



Rainfall interception by deciduous and coniferous trees in an urban area

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Hydrological properties of an area have been changed by the process of urbanization which results especially in increased runoff. Previous studies have suggested that rainfall interception by urban trees can reduce the runoff. The amount of intercepted rainfall depends on type of vegetation and on meteorological conditions which have the impact on reduction and retention of runoff which is important in urban areas.

For four months, from 1st of April to 31th of July 2014, we had measured throughfall and stemflow under two deciduous trees (*Betula pendula*) and two coniferous trees (*Pinus sylvestris*) in center of Ljubljana, capital of Slovenia. Under each type of tree throughfall was measured with two trough gauges, one equipped with tipping bucket and one with manual 60 l tank to control automatically gathered data. There were also ten manual roving gauges which were randomly moved under the tree canopy. Stemflow was measured on one tree of each type with rubber collar fitted around the tree. The tube was connected to manually reading 20 l plastic tank. Data were collected after each event. Gross rainfall was measured using a tipping bucket rain gauge located on the clearing near the trees.

During the measuring period we have detected 85 rainfall events with total depth of 488,3 mm. The average amount of gross precipitation per event was 5,7 mm and ranged from 0,2 mm to 57 mm. Throughfall events measured automatically with tipping bucket were grouped according to the dates of manually collected data and verified with weighted average of data collected with trough gage and roving gauges. Cumulative throughfall for birch (*Betula pendula*) was 280,5 mm with average value 6,0 mm per event and standard deviation of 7,31. Throughfall amount measured underneath pine (*Pinus sylvestris*) was 202,9 mm with an average value of 3,4 mm and standard deviation of 5,62. The total amount of stemflow for birch was 11,62 mm and for pine 0,72 mm. In case of birch stemflow was generated when the total rainfall exceeded 4,8 mm while the threshold depth of total rainfall for generating the stemflow on pine was 5,8 mm.

Birch and pine have intercepted 40,2 % and 58,3 % of rainfall, respectively. The interception values suggest that coniferous trees in comparison with deciduous trees intercept more rainfall not only in winter time when deciduous trees are leafless but also in spring and in summer time. Possible parameters contributing to that are vegetative properties of coniferous trees which are thicker tree canopy, rougher bark and the slope of the branches away from the tree trunk. As result of those properties stemflow was much lower for pine in comparison with birch and can be even neglected.