



Trend in groundwater quality near FMD burials in agricultural region, South Korea

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After the nation-wide outbreak of Foot and Mouth Disease (FMD) in winter of 2010-2011, thousands of mass burial site had been built all over the country in Korea. Though the burial pits were partially lined with impermeable material, potential threat of leachate leakage was still in concern. In worry of leachate release from those livestock burials during decomposition of carcasses, groundwater samples from wells near the burials were collected and analyzed in between 2011 and 2013. Among the sample locations, 250 wells with monitoring priorities were chosen and had been watched continuously through the years. For trend analysis of groundwater quality, relations between land use types, distances to burial and nitrate concentrations are studied. Types of land use within 300 m radius of each well were investigated. Nitrate concentrations show proportional relations to the area of agricultural activity and inversely proportional to the area of forest. The proportionality decreased with both agricultural and forest area since 2011. When seasonal variation is concerned, slightly stronger proportionality is shown in dry season for both agricultural and forested area. For a qualitative analysis of the trend, non-parametric Kendall test is applied. Especially, regional Kendall test is implemented to find out spatial feature of nitrate concentration. Nitrate concentrations show slow but statistically significant decreasing trend for every well. When the wells are group according to their distances from the nearest burial pit, decreasing trend of nitrate concentration is shown in all groups. However, there was no consistency in significant factor among the groups. Considering the above mentioned results, the groundwater wells near the burials seem to be influence more from agricultural activities near the wells than from the burial leachate. The slow but significant decreasing trend in nitrate concentration is supposed as the result of an increasing governmental interest in managing groundwater quality concerning nitrate concentration in agricultural region.