

Accepted Manuscript

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PII: S1359-4311(17)35610-7
DOI: <https://doi.org/10.1016/j.applthermaleng.2018.07.033>
Reference: ATE 12391

To appear in: *Applied Thermal Engineering*

Received Date: 29 August 2017
Revised Date: 27 April 2018
Accepted Date: 6 July 2018

Please cite this article as: L. Zhang, R. Zhang, T. Hong, Y. Zhang, Q. Meng, Impact of post-rainfall evaporation from porous roof tiles on building cooling load in subtropical China, *Applied Thermal Engineering* (2018), doi: <https://doi.org/10.1016/j.applthermaleng.2018.07.033>

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**Impact of post-rainfall evaporation from porous roof tiles on building cooling load in
subtropical China**

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Abstract: Rainfall occurs frequently in subtropical regions of China, with the subsequent water evaporation from building roofs impacting the thermal performance and the energy consumption of buildings. We proposed a novel simulation method using actual meteorological data to evaluate this impact. New features were developed in EnergyPlus to enable the simulation: (1) an evaporation latent heat flux source term was added to the heat balance equation of the external surface and (2) algorithms for the evaporative cooling module (ECM) were developed and implemented into EnergyPlus. The ECM experimental results showed good agreement with the simulated results. The ECM was used to assess the impact of evaporation from porous roof tiles on the cooling load of a one-floor building in subtropical China. The results show that the evaporation process decreased the maximal values of the external and internal roof surface temperatures by up to 6.4 °C and 3.2 °C, respectively, while the lower internal surface temperature

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