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**Interactive
comment**

Interactive comment on "Characteristics of total gaseous mercury (TGM) concentrations in an industrial complex in southern Korea: Impacts from local sources" *by* Yong-Seok Seo et al.

Anonymous Referee #2

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General Comments:

This study measured TGM concentrations in South Korea and analyzed seasonal and diurnal variations of TGM. They also used the statistics analysis to correlate TGM with other pollutants and meteorological data. They tried to identify the possible TGM sources using CPF, CBPF, and TPSCF models. They found that the nearby local sources are more significant than others. Over all, this paper meets the original contributions and contains unique TGM data nearby industrial areas. The authors performed the appropriate modeling approaches to identify possible mercury sources. However, the presentation quality doesn't meet the ACP's requirement. I suggest that the paper should be carefully revised and edited prior to publication on ACP.

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Discussion paper

Specific comments:

Introduction section contains too basic and out of dated information. I suggest adding some recent mercury inventory/modeling studies in East Asia. Result and discussion contains unnecessarily much literature review. More discussions are needed. The author used statistics analysis in many places. Please provide the type of analysis in this paper.

Here are details below.

Line 118 – 133: it should be combined into one paragraph.

Line 133: So what are their results in Kim et al. 2010? What did they find?

Line 146-151: it doesn't fit in material & method section. Please move to results & discussion section.

Line 156-157: need to explain how often manual injections were conducted.

Line 164: already used CPF in Line 163. Replace "Conditional Probability Function (CPF)" with "CPF"

Line 220 – 222 and line 230 – 233 are same.

Line 237: what is nij values here?

Line 272-275: Can the author provide recent TGM data from China and other country?

Line 285 and later: if the author mentioned p-value ($p < 0.01$ or $p < 0.05$), "statistically significantly" does not have to be addressed every time. Readers already know that the author performed statistical analysis.

Line 293: "as will be discussed later…." Can you indicate where and which section it was discussed?

This 5.4 section is for result and discussion. It includes too much literature review rather than discussion.

Line 346 – 348: can you explain what previous studies concluded about these diurnal variations? Needs more discussion.

Line 353: "as will be discussed later…." Indicate where and which section it was discussed? What is "this" mean here? Does "this" mean lower TGM in daytime?

Line 355 – 356 and line 369 – 370 are same. Please rephrase or rewrite.

Line 369 – 378: this paragraph is vague. Please clarify.

This 5.5 section also has too much literature review rather than discussion.

Line 381 – 385: this paragraph is the result from the section 5.4. Please move it to section 5.4.

Line 388 – 389: is this the only result from CPF model? Please explain the reason to adopt this model?

Line 391-393: Needs more detail explanations to clarify.

Line 434: is it "TPSCF"?

Line 434 – 436: the author mentioned that CPF only can provide high probabilities from the west of the site. Please delete the CPF in this sentence.

Line 436 – 437: same sentence as Line 412 – 413. Please rephrase or rewrite.