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Deposition characteristics of fog in mountainous region

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Context/Purpose: Fog is formed frequently and deposited as throughfall on mountainous regions, but the deposition properties have not been fully clarified because of the observation difficulties in the regions. In this paper, we discuss the deposition properties of fog with the results of some observation instruments and the collection characteristics of passive fog sampler.
Methods: We have collected fog, rain, and throughfall samples in Mt. Oyama (1252m) situated at the southwest of Tokyo. Fog is also observed by cameras at the base and the summit of the mountain and a visibility meter at the summit. Passive fog samplers were placed not only in the mountain but also on the roof of our university and the components of the collected samples was analyzed. Weather phenomena were also observed in the mountain and the university.
Results/Interpretation: In our sampling site, fog is formed about 30% of a year at the summit, while fog is rarely formed at the hillside of 680 m altitude. The precipitation of throughfall at the summit and that on 680 m altitude under cedar trees have been observed and their difference has a good correlation between the fog sample amount collected by the fog sampler at the summit. We have collected water samples by the passive collector in our university, although fog events have not been observed there. The sample composition resembles to that of drizzle in the same sampling site, and then, passive fog sampler collects not only fog but also drizzle. We have observed fog events by three instruments, but the data were different to each other. The camera at the base overestimates the fog event frequency because of 8 km distance from the summit. The fog frequency data obtained by visibility meter sometimes different to that obtained by the observation of the camera at the summit because fog is sometimes covered at the limited site of the summit and the thickness of the fog layer is thinner than the definition of fog, 1 km, or fog covered upper side of the mountain but the summit is locally clear as a hollow.
Conclusion: Passive fog collectors collect not only fog water but also drizzle. Fog is formed frequently at mountainside and sometimes limited partially in a mountain.