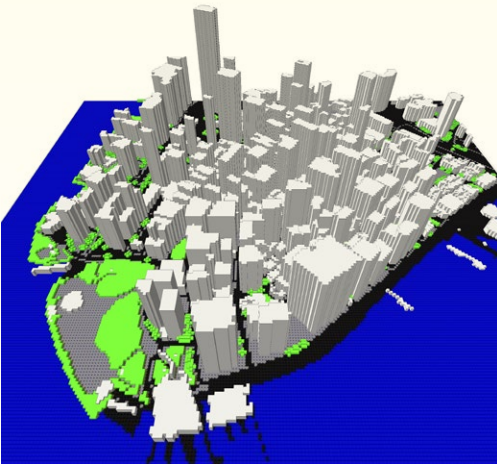


Solar Radiation

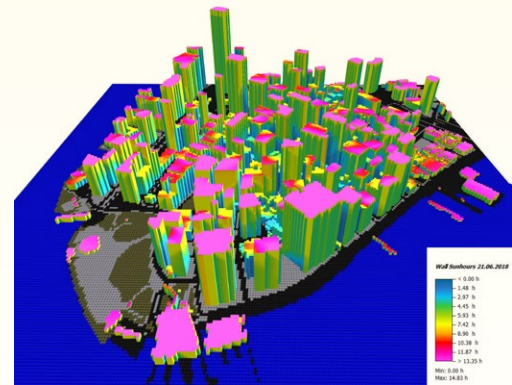
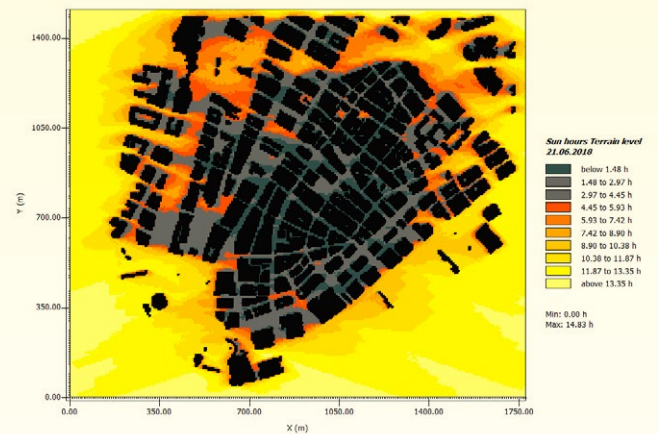
ANALYSIS OBJECTIVE

ENVI-met provides a multitude of tools to simulate and analyze solar radiation in your simulation area.

In an exemplary study, a simulation with a model area of 1778 m x 1512 m x 784 m was run in order to visualize the solar radiation values in New York City. As a date for the analysis, the 21st of June – the longest day of the year with the most sun hours – was chosen. A map of Manhattan containing the sun hours on Terrain level and a 3D map of the sun hours on the facades represent the simulation results.



SIMULATION RESULTS



ANALYSIS

In a metropolitan area like New York City with Manhattan as its CBD, the surface areas are rarely exposed to any direct sunlight. Even on the longest day, where sun hours can lead up to more than 15 hours/day, some districts in Manhattan are shine on by the sun for even less than 1 hour. The ratio between building height and street width leads to great differences in the available sun hours throughout the city. Looking at the three dimensional facades, it becomes visible that the horizontal surfaces, such as the highest rooftops which are not obstructed by any other objects, receive the maximum amount of possible sunlight. Higher floors receive relatively more sun hours compared to the consecutively lower floors. At street level – especially in North-South extending streets – almost no sun light

reaches the surface. With little to no sunlight on the surface levels, no shortwave radiation reaches the ground and thus less longwave radiation is being emitted by it. This might lead to lower temperatures and a hence improved Thermal Comfort for the human individuals when only considering the radiation impact and neglecting e.g. wind flow, humidity, and air pollution. This study shows ENVI-met's capability to analyze solar radiation and provides multiple tools to further examine the consequences of it.

