"De Facto" Data Analysis Methods for Goal Oriented Monitoring: What does current practice tell us?

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Abstract. Reviewing literature on water quality monitoring reveals the commonality of using "standard" statistical procedures to produce information about the water quality from the raw data. These statistical methods use the concepts of "statistical significance" (i.e. p-values) to validate the information produced, be it comparison of means/medians (e.g. upstream/downstream averages), evaluation of trends, or detection of extremes. These "standard" methods are accepted throughout the field as the appropriate methods through which to draw conclusions.

The use of the term "standard" here is not meant to imply that there is an established set of statistical analysis methods that have been reviewed and recommended for all water quality monitoring situations. However, this paper will attempt to establish that there are certain methods that are commonly used by a variety of monitoring entities, depending on the type of information sought. These common methods are thus the "standards" for current data analysis.

The purpose of this paper will be to review the current statistical analysis methods used in water quality monitoring, and establish a connection between commonly selected methods and information sought from the monitoring program.