



## Non-point sources analyses in paved areas using statistical methods: case study of vortex type

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### ABSTRACT

During a dry period, many kinds of pollutants are accumulated on the surface of paved roadways, and these are swept into nearby waterways when rain falls. Particularly when the pollutants are toxic heavy metals, the damage they cause to the water system could be significant. This study evaluated the removal efficiency of vortex-type treatment facilities in Yongin City, Gyeonggi Province, South Korea, over a 2-y period from 2006 to 2007. Grain-size analyses of Zn, Pb, and Cd, which are particulate materials and heavy metals, were also conducted. Monitoring results showed removal efficiencies ranging from 9% to 65% for TSS, 0–55% for BOD, 1–58% for TN and 1–68% for TP. In addition, analyses of the correlation between removal efficiency and precipitation characteristics by pollutant type showed that particulate materials have a high correlation with nutrient materials and heavy metals, while organic materials and nutrient materials also have a high correlation. A grain-size analysis of 1–100 µm diameter particles showed that fine particles contain large amounts of Zn and Pb, which are heavy metals.

*Keywords:* Event mean concentration (EMC); Non-point sources; Removal efficiency; Vortex-type; First-flush effect; Correlation coefficient; Grain-size analysis

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