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The characteristics of mercury deposition on to forest ecosystem observed in Yakushima Island

YOSHIDA, Akifumi[1*] ; NAGAFUCHI, Osamu[2] ; YOKOTA, Kuriko[4] ; NAKAZAWA, Koyomi[3] ; OSAKA, Ken'ichi[2] ; TETUKA, Kenshi[5] ; TETUKA, Tatuko[5] ; KITABUCHI, Hiroyuki[1]

[1]Environmental Science Graduate school, University of Shiga Prefecture, [2]University of Shiga Prefecture, [3]Division of Environmental Science, University of Shiga prefecture, [4]Toyohashi University of Technology, [5]Society of Yakushimaology

Mercury (Hg) is a global pollutant that affects human and ecosystem health. Atmospheric Hg can be removed from the atmosphere by wet or dry deposition. Many studies suggest that the interactions between atmospheric Hg and the forest canopy may be a key process influencing Hg input to forested watersheds. These studies are mainly conducted in Europe, however, only a few studies were reported in Asian monsoonal area. The characteristics of the seasonal variation of a precipitation is different between Asian monsoonal area and Europe region, i.e., there is a rainy season (June-July) and typhoon season (July-September) in Asian monsoonal area. It has been reported that the most of atmospheric mercury is supplied as a wet deposition. Therefore, it is important to evaluate the characteristics of Hg atmospheric deposition in Asian monsoonal area. Yakushima island has more than 8,000 mm of annual precipitation. Therefore, it is suitable site to evaluate the mercury dynamics in the forest ecosystem.

Study sites are located at a height of 200 m and 1600 m above sea level of the broad-leaved evergreen forest in the western area of Yakushima Island, respectively. In 200 m experimental site, the experiment was conducted at a 100 m x 100 m experimental site around the observation tower. We installed automatic rain samplers which can collect rain water every 10 mm precipitation, bulk deposit samplers (within canopy and without canopy) and groundwater collecting devise, respectively. In addition, we sampled stream water which flow down near the observation tower. In 1600 m experimental site, we installed automatic rain samplers. These experiments are conducted during 2011-2014 sampling campaign and each samples are collected once a month basis. Hg, major ions, and DOC were analyzed. From these result we will discuss the characteristics of Hg deposition in Yakushima Island.

Keywords: Yakusima, mercury, forest ecosystem, Asia monsoon, precipitation