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Effect of partial and clear cutting on runoff at forested small watershed

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This study was conducted in the Kamabuchi Experimental Watershed of the Forestry and Forest Products Research Institute. The site is located in north part of the mainland (Honshu) of Japan, Yamagata prefecture. Surficial geology is tuff of the Tertiary. Annual average precipitation at the site is 2456 mm. Streamflow have been recorded at recorded at 45 degree V-notch gauging weirs at the outlet of the No1 (: 3.06 ha) and No2 (: 2.48 ha) experimental watersheds since 1939, and the No3 (1.53 ha) and No4 (1.12 ha) experimental watersheds since 1961 within the site. In 1961 the No3 and No4 watershed were covered with a deciduous broad-leaved forest and Sugi (Cryptomeria japonica), respectively. In 1964 the forests were 50 % partial-cut near the stream at the No3 watershed and near the ridge at the No4 watershed. In 1970 other parts of forests at both watersheds were clear-cut and replanted with Sugi (Cryptomeria japonica). Therefore, this study aims to evaluate the effect of partial and clear cutting on runoff at the No3 and No4 experimental watersheds using 21 years records (1961-1981) during no snow cover period (May- October). Hourly discharge was plotted continuously on semilogarithmic paper. A point of inflection was obtained on the falling limb of the hydrograph between 12 and 72 h after storm. Stormflow was defined as the area above the separation line; the line on the hydrograph which connects the point of rise to the point of inflection. After partial cutting, runoff at the No3 experimental watershed more increased than that at the No4 experimental watershed. After clear cutting, runoff at both experimental watersheds more increased than those after partial cutting. The results showed that location of forest cutting was important to control runoff and stormflow in the watersheds.

Keywords: double mass curve, stormflow, partial cutting, clear cutting, Kamabuchi Experimental Watershed