



Time series models for prediction the total and dissolved heavy metals concentration in road runoff and soil solution of roadside embankments

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Highways and main roads are potential sources of contamination for the surrounding environment. High traffic rates result in elevated heavy metal concentrations in road runoff, soil and water seepage, which has attracted much attention in the recent past.

Prediction of heavy metals transfer near the roadside into deeper soil layers are very important to prevent the groundwater pollution. This study was carried out on data of a number of lysimeters which were installed along the A115 highway (Germany) with a mean daily traffic of 90.000 vehicles per day. Three polyethylene (PE) lysimeters were installed at the A115 highway. They have the following dimensions: length 150 cm, width 100 cm, height 60 cm. The lysimeters were filled with different soil materials, which were recently used for embankment construction in Germany.

With the obtained data, we will develop a time series analysis model to predict total and dissolved metal concentration in road runoff and in soil solution of the roadside embankments. The time series consisted of monthly measurements of heavy metals and was transformed to a stationary situation. Subsequently, the transformed data will be used to conduct analyses in the time domain in order to obtain the parameters of a seasonal autoregressive integrated moving average (ARIMA) model. Four phase approaches for identifying and fitting ARIMA models will be used: identification, parameter estimation, diagnostic checking, and forecasting. An automatic selection criterion, such as the Akaike information criterion, will use to enhance this flexible approach to model building