

The percolation mechanism in a forested drainage basin: The Oikamanai River basin

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The rainwater movement in soils of high permeability is important to know how river runoffs are produced, and how sediment and nutrient are additionally loaded. In this study, we focus on runoff processes in the forested Oikamanai river basin, Tokachi Hokkaido. The catchment area is 62.6km², consisting of 88.3% forest and 10.6% farmland (mostly, grassland). Surface geology of the basin is mostly Miocene conglomerate, sandstone and mudstone. These are distributed on the hillslope or in mountainous regions. Farmlands are developed on the Holocene flood plane deposits. The Miocene sedimentary rocks are supposed to be highly permeable. We set a soil moisture profiler (4 channels) at each of forested area and grassland, and calculated the amount (mm) of percolation in the rainfall events (total rainfall of more than 50mm). As a result, the amount of percolation is near to total rainfall amount, and the ratio of the percolation amount to runoff height at a gauging station was low at ca. 12% in the forested area and ca. 19% at grassland. These low values suggest that the groundwater recharge to the deep zone is great because of the high permeability of the bedrock with many faults. Meanwhile, there is a soil layer of low permeability at depths of more than 20cm at grassland. Hence, it is suggested that saturated throughflow is more active than in forested area during the rainfall events. We set one more observation point near the upstream end of farmland. We will quantitatively estimate the farmland's contribution to water discharge and nutrient load by their comparison between the upper and lower observation points.

Keywords: percolation, soil moisture profiler, nutrient, river