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Multi-isotope-measurements (18O/2H,3H/3He,13C/14C) confirm old ascending karst spring-water at the western border of the Pannonian Basin (Austria).

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The Winden Springs and two drilled extraction wells are situated at the North-East slope of the Leitha Mountains. They are a small mountain range (max. 484 m) extending 30 km in the SW-NE direction at the West-side of the Lake Neusiedl. The region is characterised by major SW-NE trending fault zones forming the Western margin of the Pannonian Basin (Austrian-Hungarian border). The Winden Springs are used as drinking water source from the regional water supplier (Wasserleitungsverband Nördliches Burgenland). The Winden Spring discharge is 13 L/s and the two additional extraction wells deliver additional 20 L/s. All the waters are from the alkaline-earth-carbonate – sulphate type with an electric conductivity of 700–1000 μS/cm and a mean water temperature of 13 °C. All three water extraction sites are in the area of a major fault zone parallel to the Leitha Mountains. The core of the Leitha Mountain range is formed by Variscian mica-schists and paragneiss. They are overlain by Triassic dolomites and Tertiary Leitha-Limestones. In a recently drilled exploration-hole the tectonically deformed dolomite was recorded down to 150m depth. From the results of the multi-isotope-investigations (δ18O,2H, 3H/3He, 13C und 14C) on all three water-extraction points during May – June 2017 in combination with basic hydrogeological investigations following conclusions can be drawn:

• The spring and the well waters are a mixture of newly formed groundwater and on the fracture-zone ascending old water. This is supported by high helium-4 concentrations, the low radiocarbon(14C)-values and the slightly elevated groundwater temperature of 13-14°C.

• Depending on the estimated end-members a portion of 10 to 50

• Based on the radiocarbon(14C)-values of the sulphate – rich ascending waters a mean transfer time (MTT) of 10,000-15,000 years can be calculated. This agrees with relatively depleted δ18O-values of -12 bis -11.5 ‰ which indicates recharge during colder climates.

• The estimate of the MTT of the “young” water fraction is complicated by high 3He/4He-ratios, which indicate a mantle helium contribution. Tritium-measurements allow an estimated time range of 10 to 40 years.

• The “young” water fraction is characterised by high nitrate concentrations, which originate from vineyard fertilisation. The low yearly precipitation rates (400-600 mm) limit the dilution of the nitrate concentrations.

• In the Winden Spring and the shallow extraction wells (< 30m) groundwater is naturally mixed, which allows the compliance with the nitrate and sulphate drinking water limits.