Computational technologies for modeling thermal processes in permafrost zone

Sirditov I. K.[1], **Vasilieva M. V.**[1,2], **Stepanov S. P.**[1]

[1] *M.K. Ammosov North-Eastern Federal University, Russia*
[2] *Institute for Scientific Computation, Texas A& M University*

In this work, we present results of numerical simulations of thermal processes with phase change. This problem is considered in a three-dimensional formulation with a complex variable geometry. The computational domain is a multi-layer soil, taking into account the installation of a large number of piles with a small diameter.

Numerical simulation of the problem was carried out with the following variants of the geometry:

Stage 1 - geometry with soil and vegetation layer;

Stage 2 - geometry after removal of soil-vegetation layer;

Stage 3 - geometry with the addition of a mound;

Stage 4 - geometry taking into account the installation of piles.

To solve the problem used FEniCS - computing platform and the programm developed by us, Heat Transfer.