INFLUENCES OF TOURISM ACTIVITY ON AIR POLLUTION IN SIEM REAP AND ANGKOR MONUMENT PARK, CAMBODIA

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ABSTRACT

Influences of the Angkor tourism, which has been growing drastically during the last decade (from 5 ~ 6 thousands of tourists in 1993 to more than 1.5 million in 2008), on the atmospheric environment in this area were discussed based on the continuous monitoring of air pollutants, such as PM, NO₂ and SO₂ at several sampling sites in Siem Reap and Angkor Monument Park, Cambodia during 2005 - 2008. PAHs and other chemical components in total suspended particulates (TSP) were analyzed to discuss the contribution of possible emission sources. Daytime and night time samplings of PM10/2.5/1 particles as well as TSP and VOC were conducted in selected seasons to discuss day-night differences in emission sources and influences of the height of mixing layer. Pollutants from suspected emission sources, such as automobiles and diesel generators used in hotels and wood burning smoke, were sampled and particle-bound PAHs were analyzed for inventory data. Census of traffic along a main street in Siem Reap and the interview to hotels to obtain the information of capacity of generators and their pattern of use as a function of time and season were also conducted. Meteorological data in a typical site in the monument park, which is important to discuss the transportation of pollutants from the city area to surrounding monument area have been continuously monitored and the temperature distribution over the monument park was measured to discuss a cooling effect of the dense forest and a relation between the land use and air pollution.

The monthly average concentration of total suspended particles (TSP) at every sampling location showed a maximum peak in February and linearly increased with the number of tourists to Siem Reap. PAHs concentration also increased as similar to TSP, suggesting clear influences from tourism activities to the environmental load.

Keywords: tourism, environmental load, air pollutants, PM, PAHs, emission inventory, seasonal change
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