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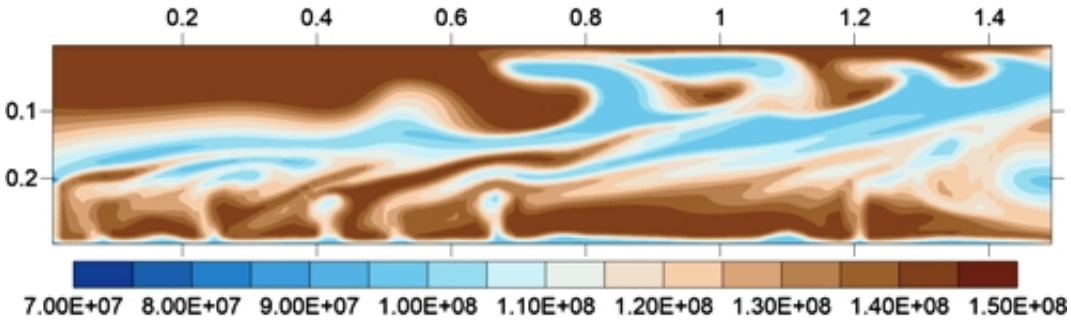
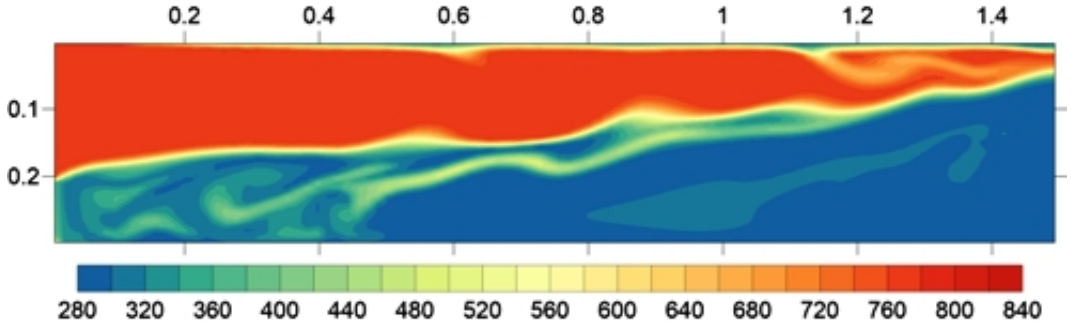
Features of the introduction of magmatic melts in permeable zones of the platform cover

Yury Perepechko, Konstantin Sorokin, and Sherzad Imomnazarov
Institute of Geology and Mineralogy SB RAS, Novosibirsk, Russian Federation

The problem of the introduction of heterophase magmatic melts into the conducting channels of the lithospheric mantle under the cratons of the Siberian platform has been studied numerically. The analysis of the features of the introduction of melts was carried out on the basis of a hydrodynamic model of the evolution of magmatic and fluid-magmatic systems. The mathematical model describes the two-speed dynamics of the redistribution of hot heterophase melts and magmatogenic fluids in the flow during their movement from the generation zones to the platform cover, as well as the processes of heat and mass transfer between melts and rocks in permeable zones of the lithosphere. The nature of the flow of mixtures of liquid fractions of aluminosilicate, sulfide, native and oxide liquids, in which a sub-liquid solid phase appears during movement and decompression boiling occurs, the features of heat and mass transfer processes determine the type of magmatic and magmatogenic deposits of the trap formation of the Siberian platform. The flow of magmatic melts in a wide temperature range of 300-1200 °C, the viscosity of the melt phases of 101-106 N, as well as the rate of penetration and the degree of stratification of the heterophase magmatic flow were studied.





The figure shows an example of the randomization of an intrusive flow. (a) (b) An example of the development of heterogeneity in the distribution of the concentration of particles of the dispersed phase (a, m-3) and temperature (b, °C) in an initially stratified magmatic flow embedded in the host rocks. The temperature of the introduced flow is 500 °C, in the channel at the initial moment standard thermodynamic conditions; the dynamic viscosity of the melt is 102 P. The work was carried out with the financial support of the Russian Science Foundation, grant No. 24-27-00411.