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How are throughfall quantity and chemistry influenced by canopy phenology? Evidence from a field investigation in an Oriental beech forest, Iran

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The temporal dynamic of forest canopy in deciduous forest is important to forest ecology and management as it influences all subsequent ecohydrological processes, e.g., throughfall, runoff, etc. To our knowledge, no research exists addressing the effect of seasonal variability (i.e. leafed and leafless periods) on throughfall quantity and chemistry in pure and mixed Oriental beech (Fagus orientalis L.) stands. For this reason, the purpose of this work was to analyse the effect of structural changes in trees (periods with and without leaves) on throughfall amount and chemistry in pure and mixed Oriental beech stands with very humid climate. Throughfall was 11.5 and 12.6% higher during the leafed period in pure and mixed stands, respectively, mostly due to higher incident rainfall during this period. The pH and the concentrations of throughfall nutrients (K+, Ca2+, Mg2+, P, NH4+ and NO_3-) were generally higher in the leafed vs. leafless periods for both stands. The high variability of throughfall quantity and solute flux observed in this study highlights the importance of canopy phenology in the temporal characterization of water inputs to the forest floor and atmosphere.