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Groundwater and surface water interaction in Ulaanbaatar capital city, Mongolia

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In order to clarify relationship between groundwater and river water exchange, we perform water quality survey and quantitative evaluation in Tuul river basin, around Ulaanbaatar city. An investigation of groundwater level on floodplain in Ulaanbaatar, it showed that the groundwater flowing to the east along southwest along Tuul river. This indicates the importance of the Tuul river as a source of groundwater recharge. It seems that groundwater from the north tributaries and south mountains flows into the floodplain. The floodplain groundwater quality showed a concentration of Tuul river water quality. This is considered to support exchange of groundwater and river water shown with groundwater level. North tributary groundwater concentration was higher than Tuul river water. Since, effect of north tributaries showed in the floodplain, it is seemed to be important factor in the floodplain inflow from the north tributaries.

The results of oxygen and hydrogen isotopes, in the floodplain, north tributaries and south mountain groundwater showed different trends. This shows that the different recharge process in each areas. Isotopes in north and south tributaries showed values between Tuul river water and precipitation. This suggests that groundwater in the tributaries are mixture of river and precipitation. The north tributary groundwater showed a small influence of evaporation. In the floodplain groundwater were confirmed with the lower delta value water than Tuul river water, north tributary groundwater and south mountain groundwater. Winter precipitation as a percentage of the total precipitation is very small, although winter precipitation values have lower delta values, it suggest the possibility that effective for groundwater recharge. Furthermore, using tracer of HCO_3^- and SiO_2 , End Member Mixing Analysis determined the relative contribution of origin waters in the floodplain groundwater. Consequently, the floodplain groundwater originate from 46% to 95% of Tuul river water, 2% to 54% of groundwater of north tributary, 0% to 14% of groundwater of south mountain.

Keywords: groundwater recharge, relative contribution, EMMA, semi-arid region