Evaluating changes in catchment-scale evapotranspiration after 50% thinning in a headwater catchment

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Abstract

We examined changes in catchment-scale annual and seasonal evapotranspiration after 50% strip thinning, using runoff data from headwater catchments. The short-term water balance (STWB) method between periods from 8 to 100 days was applied to the treated (K_T) and control (K_C) catchments. The estimated evapotranspiration during the pre- and post-thinning periods were 840 and 910 and 780 and 860 mm/year in the catchments K_T and K_C, respectively. According to a paired catchment analysis of estimated evapotranspiration, monthly evapotranspiration increased from 3 to 20 mm from June to December, while it decreased from 7 to 31 mm from January to May. The estimated annual and monthly evapotranspiration was compatible with the values monitored in the plot-scale interception, canopy transpiration, and ground surface evapotranspiration. Our findings showed that the decreases in evapotranspiration due to 50% thinning were similar or different in different methods of measurement when compared with thinning in the other catchments around the world. The STWB model can evaluate the effects of timber harvesting on changes in evapotranspiration (ET), including the reproduction of seasonal patterns of ET.

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