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# Salinization induced by soil liquefaction after the 2017 historic Pohang earthquake in South Korea

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The 2017 Pohang earthquake (Mw 5.4), one of the most significant seismic events in South Korea, accompanied extensive soil liquefaction, resulting in the eruption of saline groundwater to the surface. We investigated the origin of the liquefaction-induced ejecta and quantified the mixing ratios of water released from unconsolidated sediments using water isotopes ($\delta^{18}O$) and ion concentration data. The isotopic composition of the ejecta was analyzed in comparison with potential water sources, including freshwater and seawater, to determine its origin. A two-endmember mixing model based on $Cl^-$ and $\delta^{18}O$ was applied to estimate the seawater contribution in the liquefaction ejecta, revealing an average seawater fraction of 3.1 ± 0.7%. These findings indicate that pore water from unconsolidated sediments, influenced by saline groundwater, was mobilized during the liquefaction process and expelled to the surface. The results provide critical insights into the hydrogeochemical consequences of earthquake-induced liquefaction and the potential long-term impacts of salinization on soil and groundwater quality in coastal areas.