Characterizing hydrological processes during heavy rain in planted forest as affected by infiltration properties of surface soils.

taihei morisawa[1]; Yasushi Mori[2]; Hiroaki Somura[3]; Naokazu Egusa[4]

[1] Agriculture, Tottori; [2] Life&Environ.Sci., Shimane Univ.; [3] Life and Environ.Sci., Shimane Univ.; [4] Engineering on Regional Environment, Shimane Univ.

It is suggested that extensive forestry may cause water pollution during heavy rain. However, it is not explained by the water quality analysis because mixing or dilution process may occur in the stream water. In this study, soil infiltration water and runoff water were sampled and analyzed to characterize hydrological processes in two planted forests (SR1: without thinning operation, SR2: with thinning operation). Additionally, these results were compared with infiltration properties of surface soil layers. In contrast to SR2, SR1 showed higher water content and higher environmental pollution load density because of the lower infiltration properties. Soil infiltration water analysis, thus, clearly showed the hydrological processes in the forest soils. When rainfall was under 10mm/hr, environmental pollution load density in soil infiltration water decreases in both forests. This means that environmental pollution load in soil infiltration water was diluted in general rain events. During heavy rainfall event, environmental pollution load density in soil infiltration water does not rise and a large amount of environmental pollution load drained to runoff water. Particularly, the density in SR2 showed higher concentration than SR1. These results showed that the dilution effect in SR2 (with thinning operation) was not effective during heavy rain event. In Addition, even the well-maintained SR2 could not hold the buffering potential and high pollution load drained to run off water during the heavy rainfall event.