

## ABSTRACT

The intensity of urban heat island effect is an important indicator of urban development status. Satellite thermal infrared sensors can quickly obtain continuous surface temperature over a large area of space, but due to factors such as cloud cover, a large amount of data is missing, resulting in a lack of reliable long-term, all-weather surface temperature data for the study of urban heat island effects. Therefore, existing research based on urban heat islands is still limited to clear sky surface temperature data. Thanks to the steady development of research on all-weather surface temperature reconstruction in recent years, many all-weather surface temperature products have gradually matured. Therefore, this study is based on existing all-weather surface temperature products (TRIMS) to investigate the impact of different background temperature selections on the measurement of urban heat island effects, and compares it with clear sky surface temperature data. The aim is to explore the impact of different background temperature selections on the measurement of urban heat island effects from the perspective of all-weather meteorological conditions. The results indicate that the urban heat island intensity measured by all-weather surface temperature products is relatively more in line with the actual surface temperature. With the selection of background temperature, different land features show varying heat island intensity curves, each with its unique and significant characteristics.

**Keywords:** all-weather surface temperature; cloud cover; urban heat island; background temperature selection