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# Water Resources in Mid 21. Century in Slovenia - What can we expect according to regional climate predictions integrated into catchment hydrological modeling and modeling of soil water balance - an integration of top-down and bottom-up modeling approaches.

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For the purpose of calculating the water balance in the soil, the European Environment Agency (EEA) produced a computational physical model “swbEWA” (Kurnik et al, 2013). It is designed to calculate the spatial distribution of water volume in the soil during the selected time period. Model accounts soil moisture by the addition and subtraction of the input parameters of water resources in the ground, which are expressed by the water column [mm]. Kurnik and Kajfež - Bogataj (2013) then used the model swbEWA to study the soil water balance parameters in Europe for the future. They used an ensemble of eight climate scenarios and analyzed the duration and size of agricultural drought across Europe.

Surface runoff and deep percolation are two parameters of the water balance in the soil calculated by swbEWA model. They are expressed as mm of water column to the selected unit of modeled surface. The average values of monthly balance of the sum of the two quantities in the coming period 2021-2050 for selected river basins in Slovenia were compared with measured river flows in the reference periods 1961 – 1990 and 1981 - 2010. For comparison of results we have also calibrated semi-distributed HBV Light conceptual model for selected river basins and modeled catchment water-balance parameters for the period 2021-2050. As input we used the same rainfall and temperatures parameters as predicted by climatic scenarios used in the model swaEWA.

Results Kurnik and Kajfež-Bogataj (2013) show that the largest increase by a lack of moisture in the soil occurred in the southwestern and southeastern Europe, where Slovenia does not fall. Changes will be in Slovenia still important. Employing the climatic scenario A1, the increase in soil moisture deficit relative to the reference period would be at least 0.45 during the period 2021-2050 (Kurnik and Kajfež -Bogataj, 2013), but the average annual run-off water in terms of average flow rates in 1961-1990 in Slovenia would decrease by 0.65. The largest reduction is projected to happen in central Slovenia, the smallest in the coastal part of the Littoral region (0.18). In north-eastern Slovenia the average run-off will be reduced by o.50. We can expect more frequent and larger hydrological drought, increasing soil water deficits and decreasing underground water supplies.