

Observation for the temporal variation of lacustrine groundwater discharge (LGD) in Lake Biwa

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Lacustrine groundwater discharge (LGD) is one of the potential nutrient paths from a catchment to a lake. Lake Biwa is the largest freshwater lake in Japan. Some researchers have pointed out the presence of LGD in littoral area of the lake. However, the temporal variation of LGD is not well evaluated in the previous studies. In the present research, we aimed to examine the temporal variation of LGD in Lake Biwa based on the results of continuous measurements at the littoral area.

We conducted the mooring observation for about 9 hours from morning to evening in July 2016. Water temperature, electric conductivity and radon (^{222}Rn) concentration in lake water were measured at the littoral areas near Hikone city. ^{222}Rn is a radioactive element of uranium (^{238}U) series with 3.8 day of half-life. ^{222}Rn is a useful tracer of groundwater discharge because it generally enriched in groundwater than surface water. We also measured flow velocity using ADCP (Acoustic Doppler Current Profiler). ^{222}Rn concentration in lake water was totally high compared with the offshore water. It suggests the nearshore water is influenced by LGD. Water level changed about 5 cm and observed maximum velocity was $\pm 0.2\sim 0.3 \text{ m}^3/\text{s}$ during the period. It indicates exchange process between nearshore water and offshore water occurred in the study area. ^{222}Rn concentration tended to decrease with the increase of water exchange.

Keywords: Lacustrine groundwater discharge, Temporal variation, Lake Biwa