

Abstract

Water quality in the European Union is subject to legislation through some Directives which are applicable in all Member States. Those Directives specify a set of physical and chemical characteristics, which depend on the use the water is intended for, the parameters to be regularly controlled in a network of sampling points, and the limiting values of those parameters for each quality level. Hence, an administrative quality classification for each sampling point is obtained. This paper proposes a stochastic quality index that takes into account the uncertainty surrounding the quality classification still remaining after the data have been observed. This stochastic index is built with the probability classification vector of each parameter. In order to obtain those vectors, a Mixed-Lognormal model is introduced and its statistical analysis developed. The methodology proposed here is then applied to the data observed in the La Presa station, one of the sampling points of the Spanish surface water quality network. Located on the river Turia, near the city of Valencia, its aim is to control the quality of water intended for the abstraction of drinking water. Its stochastic quality classification is obtained and compared with the legally applicable administrative one.

Key words: Bayesian analysis; Estimation of percentiles; Monte Carlo methods; Mixed models; Water intended for the abstraction of drinking water.