

Study of Storms on the Javits Center Green Roof

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Abstract : A quantitative analysis of the different variables on both the South and North green roofs of the Jacob K. Javits Convention Center was taken to find mathematical relationships between net radiation and evapotranspiration (ET), average outside temperature, and the lysimeter weight. Groups of datasets were analyzed, and the relationships were plotted on linear and semi-log graphs to find consistent relationships. Antecedent conditions for each rainstorm were also recorded and plotted against the volumetric water difference within the lysimeter. The first relation was the inverse parabolic relationship between the lysimeter weight and the net radiation and ET. The peaks and valleys of the lysimeter weight corresponded to valleys and peaks in the net radiation and ET respectively, with the 8/22/15 and 1/22/16 datasets showing this trend. The U-shaped and inverse U-shaped plots of the two variables coincided, indicating an inverse relationship between the two variables. Cross variable relationships were examined through graphs with lysimeter weight as the dependent variable on the y-axis. 10 out of 16 of the plots of lysimeter weight vs. outside temperature plots had R^2 values > 0.9 . Antecedent conditions were also recorded for rainstorms, categorized by the amount of precipitation accumulating during the storm. Plotted against the change in the volumetric water weight difference within the lysimeter, a logarithmic regression was found with large R^2 values. The datasets were compared using the Mann Whitney U-test to see if the datasets were statistically different, using a significance level of 5%; all datasets compared showed a U test statistic value, proving the null hypothesis of the datasets being different from being true.

Keywords : green roof, green infrastructure, Javits Center, evapotranspiration, net radiation, lysimeter

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