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Radiokrypton Dating of groundwater, ocean water and glacier ice

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The long-lived noble-gas isotope ^{81}Kr, ^{85}Kr, and ^{39}Ar are ideal tracers for environmental water and ice samples. Together with ^{14}C, they cover an age range from a few years to 1.5 million years. ^{81}Kr-dating, a concept pursued over the past four decades, has become available recently to the earth science community at large due to the development of the Atom Trap Trace Analysis (ATTA) method. In order to meet the increasing demands from the earth science community, we have established a new laboratory dedicated to radiokrypton and radioargon dating. For Kr-dating, we can measure samples as small as 1-2 μL STP of Kr gas, which is contained in about 10-20 kg of water or ice. This allows us to perform radiokrypton dating not only on groundwater but also on glacier ice and ocean water. The development of a setup for ^{39}Ar is currently in progress, aiming at a sample size of 1-2 mL STP of argon, corresponding to a few kg of water or ice.
Here, we will present our latest developments on radiokrypton and radioargon dating, including ATTA systems, degassing systems for groundwater, ice and ocean water, and purification systems for dual krypton/argon output.

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