Robustness Issues in Environmental Data

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There is a growing concern that in so many respects we are putting our environment at risk. Statisticians can play a major role to formulate models and develop methods for understanding and handling of environmental issues. The countries around the Indian Ocean are already experiencing profound environmental change and for sustainability, safety and security we need valid and reliable inferential statements from data analysis. In this paper we will see how the presence of outliers can lead to misleading conclusions to many environmental issues. Detection and handling of outliers has been an area of a great deal of attention over the years. Study of the presence outliers is really necessary because the existence of 1-10% outliers is rather a rule than exception in most routine data and the presence of outliers can create huge interpretive problems in statistical data analysis. Attitudes towards the handling of outliers vary from one extreme to another: from the view that we should never sully the sanctity of the data to if in doubt, throw it out. Our experience with the analysis of British Antarctic Survey data was that observations deleted in a suspicion of outliers were the most informative part of the data and mainly because of ignoring these suspect outliers, the creation of ozone whole went unnoticed to the scientists for several years. This example shows the importance of considering robust methods in environmental data. In this paper we will give a brief review of some recently developed robust methods for detecting and handling of outliers and other robustness issues in environmental studies.