# Application of Geographic Weighted Regression to establish average rainfall-altitude functions reflecting spatial variation

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***Abstract***

Taiwan is located in the East Asia and in the subtropical zone. Because of its geographical location, climate and topography, there is a lot of rainfall annually in Taiwan. According to studies, it is shown that the average precipitation increase with altitude. The Ordinary Least Squares (OLS) for global regression was used at the beginning to establish the average rainfall-altitude functions in this study. After the model was confirmed through all the needed statistical tests, the Moran's I statistics was then used to examine if there were any spatial autocorrelations in residual. If spatial autocorrelations in residual were present, then the Geographically Weighted Regression (GWR) was applied to solve the problem. The results showed that GWR model improved the R2 increased from 0.15 as in OLS regression to 0.78, demonstrating that GWR provides a better interpreting ability than OLS. Besides, the spatial autocorrelation problem in OLS was already corrected.

***Keywords:*** *average rainfall、altitude、GWR、spatial autocorrelation*