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A Study on Impact Forecasting of Building-scale Resolved Heat Exposure for Local Weather Information Services

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The Korean peninsula has complex and diverse weather phenomena, and the Korea Meteorological Administration has been working on various numerical models to produce better forecasting data depending on the purpose. The UM (unified model) Local Data Assimilation and Prediction System (LDAPS) is a limited-area model with a horizontal resolution of 1.5 km and is a working model for estimating local-scale weather forecasts on the Korean peninsula. However, in order to numerically predict the detailed temperature weakness characteristics of the urban space where surface characteristics change rapidly from tens of meters to several hundreds of meters, a city temperature prediction model with higher resolution spatial decomposition capability is required.
As an alternative to this, this study statistically combines the LDAPS model with low spatial resolution but excellent temperature prediction capability and the Climate Analysis Seoul (CAS) workbench, which analyzes spatial characteristics of urban surface physical parameters in detail. The techniques used are machine learning and linear regression models, and a method for predicting the effect of the heatwave in urban areas was studied.
The purpose of this study is to estimate the resolved temperature at the building scale through calibrating the forecast data from the Korea Meteorological Administration using the detailed surface analysis technique and machine learning method. By combining the merits of the two technologies, a forecasting model was developed to improve the accuracy and detail of the temperature data and the detailed analysis of the predicted temperature was verified using ground observation data. Detailed (building-scale resolved) temperature prediction information were mapped and matrices were generated according to local thermal stress risk grades. Using these results, we tried to predict the impact weather of potential heat risk due to summer maximum temperature.

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