



HAL
open science

Detecting flow processes in peatlands using Li isotopes

Philippe Négrel, Martin Šanda, Romain Millot, Alena Kulasova

► **To cite this version:**

Philippe Négrel, Martin Šanda, Romain Millot, Alena Kulasova. Detecting flow processes in peatlands using Li isotopes. EGU General Assembly 2011, Apr 2011, Vienne, Austria. pp. EGU2011-3786. hal-00582477

HAL Id: hal-00582477

<https://brgm.hal.science/hal-00582477>

Submitted on 1 Apr 2011

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Detecting flow processes in peatlands using Li isotopes

Philippe Negrel (1), Martin Šanda (2), Romain Millot (3), and Alena Kulasova (4)

(1) BRGM, Orleans, France (p.negrel@brgm.fr, +33 2 38 643446), (2) Faculty of Civil Engineering, Czech Technical University, Prague, Czech Republic (martin.sanda@fsv.cvut.cz), (3) BRGM, Orleans, France (r.millot@brgm.fr, +33 2 38 643446), (4) Water Research Institute T.G.M., Prague, Czech Republic

Mountainous fens are important hydrological components of the headwater catchments in Jizera Mountains, (the Czech Republic). Experimental catchment Uhlířská (1.78 km²) is formed by Paleozoic crystalline bedrock overlaid by shallow highly permeable cambisol on the hillslopes, whereas the thick saturated glacial deposits in the valley are overlaid by histosols. Standard meteorological and hydrological monitoring is supplemented by measurements of the soil moisture, soil pore water suction, water table fluctuation in the saturated riparian zone of Černá Nisa creek. Isotopes in water molecule ¹⁸O, ²H and ³H are analyzed in precipitation, shallow groundwater, soil pore water, groundwater and stream outflow to select proper hypothesis about the flow formation. Complementary sampling for the Li-isotopes ($\delta^7\text{Li}$) was performed in the period of 2008-2010 on the monthly basis in precipitation, shallow groundwater and outflow waters.

Lithium contents fluctuate significantly between the precipitation (mean: $0.35 \pm 0.21 \mu\text{g/l}$), the shallow groundwater (mean: $1.87 \pm 0.23 \mu\text{g/l}$) and the outflow (mean: $3.10 \pm 0.36 \mu\text{g/l}$). There is no link between the Li contents and the rainfall amount but a positive trend can be seen between Li contents and the outflow discharge. First set of Li-isotopes data shows an increase in the $\delta^7\text{Li}$ between the precipitation (mean: $+5.6 \pm 2.7\%$), the shallow groundwater (mean: $+13.9 \pm 4.4\%$) and the outflow (mean: $+18.4 \pm 3.5\%$). There is no evidence of link between the $\delta^7\text{Li}$ and the Li contents (as $1/\text{Li}$) revealing no simple mixing.

Comparing the data reveal causalities between content of lithium isotopes in precipitation, shallow groundwater in wetlands and outflow from the catchment and prove that naturally present lithium isotopes can be a very useful tool in hydrological tracing.

This research is supported by the Czech Science Foundation projects No. 205/09/0831, by IAEA research contract 14007, Czech Ministry of Environment No. SP/2e7/229/07 and by BRGM Research Division.