2009 Fall Meeting
Search Results

Cite abstracts as **Author(s) (2009), Title, *Eos Trans. AGU, 90*(52), Fall Meet. Suppl., Abstract xxxxx-xx**

Your query was:
urban efficient energy evaluation

1340h

B33D-0422

URBAN EFFICIENT ENERGY EVALUATION IN HIGH RESOLUTION URBAN AREAS BY USING ADAPTED WRF-UCM AND MICROSYS CFD MODELS

San Jose, R
roberto@fi.upm.es
Environmental Software and Modelling Group, Technical University of Madrid (Spain) Computer Science School, Madrid, Spain
Perez, J L
jlperez@fi.upm.es
Environmental Software and Modelling Group, Technical University of Madrid (Spain) Computer Science School, Madrid, Spain
Gonzalez, R M
barras@fis.ucm.es
Complutense University of Madrid (UCM), Department of Geophysics and Meteorology, Madrid, Spain

Urban metabolism modeling has advanced substantially during the last years due to the increased detail in mesoscale urban parameterization in meteorological mesoscale models and CFD numerical tools. Recently the implementation of the “urban canopy model” (UCM) into the WRF mesoscale meteorological model has produced a substantial advance on the understanding of the urban atmospheric heat flux exchanges in the urban canopy. The need to optimize the use of heat energy in urban environment has produced a substantial increase in the detailed investigation of the urban heat flux exchanges. In this contribution we will show the performance of using a tool called MICROSYS (MICRO scale CFD modelling SYStem) which is an adaptation of

the classical urban canopy model but on a high resolution environment by using a classical CFD approach. The energy balance in the urban system can be determined in a micrometeorologicl sense by considering the energy flows in and out of a control volume. For such a control volume reaching from ground to a certain height above buildings, the energy balance equation includes the net radiation, the anthropogenic heat flux, the turbulent sensible heat flux, the turbulent latent heat flux, the net storage change within the control volume, the net advected flux and other sources and sinks. We have applied the MICROSYS model to an area of 5 km x 5 km with 200 m spatial resolution by using the WRF-UCM (adapted and the MICROSYS CFD model. The anthropogenic heat flux has been estimated by using the Flanner M.G. (2009) database and detailed GIS information (50 m resolution) of Madrid city. The Storage energy has been estimated by calculating the energy balance according to the UCM procedure and implementing it into the MICROSYS tool. Results show that MICROSYS can be used as an energy efficient tool to estimate the energy balance of different urban areas and buildings.

http://artico.lma.fi.upm.es

[0315] ATMOSPHERIC COMPOSITION AND STRUCTURE / Biosphere/atmosphere interactions
[0342] ATMOSPHERIC COMPOSITION AND STRUCTURE / Middle atmosphere: energy deposition
[0345] ATMOSPHERIC COMPOSITION AND STRUCTURE / Pollution: urban and regional
[3329] ATMOSPHERIC PROCESSES / Mesoscale meteorology