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Extended Abstracts

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title: **In situ detection of thermal drawn springs in the Danube riverbed using helium and radon isotopes**

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The western part of the capital of Hungary is a large karstic mountain region where many thermal springs break to the surface. Many of them arise in the bed of the Danube River, under the water surface. Knowledge of the locations of these springs and of the dependence of their recharge rates on the river water level is of major interest for the local thermal water resource management.

We intend to use in-situ measurements of dissolved ^{222}Rn and helium ($^{3}He/^{4}He$ ratios) to study the related groundwater/surface water interaction (GSI) processes. The concentrations of both gases in the thermal waters probably exceed that of the river water by at least one or two orders of magnitude, making them particularly suitable GSI tracers. As it has been already mentioned we are planning to present a field survey during which we detected drawn springs in the Danube River bed using in-situ measurements of helium and radon dissolved in the water as well as other suitable noble gases and physical and chemical water parameters (conductivity, temperature, etc.).

We will show how sampling of these tracers has been preformed. In the winter of 2010, when the river water level is low and the water is cold we are planning to carry out a field measurement. The sampling will be done in the following way: the water at the bottom of the river bed is pumped into the membrane inlet system of a portable quadrupole mass spectrometer (QMS). The dissolved gases are penetrating through the silicon membrane and entering the ion source of the QMS, enabling us to in situ analyse their concentrations. For the radon measurement, the water is flowing into a vessel that is equipped with a long silicon tube of wall thickness of 0.4 mm. Both ends of the silicon tube are attached to a radon detector device making a closed circuit for the gases in the tube and the radon detector. The pump in the radon detector makes the entire gas to circulate. Between the river water and the gas in the silicon tube a gas exchange occurs until equilibrium is reached. The response time of this sampling technique is about a few minutes. Additionally, noble gas samples in copper tubes will also be taken so that more precise helium measurements are performed.

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