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Including Land Use Information for the Spatial Estimation of Groundwater Quality Parameters – 2. Interpolation Methods, Results, and Comparison

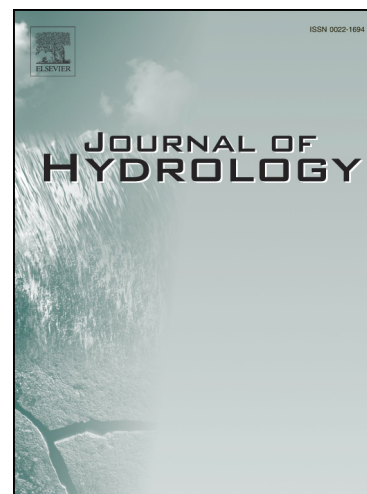
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1 Including Land Use Information for the Spatial
2 Estimation of Groundwater Quality Parameters –
3 2. Interpolation Methods, Results, and Comparison.

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10 **Abstract**

11 Two dominant processes determine solute concentration in groundwater:
12 vertical infiltration and horizontal advection. The goal of this paper is to in-
13 corporate both processes into a geostatistical model for spatial estimation of
14 solute concentrations in groundwater. A multivariate copula-based method-
15 ology is demonstrated that considers infiltration via the marginal distribution
16 and solute transport via the multivariate spatial dependence structure.

17 The novel approach is compared to traditional methods as Ordinary- and
18 External Drift Kriging. Leave-one-out cross-validation demonstrates that
19 the novel approach estimates better both in concentration and in probability
20 space, and improves the quantification and quality of uncertainty. The gain
21 in uncertainty reduction is equivalent to at least a few hundred additional
22 observations when Ordinary Kriging was used.

23 Both censored and not-censored measurements are included. An ideal
24 neighborhood size is estimated via cross-validation. The methodology is
25 general and can incorporate other kinds of secondary information. It can be

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