

Simulating urban climate and energy use interactions with a new urban land surface model





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1. A new model has been developed,

The Urban Climate and Energy Model (UCLEM) brings new building energy simulation capabilities to an Australian urban land surface model, allowing climate-scale simulation of the interdependence of urban climate and energy use.





atmosphere model





road

street width

traffic

external and internal urban environments.

Urban environment

2D urban "canopy" model

UCLEM schematic

vegetation

2. that simulates urban climate and energy use,

By integrating results of a statistical model for energy use behaviours at different hours of the day ...





Lipson, M.J., Thatcher, M., Hart, M.A., Pitman, A., 2018. A building energy demand and urban land surface model. Quarterly Journal of the Royal Meteorological Society 144, 1572–1590.

... UCLEM can predict seasonal gas and electricity demand variability ...





... as well as diurnal cycles of energy use.

3. and is now coupled to CCAM.

UCLEM has been coupled with CCAM atmospheric model and run in decadal global simulations.



2m air temperature

CCAM nest ~4km grid



surface temperature

25 Dec, 2000, 9pm



sensible heat flux

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