



An evaluation of the impact of soil moisture and evapotranspiration on runoff

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Runoff is the part of precipitation that appears in surface streams as a result of physical processes in the catchment. The volume of runoff is greatly affected by soils, vegetation and antecedent soil moisture. Regarding to natural conditions in Slovenia the soil moisture content and evapotranspiration are, in addition to precipitation amount and distribution, the most influential factor for runoff generation. The greatest floods have usually occurred in autumn when soil moisture content is high and rate of infiltration is low.

Two major floods affected the Savinja River basin in 1980 and 1990 are especially interesting for analysis of hydrometeorological characteristics. They both occurred in autumn (October 9, 1980 and November 1, 1990) with similar amount and distribution of precipitation. In the event of October 1980 there was a little more precipitation in comparison with the event in November 1990, but the raging waters caused no devastation at that time. There was a long dry period before the flood in October 1980 and precipitation fallen in less than 24 hours led to a sudden rise of water levels, but not so high than in November 1990. October 1990 was wet especially in the last days of the month, culminating in storms on October 31 and November 1. Since the soil moisture at the beginning of the storms was close to field capacity, the heavy rainfall led to flooding and landslides.

Both floods were analysed by using the HBV-96 model for the Savinja River basin to show the influence of soil moisture and evapotranspiration to runoff. Before the flood event in October 9, 1980 the antecedent soil moisture was very low and soil was fairly dry. The rate of infiltration into the soil was considerable large at the beginning of the storm. More than 30% of falling rain infiltrated into the soil. In the 1990 event, the

soil was becoming saturated due to frequent rainfalls in October. The precipitation in last days of October 1990 before the flood event in November 1 caused that the soil became almost fully saturated and the rate of infiltration at the beginning of the storm, which caused the flood in November 1, was very low. Only about 12% of falling rain infiltrated into the soil on the whole basin. Evapotranspiration is very low in autumn and winter months and its influence to runoff is almost negligible. Only about 1% of fallen precipitation was lost by the evapotranspiration in both flood events.