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MODELING OF PERMEABLE PAVEMENTS FOR TREATMENT OF URBAN RUNOFF USING SELF-ORGANIZING MAPS

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Abstract

Kohonen Self-organizing map (KSOM) modeling have been applied increasingly for analysis, estimation and prediction of several water quality processes, which are embedded with high complexity, dynamism and non-linearity. KSOM or unsupervised neural networks were applied to microbial data (*Escherichia coli*, faecal streptococci, and total coliforms) from the effluent of a two year data set (2008-2010) on two permeable (pervious) pavement systems used to treat storm water runoff contaminated with gully pot liquor and faecal matter from dogs. The KSOM models can reduce time-consuming and expensive microbial water quality analysis by the use of alternative parameters, which are faster and easier for measurement. The results suggest that the selected microbial pathogens can be efficiently estimated by applications of machine learning tools such as KSOM with input variables including temperature, pH, conductivity, total dissolved solids, suspended solids, turbidity and chemical oxygen demand (COD), which can be monitored in real time. The application of KSOM is simple, computationally efficient and highly accurate for predicting the effluent concentrations for these microbial pollutants. A methodology based on KSOM is proposed as a tool in aiding decision makers for sustainable storm water management.

Key words: faecal pollution, geothermal heat pump, Kohonen neural network, permeable pavement, storm water reuse

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