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Exploratory analysis of long-term meteorological data from Burkina Faso: anomaly detection and management.

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Abstract:

The availability of quality data is essential for scientific decision-support programs. For a poor country like Burkina Faso, which has implemented a vast development program through agro-sylvo-pastoral growth poles, the availability of quality agro-climatic data is a prerequisite for all prediction and practice optimization methods that will guide professionals to a good return on their investment. Unfortunately, Burkina Faso's long-term meteorological data present significant gaps, with missing observations and outliers, compromising their reliability for climate modeling and forecasting. This study explores anomalies in meteorological variables using exploratory analysis and machine learning methods. We characterize missing data and apply statistical techniques such as correlation, regression, principal component analysis (PCA) and mutual information analysis (MIA) to 41-year time series from 10 synoptic stations. The results obtained serve as a basis for developing anomaly management strategies aimed at improving the quality of meteorological megadata in Burkina Faso.

Keywords: weather data, exploratory data analysis, anomalies, missing data, machine learning

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