



Density variability - fundamental basis of structure formation and tectonic-geodynamic evolution of the Earth

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It was shown that there are some common geomechanical basis of process of consolidation, deconsolidation, phase transitions, formation of zones of small shear stiffness (waveguides), realization of material and energetic mass flow in the internal structures of the Earth based on fundamental properties of basic systems of equations of nonlinear mechanics of the deformed bodies, data and results of Green, Ringwood, Liu's known experimental studies.

Its instability for different geological media was shown studying the distribution of medium density depending on deformation changes.

Distinguishing various forms of instability it was shown that there is general deformation mechanism of consolidation process of compressible medium according to which transfer to deconsolidation occurs at certain stages due to specific change of equilibrium states.

Instability of deformation process contributes to emergence of geometric structures in composition of geological medium which are favorable to form deconsolidation zones and zones of small shear stiffness.

Destruction by delamination at various depth of the Earth's interior can lead to formation of voids of various scale. Various forms of instability can be realized in the process of further evolution in the vicinity of these free surfaces, and voids can be filled by the loosened mass, i.e. deconsolidation process occurs under compression conditions.

More hard bodies of local scale in the form of rod, strips, plates, cylindrical bodies, voids etc. can exist at different depth of mantle. These bodies can lose the stability under compression conditions. Therefore, part of their material and environment are loosened and deconsolidation process occurs again.

The above described cases significantly depends on the realized form of deformation. Unevenness of deformation has a great value.

Partial melting and magma formation can occur in these deconsolidated zones depending on mineral associations, petrochemical properties, thermobaric conditions and depth. This process becomes more feasible in case, when water appears as a result of dehydration in the considered zones.

Some of these zones of deconsolidation can turn to focus of liquefied mass and give the beginning to mass flow on various directions in further evolution.