A new groundwater radon monitoring system for climate change observation and research

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We have developed and tested a new groundwater radon monitoring (GRM) system with remote control and data download capabilities. The GRM system consisted of a radon detector, a set of desiccant columns, a VPN unit for remote control and data transmission, and a temperature control unit. An air radon detector (RAD7, Durridge Co., USA) was used to continuously measure the radon concentration in the air layer of the groundwater well. An open loop was formed between the air layer of the groundwater well and the hemispherical chamber of RAD7. The low radon atmosphere was brought into the groundwater well, and the air inside the well with radon emitted from the groundwater was drawn into RAD7 through a laboratory desiccant column. This new system was applied to continuously monitor the concentration of radon in the air inside climate change observation wells. The GRM system has been operating in the three groundwater wells of the climate change observation network since May 2020. The water level, temperature and electrical conductivity of groundwater are simultaneously monitored. In addition, the soil moisture content, temperature and electrical conductivity are monitored near the observation well. Preliminary experiments over the first six months have shown that the GRM system can be usefully used for monitoring groundwater radon for climate change observation and research.

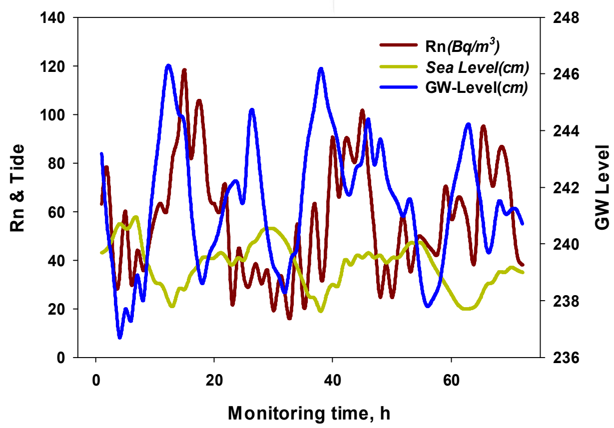

Fig. 1. An example of continuous air radon monitoring in a climate change observation well(Gangreung) (Relationship between groundwater and sea level change, 3 days)

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