

REEVALUATION OF THE MONITORING DATA OF TRIBUTYLTIN COMPOUNDS (TBT) IN SEDIMENT OF JAPAN TO CONFIRM AND EVALUATE THE EFFECTS OF DIFFERENT KINDS OF DATA CALCULATING METHODS

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Abstract

Ministry of the Environment in Japan has published the monitoring results of chemical substance persistent condition in Japan as “The Chemicals in the Environment” since 1974. And many persistent organic pollutants (POPs) were involved as target chemicals. We reevaluated the data of Tributyltin compounds(TBT) which is assumed the same category of the Persistent Organic Pollutants (POPs) using not only geometrical mean method but also the 50 percentiles method as the raw data calculating method. At the results, we have some small differences between two methods which are negligible, and have almost the same shapes of two TBT trend monitoring by geometrical mean method and by the 50 percentiles method. Hence we consider that the geometrical mean is one of the proper methods to explain the monitoring of TBT.

Introduction

Yoshitoku Yoshida had worked as a public servant in the Ministry of the Environment in Japan from fiscal year 2006 to fiscal year 2007. At that time he was in charge of the environmental survey and monitoring of chemicals in both Japan and the East Asian region. During that time he had chances to participate in the 24th and 25th International Symposia on Halogenated Persistent Organic Pollutants (Dioxin 2004 and 2005) to introduce Japanese activities about the environmental survey and monitoring of chemicals including the POPs and relative compounds¹⁻³.

Recently The Central Environment Council of the Ministry of the Environment in Japan recommended that the monitoring results should be considered how to present, for instance it should be presented using not only the geometrical mean method but also the 50 percentiles method as the raw data calculating methods because of avoiding the effect of correction by adding the half of the Quantitation of Limit (QL) in the case of the data is

not detectable. But this trial has not yet been done by the Ministry of the Environment in Japan without any reasons.

On the other hand, in 2007 Statistics Law in Japan was amended to promote the usage of the raw data which were provided by the Central Government more and more in all fields including the academic field.

Therefore we tried to reevaluate the data of TBT in sediment of Japan as the representative of POPs and related compounds using both of the raw data calculating methods and confirm the effectiveness of 50 percentiles method as one of the raw data calculating methods.

Materials and Methods

The raw data of TBT in Sediments of Japan from fiscal year 1988 to fiscal year 2005 were collected by “The Chemicals in the Environment” which was published⁴ and is available on the homepage of the Ministry of the Environment in Japan as well. The reevaluation was conducted by using 50 percentiles as well as by using geometrical mean as the raw data calculating method. Sample size was minimum 90 and maximum 108 from 1988 to 2005 excluding 2004.

Results and Discussion

We have some small characteristic differences of TBT trends between geometrical mean and the 50 percentiles as shown in Figure 1. The decreasing slope of data by geometrical mean is milder than that of 50 percentiles. But the shapes of both line charts are very similar. For instance the highest pick is the data of 1990, and the second highest pick is the data of 1994.

The decreasing amount of TBT was started from 1990. In 1986 the Law Concerning the Examination and Regulation of Manufacture, etc of Chemical Substances was amended in terms of importance of persistence characteristic of chemicals. First of all the regulation of TBT was initiated by the Fishery Agency from 1986 based on the result of “The Chemicals in the Environment” by Ministry of Environment in Japan. In 1990 Japan’s government acted the strong countermeasure against the TBT such as to ban the usage of these compounds as anti-foulant paints. These effects were reflected on the both figures which were drawn by two calculating methods.

Quantitation of Limit (QL) is about 10 forth between till 2001 and after 2001 by the improvement of analytical method, but the correction of adding the half of the QL is not so effected to the shapes of both two figures. This is because the measured raw data in each measuring spot are so large that they affect to the shapes more critically and severely than QL correction.

Therefore we consider that the geometrical mean evaluation method is one of the useful methods to explain the monitoring of TBT persistent condition through Japan.

References

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Fig. 1 Annual change of TBT in sediment of Japan using by geometrical mean method and the 50 percentiles method

