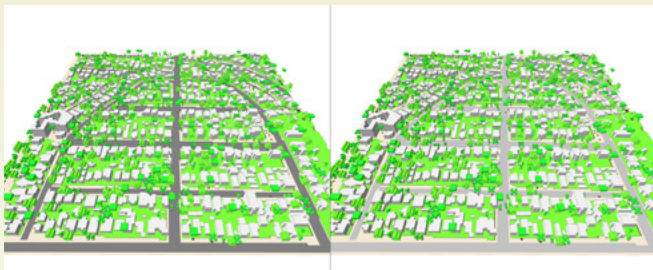


Living in cities White Streets

ANALYSIS OBJECTIVE

ENVI-met provides a multitude of tools to simulate and analyze the effects of different surfaces in your simulation area.

One adaption strategy to mitigate the Urban Heat Island effect that has produced a lot of interest is coating streets with a high albedo material to decrease surface temperatures of streets and thus the local ambient air temperature. In an exemplary study, one of LA's oldest neighborhoods, Angelino Heights, was simulated in order to analyze changes caused by different surface materials. In this 552 m x 552 m large model area, the streets' albedo was changed from 0.12 (worn asphalt) to 0.33 – a reflectivity value indicated by one of the leading companies that provide cooling asphalt sealcoats. To properly investigate the heat storage of the different materials and its influence on the surrounding air temperature, the simulation was run for 7 simulation days.

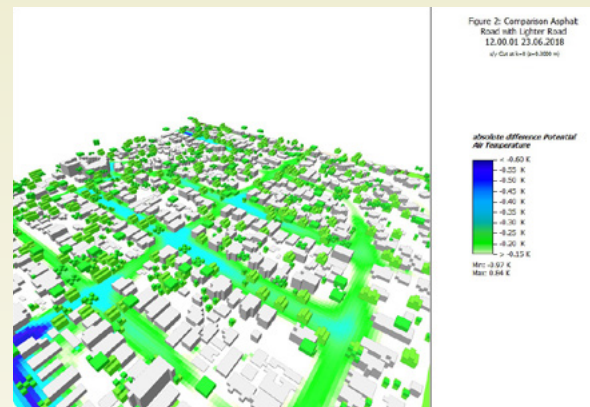
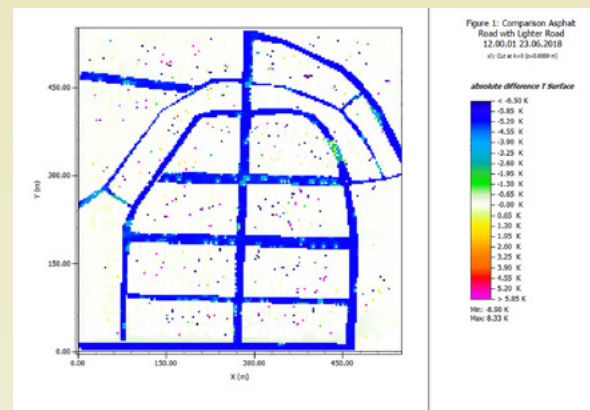


ANALYSIS

In this example in LA, the differences in surface temperature can be seen clearly. With less radiation being reflected by the common asphalt street, the surface stores more heat and develops higher temperatures than the higher albedo street: Differences in surface temperature of around 4-5 K can be observed in the streets. In areas that receive overall less radiation (e.g. underneath a tree), the differences are slightly lower.

Air temperature variations are, in comparison, not as substantial. Here, in the cell above the surface with a height of 0.3 m, values of less than 1 K can be noted. The relatively

SIMULATION RESULTS



small change in albedo does not have an as great as anticipated influence on the ambient temperature. If the albedo of the cooling material was higher, higher differences in air temperature may be expected. However, this may also have a negative influence on the thermal comfort of human beings on the street as the exposure to reflected radiation increases.

This study shows ENVI-met's capability to analyze the effectiveness of adaption measures in advance to applying them.

