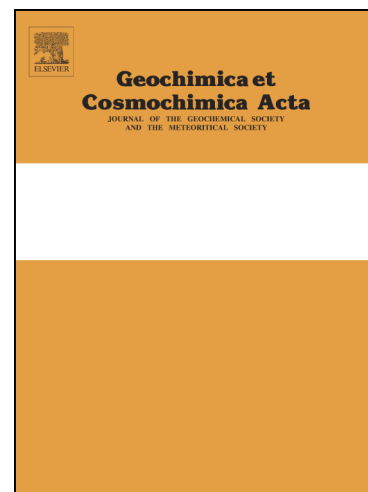


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Using ^{81}Kr and Noble Gases to Characterize and Date Groundwater and Brines in the Baltic Artesian Basin on the One-Million-Year Timescale

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Abstract

Analyses for ^{81}Kr and noble gases on groundwater from the deepest aquifer system of the Baltic Artesian Basin (BAB) were performed to determine groundwater ages and uncover the flow dynamics of the system on a timescale of several hundred thousand years. We find that the system is controlled by mixing of three distinct water masses: Interglacial or recent meteoric water ($\delta^{18}\text{O} \approx -10.4\text{‰}$) with a poorly evolved chemical and noble gas signature, glacial meltwater ($\delta^{18}\text{O} \leq -18\text{‰}$) with elevated noble gas concentrations, and an old, high-salinity brine component ($\delta^{18}\text{O} \geq -4.5\text{‰}$, $\geq 90\text{ g Cl}^-/\text{L}$) with strongly depleted atmospheric noble gas concentrations. The ^{81}Kr measurements are interpreted within this mixing framework to estimate the age of the end-members. Deconvoluted ^{81}Kr ages range from 300 ka to 1.3 Ma for interglacial or recent meteoric

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