

### 3.100 Bi-directional air-surface exchange of ammonia in a cool-temperate forest in northern Japan.

Early Career Scientist

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Abstract:

Atmospheric ammonia ( $\text{NH}_3$ ) is one of the important components that affect nitrogen saturation of forest ecosystems and eutrophication of rivers and lakes. Since the  $\text{NH}_3$  exchange over vegetated surface is known to be bi-directional as shown in a number of studies of flux measurements in Europe and North America, it is difficult to evaluate the dry deposition. On the other hands, there have been some studies in Asia. To investigate the air-forest  $\text{NH}_3$  exchange process over the forest and the applicability of the previous knowledge to Japanese forest, we measured the vertical profiles of  $\text{NH}_3$  and relevant components in a cool-temperate forest in northern Japan from 21 July to 5 August in 2017. The filter pack method was used to collect  $\text{NH}_3$  and aerosols.  $\text{NH}_3$  was collected on the phosphoric acid impregnated filters placed downstream of the quartz fiber filters for aerosols. During the observation period, we made the daily sampling using the filter holders at four heights of 0.1, 2, 8 and 16m at the observation tower over and within forest canopies and dwarf bamboo of 6 and 1.5m, respectively. At 0.1 m, 2 sets of filter holder were installed inside and outside of the dwarf bamboo, respectively. Both  $\text{NH}_3$  emissions and depositions were found during the observation. Some variations between depositions and emissions were associated with precipitation events. From the measurements at 0.1 m in height,  $\text{NH}_3$  concentrations inside the dwarf bamboo were almost always higher than that of its outside. Significant emissions were found when the concentration inside the dwarf bamboo was higher than the outside. Applications of a bi-directional  $\text{NH}_3$  exchange model to the observations were attempted.