

Monitoring on atmospheric mercury concentration by Carbonized passive sampler
-Comparison of the Tokyo metropolitan area and Hokkaidou-

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[Introduction]

Mercury in atmosphere is typically measured as three fractions : Hg⁰(Gaseous elemental mercury), Hg²⁺(gaseous oxidized mercury) and Hg-p (particulate bound mercury). Hg⁰ is the prevalent form in the atmosphere, consisting of >95% of the total mercury. Due to its volatility and chemical stability Hg⁰ can circulate in the atmosphere for 1~2 years, allowing its wide dispersion and long distance transportation. Monitoring on atmospheric mercury in Japan has started since 1997 year and at the moment, >300 points monitoring stations research atmospheric mercury by active sampler (gold amalgam method). But measuring frequency is once monthly and different sampling day. And It's difficult for active sampler research at remote point because needs electric power.

In this research, We developed carbonized passive sampler and research atmospheric mercury at Hokkaidou, Gunma, Saitama and Yamanashi.

[Method]

Developed carbonized passive sampler was set at Horikawauchi, Hokkaidou (Uryuu experimental forest), Sapporo, Hokkaidou (Hokkaidou Univ), Kumagaya, Saitama (Rissho Univ), Kazo, Saitama (Center for environmental Science, Saitama), Nakanojou, Gunma and Nirasaki, Yamanashi. Sampling period was Jun/2014~Aug/2015. Moreover, Active sampler was set at Kumagaya and Kazo at the same time carbonized passive sampler sampling period.

[Result]

Relation between integrate atmospheric mercury concentration (M) and Carbonized passive sampler (P) was $M=0.003P+0.06$ ($r=0.09$, $n=20$). We used it equation to convert quantity of mercury adsorption in the carbonized passive sampler to atmospheric mercury concentration. Every points mercury concentration were 0.1~1.3ng/m³ at the Horikawauchi, 0.6~1.5ng/m³ at the Sapporo, 0.2~1.4ng/m³ at the Nakanojou, 1.7~3.1ng/m³ at the Kumagaya, 1.9~2.9ng/m³ at the Kazo and 0.4~1.8ng/m³ at the Nirasaki. Kumagaya and Kazo were same level as Japanese average of atmospheric mercury concentration (about 2.3ng/m³) and, Other points were little lower than North American and European remote area (1.5~1.7ng/m³).

Keywords: Monitoring on atmosphere, Carbonized passive sampler, mercury