Quality and origins of groundwater in an urbanized area - A case study in Kobe district, central Japan-

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Quality and origins of groundwater in a highly urbanized area was investigated in Kobe district, central Japan, on the basis of hyrdochemical and statistical methods. Groundwater quality is characterized by a wide variety of concentration in both space and time, indicating the complexity of origins of groundwater in the study area. Tritium analyses indicate an actively circulating groundwater system extends as deep as 200m below ground surface. Some deep groundwaters from the depth between 500 and 1500m have stable isotope values indicative of the mixture of deep-seated thermal water (Arima-type groundwater) probably ascending through the faults and other geologic boundaries. The principal component analysis suggests four end-members contribute mainly to the formation of groundwaters: sea water, inflitrating river water, infiltrating precipitation, and Arima-type thermal water. By a mixing analysis, infiltrating precipitation proves to be an important contributor even in a highly urbanized Kobe disitrict whose impervious surface ratio is expected to be more than 70%.