

Effect of partial and clear cutting on evapotranspiration at forested small watersheds

Shoji Noguchi^{1*}, Yukio Yasuda¹

¹FFPRI

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 evapotranspiration at the No3 and No4 experimental watersheds using 21 years records (1961-1981) during no snow cover period (May-October). The evapotranspiration was estimated using short-time period water-budget method. The conditions for water budget period were referred to Suzuki (1985). After partial cutting, evapotranspiration at the No3 experimental watershed more decreased than that at the No4 experimental watershed. After clear cutting, evapotranspiration at both experimental watersheds more decreased than those after partial cutting. 7 to 12 years later after clear cutting, the evapotranspiration recovered at the same degree during partial cutting period. Ohta and Kido (1986) evaluated the effect of forests on slope discharge using a mathematical simulation model. They showed that evapotranspiration from the lower part controled the discharge compared with that from the upper part. The results in this study supported the results of the simulations. The results showed that location of forest cutting was important to control evapotranspiration within the watersheds.

Ohta, T. and Kido, T. (1986) *J. Jpn. For. Soc.*, 68, 490-498; Suzuki, M. (1985) *J. Jpn. For. Soc.*, 67, 115-125.

Keywords: short-time period water-budget method, partial cutting, clear cutting, evapotranspiration, the Kamabuchi Experimental Watershed