



Spatial variations of groundwater background concentrations in coastal aquifers, Korea

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In coastal aquifers the mixing between fresh terrestrial water and seawater occurs, which influences groundwater quality. Due to mixing elevated chloride concentrations are often observed in coastal aquifers. In coastal areas terrestrial water-seawater mixing can be caused by anthropogenic activities or natural factors such as tides and sea level changes. Therefore, it is difficult or even impossible to characterize groundwater background concentrations in coastal aquifers. Although it is usual to exclude coastal aquifer when characterizing background concentrations, it is essential to accurately characterize naturally-affected groundwater quality in coastal areas because groundwater is a major water resource for potable, irrigation, domestic uses. So in this work we define groundwater background concentrations as naturally occurring ambient concentrations with excluding groundwater abstraction. Based on this definition, we evaluate groundwater background concentrations in various geologic formations and analyze characteristics of groundwater quality in coastal aquifers by utilizing Groundwater Quality Monitoring System (GQMS) data. The results show that high concentrations of chloride are observed in some coastal areas but not always. Tidal effects and topographical characteristics are thought to be as factors affecting such spatial variations. In some coastal areas high concentrations of chloride are observed with high nitrate concentrations. This means that agricultural practices can attribute to anthropogenic background, leading to elevated concentrations of nitrate. These results provide some essential information for groundwater resources management in coastal areas. Further data collection and analysis is required for evaluating the effect of tide and sea level changes on groundwater quality.