A new edition of the most comprehensive overview of statistical methods for environmental monitoring applications. Thoroughly updated to provide current research findings, Statistical Methods for Groundwater Monitoring, Second Edition continues to provide a comprehensive overview and accessible treatment of the statistical methods that are useful in the analysis of environmental data. This new edition expands focus on statistical comparison to regulatory standards that are a vital part of assessment, compliance, and corrective action monitoring in the environmental sciences. The book explores quantitative concepts useful for surface water monitoring as well as soil and air monitoring applications while also maintaining a focus on the analysis of groundwater monitoring data in order to detect environmental impacts from a variety of sources, such as industrial activity and waste disposal. The authors introduce the statistical properties of alternative approaches, such as false positive and false negative rates, that are associated with each test and the factors related to these error rates. The Second Edition also features:

- An introduction to Intra-laboratory Calibration Curves and random-effects regression models for non-constant measurement variability
- Coverage of statistical prediction limits for a gamma-distributed random variable, with a focus on estimation and testing of parameters in environmental monitoring applications
- A unified treatment of censored data with the computation of statistical prediction, tolerance, and control limits
- Expanded coverage of statistical issues related to laboratory practice, such as detection and quantitation limits
- An updated chapter on regulatory issues that outlines common mistakes to avoid in groundwater monitoring applications as well as an introduction to the newest regulations for both hazardous and municipal solid waste facilities
- Each chapter provides a general overview of a problem, followed by statistical derivation of the solution and a relevant example complete with computational details that allow readers to perform routine
application of the statistical results. Relevant issues are highlighted throughout, and recommendations are also provided for specific problems based on characteristics such as number of monitoring wells, number of constituents, distributional form of measurements, and detection frequency. Statistical Methods for Groundwater Monitoring, Second Edition is an excellent supplement to courses on environmental statistics at the upper-undergraduate and graduate levels. It is also a valuable resource for researchers and practitioners in the fields of biostatistics, engineering, and the environmental sciences who work with statistical methods in their everyday work.