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Triple diagram model of level fluctuations in Lake Van, Turkey

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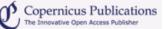
Abstract. This paper presents a triple diagram method (TDM) based on the Kriging technique for predicting future lake levels from two antecedent measurements, which are considered as independent variables. The experimental semivariograms (SV) for three lags are obtained, and the most suitable theoretical SV for the three cases is the Gaussian type. Based on these theoretical SVs, the contour lines of the dependent variable are constructed by Kriging. The resulting maps are referred to as the TDM model for lake level fluctuation. It is expected that this model will be used more extensively than the Markov or ARIMA (AutoRegressive Integrated Moving Average) models commonly available for stochastic modelling and predictions. The TDM does not have restrictive assumptions such as the stationarity and ergodicity which are preliminary requirements for the stochastic modelling. The TDM is applied to monthly level fluctuations of Lake Van in eastern Turkey. In the prediction procedure lags, one, two and three are considered. Interpretations from these three basic diagrams help to identify properties of lake level fluctuations. It is observed that the TDM preserves the statistical properties. These diagrams also help to make predictions with less than 10 % relative error.

Keywords: fluctuation, hydrologic budget, lake level, Kriging, prediction

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