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**Combining Satellite Data and Models to Assess the Impacts  
of Urbanization on  
the Continental US Surface Climate**

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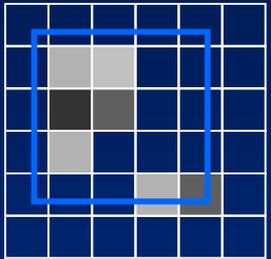


# Combining Satellite Data and Models to Assess the Impacts of Urbanization on the Continental US Surface Climate

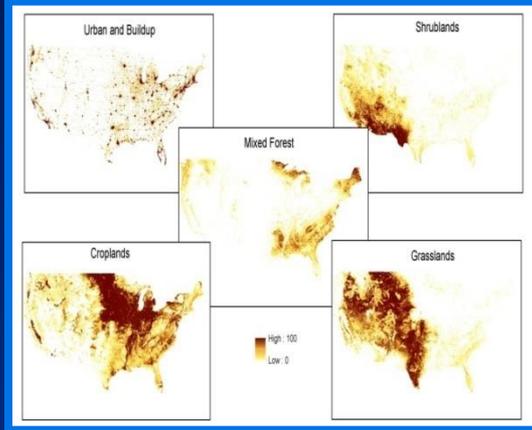
Bounoua et al. 2012

## Generating Land Use parameters at the urban scale

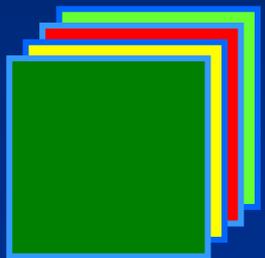
NLCD 30m  
% impervious



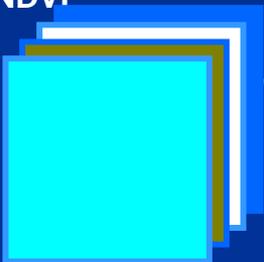
Fractional LC and NDVI at (0.05 deg.)



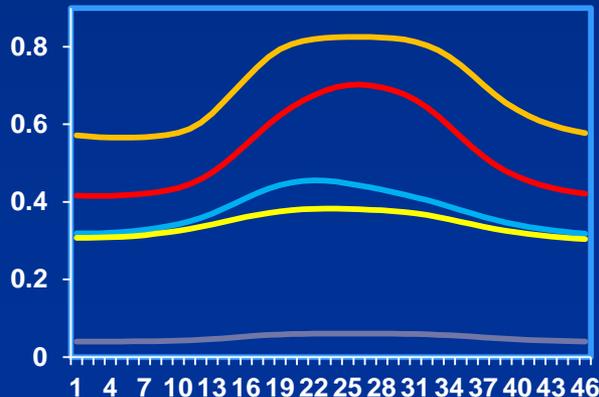
MODIS 500 m LC



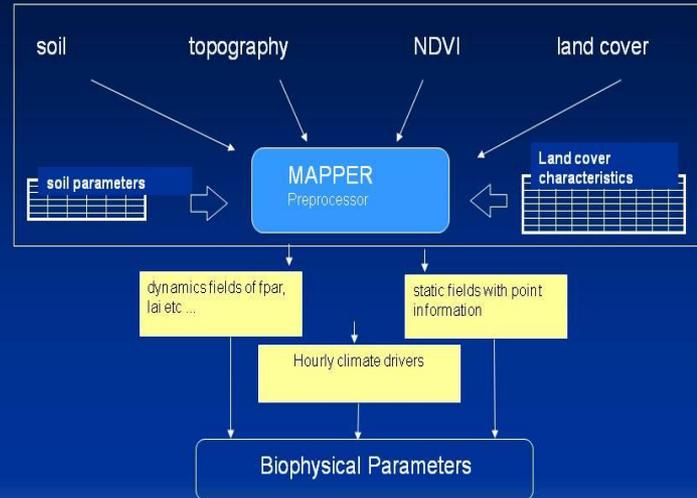
MODIS 500 m  
NDVI



urban  
grass  
Shrublands  
crop  
Mixed Forest



Generating the Biophysical parameters



1- FPAR, 2-LAI, 3-Greenness, 4- Roughness  
5- Snow Free Albedo, 6-zero dd, 7-resistance

Models



# Combining Satellite Data and Models to Assess the Impacts of Urbanization on the Continental US Surface Climate

Bounoua et al. 2012

## Modeling the impacts of Urbanization on Climate

### Continental Scale Offline Simulations

SiB2 runs will be performed over the CONUS at 5x5 km spatial resolution for :

- 2001 (Recent past).
- Pre-Urban
- 2010 (Present)
- 2020 (Near Future)

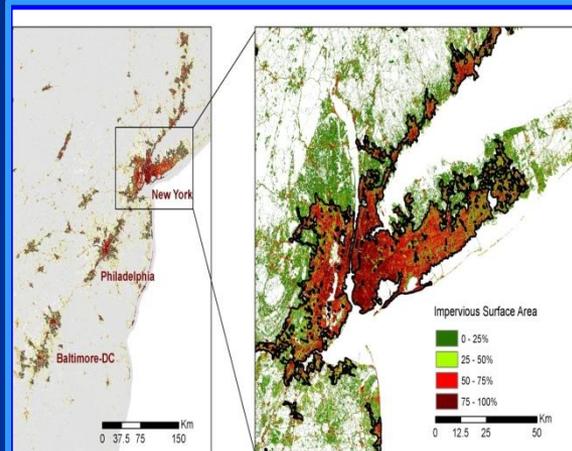
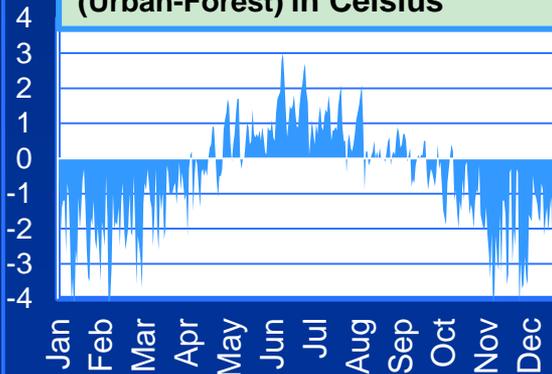
### Regional Scale Coupled Simulations

WRF model runs will be performed over the Eastern US to capture the urban morphology on mesoscale regional climate. Such simulations will provide insight on how the UAI modify the atmosphere's thermal and dynamic regimes.

### Continental Scale Socio-economic study

- What are the driving forces behind cities' growth?
- Why do some cities grow faster than others?
- How is the influence of climate manifested in urban growth?

### Daily temperature difference (Urban-Forest) in Celsius



### Impervious Surface



### Population data



### Income data

