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9 Questions with WRG authors

Title of the paper: Distribution of perfluorinated compounds (PFASs) in the aquatic environment of the industrially polluted Vaal River, South Africa

Journal: The Science of the Total Environment

Authors: **T. Groffen**, V. Wepener, W. Malherbe & L. Bervoets

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Prof. Victor Wepener

1. What previous work was integral to the new study?

We have been working on ecotoxicological aspects of the Vaal River system for the past 10 years. These studies were initiated as part of an interdisciplinary study commissioned by the Department of Water and Sanitation, Randwater and SASOL to determine the causes of mass fish mortalities in the Vaal Barrage. The sites selected for the study that is reported in the paper were the same as those used previously for studies on levels of organochlorines in fish from the Vaal River system. The Vaal River is once again in the news with increased fish mortalities occurring downstream of the Barrage.

Q&A WITH AUTHORS

2. Why do you care about this particular subject?

The Vaal River does not only supply water to the industrial and economic heartland of South Africa but also receives all the waste water produced by this large urban sprawl. This makes the system a hot spot for diffuse and point source release of a wide variety of traditional and emerging contaminants. Notwithstanding the exposure to these stressors the Vaal River is an example of a highly resilient ecosystem and surprisingly still supports a strong ecological infrastructure.

3. Did any of the findings surprise you?

We expected that the Vaal Barrage site, which is directly downstream from the main tributaries that drain the industrial regions of Johannesburg, Ekurhuleni and the Vaal Triangle, would have the highest perfluorinated compounds (PFAS). However, what was surprising was that the highest levels in water (Fischgat) and sediments (Thabela Thabang) were recorded upstream and downstream of the Barrage respectively.

4. What are some of the limitations of this study?

In future we would like to increase the sample size and expand on the invertebrates that were collected for the study. This would give us a better indication of trophic interactions.

5. Do you expect these findings to be controversial in your field?

No, however the study does show that PFAS levels in fish are comparable to other largely industrialized regions, e.g. China and the USA.

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6. What are the broader implications of these findings?

These data are the first PFAS levels reported in the Vaal River system biota and can serve as a reference for future studies. Due to the limited analytical capabilities in South Africa, it is however unfortunately extremely unlikely that PFASs will be included in routine monitoring programmes.

7. What do people usually get wrong about this subject?

All too often high levels of pollutants are linked to environmental episodes such as the recent fish kills. The golden rule that correlation is not necessarily causation should be applied. Just measuring levels of different contaminants in abiotic and biotic compartments is not enough. Studies should endeavour to link the exposures to clear biological effects.

8. Looking back on the study, what were some of the most memorable moments for you and your colleagues?

This study is another output of a very long-term and fruitful research collaboration that we have with the University of Antwerp (Belgium). The data from this study formed part of the Master's degree of the first author, Thimo Groffen.

9. What are you working on next?

We are currently working in the Phongolo River floodplain where we are linking DDT exposure in a wide range of aquatic and terrestrial species to biological effects.

Thank you for your time, Prof. Victor!

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