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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Bimodal variation in mercury wet deposition to the coastal zone of the southern Baltic" *by* P. Siudek et al.

Anonymous Referee #1

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General Comments: The purpose of this research is not clear. Clarify the aim of this paper in the Introduction. "Introduction" is too long. This study collected valuable long-term Hg data of wet deposition, but detailed analysis of Hg cycle is rather deficient. For instance, based on air mass trajectory or wind direction (e.g., wind sectors), characteristics of Hg concentration (including Hg(II)) in rain between continental air mass (polluted) and marine air mass (clean air mass) can be analyzed in detail. Precipitation amount (monthly and yearly) should be included in the analysis which is key information of wet deposition rate. In addition, difference in Hg flux for both air masses can be further analyzed. Relation between elemental (or total) mercury and Hg(II) for each air mass can be characterized. Clarify the bimodal characteristic in the main text whether it is in Hg concentration or wet deposition rate of Hg. Discussion on seasonal and monthly distribution of Hg(II) was recommended to be included. Is there any difference

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of total Hg concentration (and Hg(II)) in precipitation between snowfall and rainfall? In other words, different Hg chemistry? In Figs 3 and 4, information on relative fraction of Hg(II) to total Hg can provide valuable analysis of Hg chemistry such as Hg transformation in aqueous chemistry of Hg. In Figs 5 and 6, Hg(II) concentration is recommended to be included.

Specific Comments 1) Abstract: "wet deposition value of 28.9 ug m-2" is annual value? insert time unit. 2) Page 22775, line 3: "4500-5000 tons a-1", use SI unit. 3) Page 22775, line 25: "about 1.5-1.4 ng m-3", check the range 4) Page 22776, lines 4-6: insert the references. 5) Page 22776, lines 6-9: Sentences are unclear, the deposition value without AMDE is lower. Check the number 6) Page 22777, lines 1-5: insert the references. 7) Page 22777, line 13: what is difference between sea salts and marine aerosols? 8) Page 22777, line 18: “a four scale” means “4 orders of magnitude”? 9) Page 22778, line 1: Contamination by mercury is also affected by the strength of emission sources. 10) Page 22779, line 9: Fig.1, indicate the measurement site in the Fig. 11) Page 22779, line 13: Typo, in to -> into 12) Page 22779, line 18: “average month temperature” -> average monthly temperature. 13) Page 22780, line 7: what is the unit of detection limit? 0.5 pg per liter? 14) Page 22782, line 16: In Fig. 2, rainfall intensity is recommended to be included for better understanding the results. In y-axis, the unit “ng L-1 month-1”, delete month-1. 15) Page 22782, lines 21- : include discussion on seasonal distribution of Hg(II). 16) Page 22784, line 12: Spell out TPM. 17) Page 22784, line 15: Spell out 3 t 18) Page 22784, Fig 4: Relative fraction Hg(II) to total Hg can provide more important information on relation Hg(II) to pH in terms of air mass characteristics (polluted vs clean). In addition, statistical analysis between pH and Hg(II) concentration is recommended to be included. 19) Page 22787, lines 15-16: Provide summary table for total Hg and Hg(II) with heights of inflowing air mass. 20) Page 22787, line 20: Table 3 is omitted.

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 22773, 2009.