# Evaluation of inflowing nutrients from groundwater on nutrient input in Lake Biwa

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There are few studies on nutrient fluxes from groundwater into a lake. To evaluate nutrient cycling in a lake more in detail, however, it is necessarily to investigate inflowing nutrients from groundwater into the lake.
1) We measured groundwater levels at the two sites (depth, 1 and 2 m) constructed in southern (Yasu) and western coasts (Takashima) in northern part of Lake Biwa in 2015. 2) Radon radioisotope ($^{222}$Rn) concentrations were measured with a RAD7 at 500 m interval along the shoreline of the southern and western coasts, and surface water samples were coincidently collected. Oxygen stable isotope ratio ($\delta^{18}$O), Chloride anion and nutrients (nitrogen, phosphorus, and silicon) concentrations were measured in the laboratory in order to evaluate inflow of the groundwater into the lake. 3) Those dissolved materials were also measured from the groundwater samples were collected in ca. 20 wells situated along the shore of the lake as well as those in river waters. In the eastern coast (Hikone), artesian groundwater was also collected because of aquiclude at 10m deep under the ground. 4) Lake waters at the surface, middle and bottom layers and interstitial waters in the bottom sediments were collected for measuring $^{222}$Rn concentrations.
At the both sites of Yasu and Takashima, high pressures of groundwater indicated flow of the water to the lake under the ground. Spatial distributions in $^{222}$Rn, $Cl^{-1}$ and nutrient concentrations with those in$\delta^{18}$O along the coasts also indicated discharges of groundwater into the lake. High concentrations of dissolved phosphorus phosphate (> 0.1ppm) were detected from several wells out of 15 ones investigated. Finally, $^{222}$Rn concentrations were higher in the site of 20m deep than those in the littoral sites, suggesting higher possibility of groundwater discharges into the lake. This implies inflow of the artesian groundwater from the deep lake floor that has never known previously.

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