English are needed, especially in the section on PAH analytical methods. Additionally, in this section, concentrations are listed as micrograms / milliliter, whereas elsewhere in the manuscript, engineering notation is used, i.e. exponent of -1 for the divisor.

17. (p. 5819, line 27; p. 5820, line 6) The abbreviation for ratio between the Mezquital Valley and other countries is “MW:OT” here but “MW:OC” in the corresponding table.

18. (p. 5822, line 13) “expected” is usually used in place of “expectable.”

19. (p. 5839, Table 4) The leftmost table header and the bottommost row should read “PAH” rather than “HAP.”

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 5809, 2009.