The combination of complex, multiple minerogenic stages and mineral superposition during geological processes has resulted in dynamic spatial distributions and non-stationarity of geological variables. For example, geochemical elements exhibit clear spatial variability and trends with coverage type changes. Thus, bias is likely to occur under these conditions when general regression models are applied to mineral prospectivity mapping (MPM). In this study, we used a spatially weighted technique to improve general logistic regression and developed an improved model, i.e., the improved logistic regression model, based on a spatially weighted technique (ILRBSWT, version 1.0). The capabilities and advantages of ILRBSWT are as follows: (1) it is a geographically weighted regression (GWR) model, and thus it has all advantages of GWR when managing spatial trends and non-stationarity; (2) while the current software employed for GWR mainly applies linear regression, ILRBSWT is based on logistic regression, which is more suitable for MPM because mineralization is a binary event; (3) a missing data processing method borrowed from weights of evidence is included in ILRBSWT to extend its adaptability when managing multisource data; and (4) in addition to geographical distance, the differences in data quality or exploration level can be weighted in the new model.