

THE SOURCE OF THE Ba, Sr IN KARSTIC CARBONATE AQUIFERS (SWITZERLAND)

1TCHEPKAJA NATALIA, 2BENSIMON MICHAEL, 2KILCHMANN SYBILLE. 1Far East Geological Institute, Vladivostok, Russia; 2Swiss Federal Institute of Technology, Lausanne, Switzerland.

The source and behavior Ba and Sr in several natural karstic carbonate aquifers of the Alpine and Jura belts in Switzerland has been investigated using shaker-leaching test and computer modeling (PHREEQCI). The aquifers studied are composed of platform and basin limestones and included pure limestones, marly limestones and evaporites. Shaker-leaching test was performed using all representative aquifer's sediments. Prior to leaching, samples were crushed and then divided according to size of particles into three groups: less 0.2mm, in range of 0.2-0.63mm and more 2mm. Leaching test was realized in different conditions: in open system, where CO₂ was bubbling during 7 days (pCO₂ at 0.3 bar) at 25°C, and in closed system at 25 and 6°C. The contents of elements in leachant were determined every 24 hours by ICP-MS. The sediment/leachant ratio during all tests was 1:10. The results indicate that: 1. The pressure CO₂, in all natural springs is about 10-2atm; 2. A rapid leaching occurs in these rocks even under deionised water: the highest level of Ba was settled in 24 hours, Sr - in 3 or 6 days from the beginning of test; 3. The origin of barium is caused by decompositions of carbonate minerals, where barium replaces calcium. Limiting factor of barium mobility is the SO₄ concentration in water; 4. The source of strontium differs in these waters. In carbonate aquifer strontium is derived only from carbonate minerals, whereas, in evaporite aquifer one comes only during weathering of sulfate minerals.