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Heat production by energy viscous dissipation at the stage of the Earth's accumulation.

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In [1] it is suggested the model of Sun's protoplanetary cloud matter differentiation during the process of terrestrial planets accumulation. In [2] it was shown that the energy released during the decay of short-lived radioactive elements in the small size more than 50 km, it is enough that the temperature inside of the protoplanet becomes larger than the temperature of iron melting. It provides a realization of the matter differentiation process and convection development inside the inner envelopes. In [3] it is shown that during the sequence of changes in the growth of accumulated protoplanets, three types of driving mechanisms of convection are realized: internal heat sources; heated top; finally in the outer forming core of the Earth, heated from bottom and chemical and thermal convection. At all stages of proto Earth's development the convective heat-mass transfer becomes a most significant factor in the dynamics of the planet. However, the heat release due to friction in the viscous liquid is still considered only for the formed planetary envelopes with a constant radius and angular speed.
In this paper we present the first results of numerical modeling of thermal evolution of 3D spherical segment for a protoplanet with increasing radius. To describe the planetary accumulation Safronov equation is used [4]. For the quantitative determination of the released heat by viscous friction a system of hydro dynamic equations of a viscous liquid is used. The obtained results show that the heat input due to viscous friction heat release at the early stage of planetary accumulation was very significant.
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