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{Contribution of mountainous flow to the lateral recharge of downstream sedimentary aquifer}

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Groundwater is one of the most important and indispensable water resources. Groundwater consists of 40% of the total water resources utilization in Taiwan. Among 10 groundwater regions, Choushui river alluvial fan is the largest region which supplies 1.2-1.5 billion tons of water annually. The mountainous catchment located in the upstream of Choushui river alluvial fan, and Wuchi river basin, plays an important role in conveying surface and subsurface runoff to the downstream sedimentary aquifers. The purpose of the study is to estimate the annual groundwater lateral recharge from upstream mountainous area using base-flow and rainfall infiltration methods. Meanwhile, Geographic Information Systems (GIS) is applied to facilitate the estimation. The monthly base-flow data of the representative stations of each basin were collected and complied. The amount of groundwater recharge were obtained by multiplying the estimated annual base-flow (m/yr) with the corresponding catchment area (m^2). The total lateral recharge estimated from upper mountainous areas was $10.85 \times 10^9 m^3$/yr where Wuchi river and Choushui river basins comprised 0.273 (25.2%) and 0.812 (74.8%) billion ton/year, respectively. These results are similar to those estimated by O^{18} isotopic analysis where 22% and 78% were from the Wuchi river and Choushui river basins, respectively. Moreover, the estimate amount using C^{14} of the lateral flow in the upstream Choushui river alluvial fan was 0.83 billion ton/year, which is close to our estimation. Groundwater recharged from rainfall infiltration was estimated based on precipitation, evaporation, land use, soil types. The total groundwater recharge obtained by the rainfall infiltration method from upper mountainous area is 1.064 billion ton/year, which is close to 1.085 billion ton/year by the base-flow method. These results provide reliable data of the input of boundary conditions for the modeling of subsurface groundwater flow model.