

Premises for the construction of balance equations of water reserves in the saturation zone of forest soil

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Abstract: Premises for the construction of balance equations of water reserves in the saturation zone of forest soil are presented in this paper. Changes of soil water reserves are dealt with as an effect of the atmosphere-tree stand-soil balance at the assumption of constant ground water flow and negligibly small losses for infiltration down the soil profile below saturation zone. These assumptions are met in permeable lowland forest soils, particularly in areas where the aquifer is situated on relatively shallow impermeable substratum. Then, for snow-free periods, it is possible to: 1) combine the increment of soil water reserves with precipitation above tree crowns and with plant and litter interception and 2) combine the losses of soil water reserves with plant transpiration and evaporation from the soil surface. The periods of increments and losses of soil water reserves are determined from limni-graph records of ground water table depth in piesometers. Examples are given in the paper of equations identified by long term data from 13 soil profiles localised in pine forests on Pleistocene floodplain of the Dunajec River. The data included: ground water table depth, physical properties of grounds in soil profiles, and hydro-climatic conditions. The equations combine increments and losses of water reserves in the saturation zone with rainfall and deficits of air humidity measured on a mid-forest meadow.

Key words: forestry, forest hydrology, mathematical modelling, soil water reserve, water budget in a forest