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Dynamic and heat balance in two-body system Earth-Moon at the stage of accumulation.

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In the papers [1, 2] it is published the differentiation model of the proto planet cloud during the accumulation of the Earth's group planets. 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. With increasing of the Earth's mass and radius, the forming region of the outer core remains in a molten state. In [3, 4] it is shown that exists a most significant factor in the dynamics of the orbital motion and in the increasing of the internal heat of the two-body system Earth-Moon. However, we do not know mathematical studies of the dynamics of such system at the accumulation stage. The first results were published in [5].

In this paper we present any results of numerical modeling of thermal evolution of 3D spherical segment for a protoplanet with increasing mass and radius and possible falling of bodies and particles. To describe the planetary accumulation Safronov equation is used. 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. That influence is defined by a set of factors. It was changed the width of the formed outer core. It was changed the distribution of the temperature and hydrostatic pressure inside the core and reciprocally the viscosity of the matter. It had been changed the orbit parameters of the system Earth-Moon. The received results depend from the parameters, the values of which are known with large degree of uncertainty. They have to be specified during next studies.

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