

Calculated mercury deposition in north of Lake Biwa

Naoko Hishida^{1*}, NAGAFUCHI, Osamu², OSAKA, Ken'ichi², MIYAKE, Takayuki²

¹Environmental Science Graduate School, the University of Shiga Prefecture, ²the University of Shiga Prefecture

Gaseous elemental mercury (GEM) account for above 95% out of the atmosphere of mercury, have the property that is hard to dissolve in water and circulates through the whole earth with the atmosphere. GEM becomes reactive gaseous mercury (RGM) that is easy to dissolve in water by the oxidation, and it is removed by deposition from the atmosphere with particle-mercury (p-Hg). Therefore mercury concentration in precipitation may elevate at the place apart from the mercury emission source. Furthermore, mercury removed from all over the atmosphere by deposition is in aquatic area and bioaccumulates in the process of the food chain. In this study, it was intended that calculated mercury deposition from mercury concentration in precipitation in north of Lake Biwa.

Sampling site is Surumi in north of Shiga prefecture there is annual mean precipitation 2800mm and classified in the heavy snowfall area. Two forms samplers, one is automatic rain sampler for researched a change of the mercury concentration in precipitation in one rain, and one is bulk deposit sampler for calculated mercury deposition in here. Automatic rain sampler developed so that every fixed quantity collected precipitation (as for every 5mm). Precipitation sampling was conducted from June to November, 2011 and from March to November, 2012. Sampling was not able to observe it for the snow in the winter season (from December to February). From July, 2012, samples were filtered by PTFE filter, and measured by alkali reduction cold vapor atomic fluorescence spectrometry.

It was 29 rain that samples were collected by September, 2012, and the total mercury concentration in precipitation fluctuated from 1.09 to 25.9 ng/L, and mean was 7.15 ± 5.31 ng/L. Pattern that became least concentration to begin to fall was frequent, but total mercury concentrations change in one rain did not showed constant pattern. By the precipitation with the typhoon of September, 2011, total mercury concentration in precipitation gradually rose. When rain cloud arrived at Surumi through mercury emission areas, mercury concentration rises. It is thought that the change of the mercury concentration in precipitation is related to the passage course of the rain cloud. In addition, mercury deposition that calculated from bulk deposit samples became 19.7 g/km²/year (from September, 2011 to August, 2012).

Keywords: mercury, deposition, Lake Biwa