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Interactive comment on "Spatio-temporal assessment of the PCB sediment contamination in the four main French River Basins (1945–2018)" *by* André-Marie Dendievel et al.

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Numbers in brackets refer to the line number.

General comments This study attempts summarizing sediment contamination data for a long period of time, and at a large spatial scale, from very different sources, which is quite challenging. Some findings, such as the relative importance of the Rhone and Seine Rivers for the Mediterranean Sea and the English Channel, are not that new, but the broad perspective of the study is certainly interesting. In my view, this article is worth publishing after revision (see specific comments below).

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Discussion paper

Specific comments I. Data handling and management: indeed, as stressed by the authors, quality control is a major challenge in this kind of study. I am afraid that this challenge was not addressed properly, on several aspects: - (111) compiling data from different sources (databases) was indeed a necessity, raising accordingly the possibility of having duplicates in the final datasets. There is in particular a concern regarding item b (database from the National Action Plan): these data are presumably also recorded in the Naïades database, as they were originally extracted from Water agencies monitoring records. Did you check for duplicates? - (156) LOQ for the sum of congeners is not equivalent to the sum of individual LOQs, but rather to the LOQ for one congener, or the highest LOQ among all congeners if they have different LOQ values. If the concentrations of six congeners were below their respective LOQs, and the concentration of the 7th would be > LOQ, ÆľPCBi would be at least above the LOQ of this 7th congener, while still below the sum of LOQs. This seems weird . . . - Two kinds of ÆľPCBi are considered as valid and selected by the authors (157-166): (i) when all seven congeners > LOQs (simple case), and (ii) when only highly chlorinated congeners are >LOQ, ÆľPCBi is estimated according to equation (1), where censored values are replaced by an estimate derived from the mean proportion of these highly chlorinated congeners in uncensored samples. This cannot at all maximize the robustness, as claimed by the authors, it is the opposite (Helsel, 2006). There are better much options for summing non-detects, as explained in (Helsel, 2010). - A brief description of the characteristics of the dataset would be useful. - (219) The Wilcoxon paired test seems sufficient for comparing both groups of matrices; graphical comparison is not a robust approach. II. There are too many figures, and not all are useful (e.g. Figure 2, Figure 4 could be skipped). Furthermore, Figure 3 is almost impossible to read and understand as a whole and does not help the reader to follow the arguments. Scales are not systematically comparable, so the benefit of having all this information summarized on the figure is hampered by the precautions that has to be made when looking at the figure. I suggest to alleviate the figure, remove some parts of it and put it in annex, allowing to enlarge the scales of the remaining parts. III. Section 3.1 –

typology: the different kinds of sediment data were put together in two groups, either “deposited” or “mobile”. This seems a good idea, for the sake of statistical robustness. Nevertheless, the rationale behind the assignment of sub-categories into one group or the other could be made clearer. More specifically, a probably significant amount of dredged sediments in the Rhone River originate from more or less recent deposits in critical locations of the waterways (e.g. locks). Should these materials be considered as mobile instead of deposited? It seems somewhat surprising that the contamination level does not differ between the two groups; how much the grouping rationale does influence this result? IV. Section 3.4: - (295-300) “Part of this increase might be due to the Eure river”; the figure 3 (c and d) is somewhat difficult to read, due to the respective sizes, but it seems that most of the PCB contaminated sites (3d) are located well upstream from the confluence of the Seine river with this tributary. Are there some specific arguments justifying this statement? Why not assigning also elevated PCB concentrations in the estuary to long term fine sediment particle transport from the Paris area? - (305-306) decreasing trend of ÆľPCBi in the lower Rhone River section: does this statement result from a statistical test? This trend seems doubtful, considering the median concentration in the last two river sections. (respectively 32 $\pm$ 24 μg kg-1 and 24 $\pm$ 18 μg kg-1). - (313-320) “. . . PCB contaminated sites are reported along the rivers . . .” sounds somewhat ambiguous, according to the current title which refers to catchments. Among the sources that are mentioned, PCB production should not be omitted; one of the two historical French production sites is located in the Rhone River basin. This remark could also be accounted for in the discussion (section 4.1, 355-372) V. Sections 4.1 and 4.2 are quite redundant; moreover, Fig. 5 seems more illustrative than Fig. 4 (which could be deleted or skipped to the annex).

Technical issues 1. A thorough language edition is recommended. Among others, repeated mistake “upstream (or downstream) from ...”; inappropriate use of articles, and so on. 2. Title: suggestion “Spatio-temporal trend assessment of PCB contamination in four major French rivers (1945-2018)” 3. When expressing units (either concentrations or flows and so on), the dot should be avoided: for instance, “ng g-1” is correct, not

"ng.g-1" (https://www.bipm.org/en/publications/si-brochure/) 4. Abstract: (34) "highest" rather than "biggest"; (37) "provide a major supply" is unclear. 5. Keywords: the term "pollution trajectories" seems useless as keyword (not found as such in bibliographic databases). It is not clear whether this term refer to the temporal trends of PCB concentrations, or to their downward transport. 6. Introduction: (45) confusing chronology: "a concern as early as in the 1970s . . . PCBs were then used as heat transfer fluid". The PCB use as heat transfer fluid was a major use well before the 70s. (65) "compared sediment and biota concentrations" was this comparison the actual purpose of these studies? Be more specific. 7. (101-102): misleading and erroneous term "regulatory water agencies". Suggestion to rephrase ". . . and monitored for regulatory purposes". 8. (157) PCB-28; (160) apparently a word missing: "we corrected the sample results where only high-chlorinated congeners . . . were > LOQs" (without this word, the sentence does not make sense). 9. (219) word missing: graphical comparison (?); please refer also to my comment in the previous section. 10. (330) Why "theoretical production trend"? PCB production along several decades is not a theory, it is a fact. I suggest to replace this inappropriate wording by "estimated production inventory". 11. (400-402) this writing sounds weird: "current river sediment concentrations exceed health-based benchmarks for freshwater fish consumption". Moreover, the so-called fish consumption benchmark was updated after the cited publications (Vigreux-Besret et al., 2015) 12. Figure 6 legend: improper term "dashed rectangles". 13. Table 1: wrong spelling "Budzinski".

References cited Helsel DR (2006). Fabricating data: How substituting values for nondetects can ruin results, and what can be done about it. Chemosphere, 65 : 2434-2439. Helsel DR (2010). Summing nondetects: Incorporating low-level contaminants in risk assessment. Integr Environ Assess Manag, 6 : 361-366. Vigreux-Besret C, Rivière G, Feidt C, Amiard J-C, Babut M, Badot P-M, Blanchemanche S, Camel V, Le Bizec B, Narbonne J-F, Roudot A, Vernoux J-P, Volatier J-L, Mahé A, Desvignes V (2015). Consommation de poissons d'eau douce et PCB : aspects réglementaires, méthodologiques et sanitaires. Avis de l'Anses - Rapport d'expertise collective, Agence

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