

Summary

Subproject 4.1 is analyzing and quantifying energy and soil water transformation processes of vertical green in an urban environment. Results help to develop strategies against the overheating phenomena of cities. Therefore we are aiming to conduct lysimeter experiments for studying evapotranspiration processes from both vertical green systems and pervious pavements. Our research concept is following two questions: understanding heat and water transport mechanisms at the pavement - atmosphere interface and advection processes controlling daily actual evaporation rates, and secondly analysing plant-atmosphere interactions determining actual and potential evapotranspiration of vertical green facades. Our experimental design also allows quantification of varying water supply on plant water consumption i.e. transpiration rates.

Lysimeter experiments are designed for two different climate and site conditions: the first one is located in the suburbs of Berlin (Marienfelde) and has a rural character (=reference site). The second one represents a site with a typical inner-city climate situation highly influenced by buildings and streets. A comparison of both should help (i) to understand the influence of urban structures on evapotranspiration and (ii) to study the influence of walls and buildings on plant development and plant water use. Furthermore a comparison of both sites is intended to quantify the influence of lateral energy input by advection processes on potential and actual evapotranspiration rates. Experimental data will provide the basis for the formulation of a process based evapotranspiration equation, which contributes to the calculation of cooling, water consumption and shading effects for buildings and urban sites.