African Volcanology and Geochemistry (Earth Science)

Methodological Evaluation of Field Research Stations Systems in Nigeria using Multilevel Regression Analysis for Risk Reduction Measurement

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Abstract

Field research stations in Nigeria are essential for monitoring environmental changes, particularly volcanic activity and geochemical processes. However, their effectiveness varies significantly across different regions due to varying levels of infrastructure, funding, and expertise. A multilevel regression model will be employed, incorporating both fixed effects (e.g., funding levels, geographical location) and random effects (e.g., regional variability in research capabilities). This approach aims to provide a comprehensive understanding of the system's performance. Analysis revealed that funding per station significantly impacts its operational efficiency, with stations receiving over 100,000 *annually achieving higher risk reduction measures compared ¿ those funded less than* 50,000. Regional climate also plays a critical role in station functionality and effectiveness. This study has provided insights into the complex interplay between funding levels, geographical location, and environmental factors affecting field research station performance in Nigeria. Based on findings, it is recommended that additional resources be allocated to stations with lower funding but high potential for impact, particularly those located in regions prone to significant volcanic activity or geochemical anomalies. Field Research Stations, Nigeria, Multilevel Regression Analysis, Risk Reduction, Environmental Science

Keywords: *Nigerian geography, multilevel modelling, spatial analysis, environmental monitoring, regression techniques, volcanic activity assessment, geochemical processes*

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