ESF Project "Establishment of interdisciplinary scientist group and modelling system for groundwater research"

Past, present and future formation of groundwater resources in northern part of Baltic Artesian Basin

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Location of Estonian model in BAB 1/2



Location of Estonian model in BAB 2/2









Groundwater composition 1/2

Groundwater is fresh (TDS <1 g/l) in Northern-Estonia, salinity increases towards south – south-east (TDS 1 to >10 g/l)



Groundwater composition 2/2



Na-HCO3-CI type of water in northern part of the aquifer that is replaced by the Na-Ca-CI type water towards south and south-east

Origin of Groundwater

Isotope and geochemical investigations as well as noble gas analyses indicate that the water in the CVAS system in northern Estonia was recharged during the last glaciations.

Intruded water has cold climate origin.



 δ^{18} O composition of the groundwater varies between -18 to -22‰ VSMOW, whereas the isotope composition of the modern precipitation is only -8 to -11‰ VSMOW

Conceptual model for intrusion of glacial water



Na

HCO3

C



Preliminary results of glacial water intrusion modeling

Advancing glacial





Preliminary results of glacial water intrusion modeling

LGM stadium





Preliminary results of glacial water intrusion modeling

Modern/Preindustrial



Summary

Water composition in CVAS was changed significantly during the last glaciations.

Strongly depleted O and H stable isotope composition, absence of 3H and low radiocarbon concentration are the main indicators of glacial origin of groundwater in the CVAS in northern part of BAB

First results of modeling suggest that during the intrusion period lasting 7.3–9.3 ka the front of glacial thaw water movement had southeast direction and reached to 180–220 km from CVAS outcrop in Baltic Sea.

Thnk you for your attention!

