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Study on the effect on rainfall storage of the river terrace sediment

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The river terrace consisting of the river sediment is mainly formed of gravel, and it penetrates much rain at the time of the storm and decrease a surface runoff. The infiltrated water flows on the basement slowly and make time lag with the surface runoff and discharge to the river. The peak of the river runoff is suppressed, and the flood of the river is controlled by this effect. In other words, river terrace sediment has a function of the rain storage, i.e., the sediment works to regulate a flood. In this study, the author reports the results of the estimated quantity of rain storage in the river terrace sediment at the time of the storm.

The study area is Nakamura district, located on the river terrace formed by the Sai river, flowing down from Akashina Azumino city, Nagano prefecture to the north. The area is between Sai river running to the north on east side and Nakayama mountains consisting of Tertiary deposits on west side, and the area consists of two terraces, i.e. the fifth (lower terrace) fourth (upper terrace) terrace. The author made a water table map of the study area and set up automatic water level recorders in several wells on the fourth and the fifth terrace for measuring the change in the groundwater level.

The author calculated the changes in groundwater level in the rainfall of August (precipitation 23mm/day) and the rainfall of September (precipitation 116mm/day). The change in groundwater level multiplied the porosity of the aquifer and the area of the surface of the terrace, is the change in storage of groundwater, i.e. the storage effect of the sediment. The quantity of the largest storage of the rain of August was estimated to be $3.5X10^4m^3$, and that of the rain of September was estimated to be $6.4X10^4m^3$.In other words, it was confirmed to be effective in delaying a runoff of the rainfall of 102.9-188.2mm.

The author also observed the change in storage at the irrigation period on the rice field.

In particularly, at the rainfall in August and September, the delayed peak appears in the groundwater level to the rainfall. Therefore, the rain, which fell on the ground surface, infiltrated to underground, and it made ”time lag” from surface runoff. Furthermore, it became clear that there were differences between the time lag of the peaks on the upper terrace and the lower terrace.

Keywords: river terrace, rainfall storage, river deposit, storm, flood