

3.146 Sequential changes of airborne microbial communities emitted from forest ground surface in Fukushima.

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Abstract:

The aerosols emitted from forest areas include not only abiotic particles but also airborne biological particles, such as fungal and bacterial cells, which act as ice nuclei and impact on ice-cloud formation processes. However, the detail sequential changes of airborne microbial communities in forest area are have not investigated in detail. Here aerosols were collected at the altitude of 1.5 m above the ground surface at the inside and outside sites of forest area in Fukushima from Spring to Autumns. Under the microscopic observation with DNA staining technique, the biological aerosols could be categorized to fungal spores and bacterial cells. The microbial particles in the air samples of outside and inside sites constantly fluctuated the similar densities ranging from 10^4 particles m^{-3} to 10^6 particles m^{-3} . Exceptionally, at one day after rain, the bacterial particles at the inside of forest area increased to 10^7 particles m^{-3} . High-throughput sequencing technology targeting 16S rRNA genes revealed that the bacterial communities in the both sites exhibited higher diversities and were frequently composed of plant-associated bacteria (Proteobacteria) and terrestrial bacteria (Actinobacteria). The organic aggregated bacterial members (Bacteroidetes) were also detected at the specific to spring and summer. Additionally, in the case of the analyses using internal transcribed spacer (ITS) sequences, the fugal community structures in the both sites were relatively dominated by the members of Basidiomycota, which were related to organic matters-degrading mushroom. The airborne microbial communities are thought to be mixed between the outside and inside of forest areas and would be originated from the forest environmental and/or organic-associated microorganisms.