

**Radioactive tracers in groundwater of the European North of Russia ALEXANDER I. MALOV Institute of Environmental Problems of the North at the Ural Branch of the Russian Academy of Sciences, Arkhangelsk, Russia malovai@yandex.ru  
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Isotopic tracers are known to be tools to refine groundwater conceptual models and their management strategies, including protection actions. Using of isotopic tracers may provide a support for identifying flow paths and transit time distributions in aquifers. At the same time, the using of them individually does not always allow to carry out a full account of all the factors necessary for the task. We used the information on the joint distribution of isotopes of carbon, tritium and uranium in 50 groundwater samples taken in 2011-2014 from the thermal springs draining carbonate deposits at the junction of the East European Platform and the Pre-Urals Foredeep and wells in the sand and carbonate sediments at the junction of the Mezen syncline with Baltic shield. The researches allowed to identify the most vulnerable areas of the surface contamination of fresh groundwater in Quaternary and Carboniferous sediments, as well as in the least mineralized groundwater in sediments of the Padun suite of Vendian. Radiocarbon age of these waters is defined as modern. It was found that all the fresh waters was formed in the Holocene. U concentration in them correlate with age, reaching 14 ppb with total alpha activity of 0.8 Bq l. The maximum concentrations of up to 16-20 ppb with total alpha activity 1.7 Bq l was found in the salt waters with TDS of 8-13 g l at the redox barrier in the aquifer. These waters were formed in the Late Pleistocene, and their radiocarbon and uranium-isotope age is 27-57 ka. Behind barrier U concentration sharply drops to 0.1-0.2 ppb. Here is the most ancient water with total dissolved solids of up to 22 g l and uranium isotopic age of 130-580 ka, corresponding to Middle Pleistocene. In general, the studies have contributed to clarify of conceptual models of groundwater in the investigated hydrogeological systems and a deeper understanding of the evolution of uranium isotopes in groundwater systems.

