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Interactive comment on “Correlation slopes of GEM / CO, GEM / CO₂, and GEM / CH₄ and estimated mercury emissions in China, South Asia, Indochinese Peninsula, and Central Asia derived from observations in northwest and southwest China” by X. W. Fu et al.

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This is an interesting paper adding to the discussion on amount of mercury emissions, particularly in a gaseous elemental form, emitted from various sources in China. This is the region where emission of mercury is the highest compared to other parts of the world. Therefore, it is of particular importance to assess these emission in China as accurate and complete as possible. The reviewed paper contributes to this process.

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My major comment relates to the application of correlation slopes of GEM/CO₂, GEM/CO, and GEM/CH₄. I am a bit concerned with the value of such analysis. All four gases are emitted from different sources. The major sources of CO₂ and mercury is the combustion of fossil fuels in large power plants, mostly coal-fired power plants. The CO emissions are mostly generated in incomplete combustion processes, basically selected industrial processes with poor industrial installations. Methane has a completely different sources/ processes generating emissions, mainly fermentation processes. How the above mentioned ratios of these gases could serve to explain the amount of these emissions? Or even to be compared with the ratios of the same gases measured in certain receptors in different regions? The authors may wish to provide more explanation on this issue. Just to even complicate this issue, the two closest gases in the context of common emission sources, such as coal-fired power plants, namely CO₂ and GEM may not be that close in the whole coal energy sector. The point is that GEM emissions from coal-fired power plants are dependent on the type and efficiency of flue gas desulfurization installation (FGDs), while CO₂ emissions are not dependent on this factor. So, even within the coal energy sector one would expect rather large ranges of GEM/ CO₂ ratios. How to use this information for the assessment of GEM emissions from this sector in various regions of Asia or the world? Some more discussion on this application shall be added in the paper with explanation of limitations in such application.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 24985, 2014.

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