

THE NEW DATA ON THE EARLY STAGE OF DEVELOPMENT OF THE EARTH, MARS, THE MOON AND MERCURY. A.V.Dolitsky¹, R.M.Kochetkov², E.A. Kozlova³, J.F.Rodionova³, 1 - United Institute of Physics of the Earth RAS, Moscow, av13868@comtv.ru, 2 - Moscow Technical University of communication and information, Moscow, krmkrm@rol.ru. 3 - Sternberg State Astronomical Institute, Moscow, jeanna@sai.msu.ru

The graphic method of the analysis of an arrangement of linear structural elements on geographical and geological maps of continents (A.V.Dolitsky, [1]) has allowed to find out global stress fields of the past and among them one which directions (the main normal and maximal tangents) describe more than 80 % of all linear elements of a relief. It has given the basis to the author to accept it for an initial global stress field of the Earth. Association in system of poles of a global stress field has allowed to find its trajectory and to establish laws of rotation of the mantle over the core [2]. In 2003. A.V.Dolitsky and R.M.Kochetkov have developed a computer method of the similar analysis of an arrangement of faults. Z.F.Rodionova and F.F.Ajnetdinova have created a databank on faults of Mars, and it has been successfully used for a finding of a trajectory of movement of its geographical pole (rotation of the mantle over the core). Results of the analysis have been reported on the previous Microsymposium [3]. Later the computer program has been advanced. It allows to connect now databanks on faults of the planets, created on the certain rules, and to find coordinates of poles of a global stress field, as the points of crossing of arches of the big circle describing these faults. The found poles share program way on density of an arrangement on 3-4 groups. Databanks on faults (set by the coordinates of their final points) of the Earth and the Moon (A.V.Dolitsky, N.N.Semenova), Mars (Z.F.Rodionova) and Mercury (E.A.Kozlova) are created. As against rotational stress fields, symmetric to geographical poles, the found out global stress fields (and the faults) are symmetric to points of the most powerful explosions happened at early stages of development of the Earth and planets of terrestrial group. The arrangement of the areas of development of such explosions allows to do new conclusions on features of their development.

The computer analysis of an arrangement of faults on a surface of the Earth has opened completely unexpected laws. Poles of global stress fields are found within the limits of the areas of the different form. The greatest number of poles and their greatest concentration are found out within the limits of circles in diameter in 3000 km in the Central Europe (the center - pole L1, Fig.1) and in antipodal areas of the Southern hemisphere (the center - pole L2). These poles were earlier established by the author graphic methods [1]. Appeared, that there is more than 60 % from the common number of such poles. Probably it is polar areas of the Earth where from the lower mantle, at non-uniform rotation of the Earth and change of its axial compression, the fused magma acted, causing the crushing of the mantle accompanied with formation of

global stress fields. Consequence of such magmatic outpourings in polar areas could become formation in them of superfluous weights and their displacement (in structure of the mantle) to equator under action of centrifugal forces of rotation of the Earth. Zones of high concentration of the poles, containing about 20 % from their common number, are found out along four axial zones of meridian directions the prodeletings, uniting circular (polar) areas (Fig.2). Probably, these zones of meridian directions have arisen as a result of fast reduction of volume of the Earth at formation of the core (Fig.3). That fact, that more than 80 % of poles have strictly ordered arrangement on a surface of the Earth, testifies to an invariance of an arrangement of faults answering to them, hence, about an invariance of an arrangement of the blocks divided by them. It means, that the displacement of blocks during a geological history and shifts, at the summation do not collect, and are mutually compensated, specifying elasticity of lithosphere. The marked magmatic processes proceeded, apparently, in the lower mantle under action of heat just the arisen the core when the upper mantle remained still cold. Result of these processes became extensive outpourings of granitoids, containing radioactive elements. By the data of the computer analysis, contours of storage sites of these breeds are close to contours of modern continents Eurasia (Fig.4) and America N. and S. (Fig.5). It means an invariance of their arrangement and their origination from granitoids of a lower mantle at the early stages of development of the Earth. The nature of a continental crust is those. Process of warming up of the mantle, connected with disintegration of radioactive elements later began to develop and prove. It has caused carrying out from it on a surface of gases and the liquids which have formed air and water environments. The upper mantle, having lost a significant part of the liquid and gaseous components (existing in it originally as ice) has been sated with the new mineralization which has come from depths and metals. The nature of an oceanic crust is those. The computer analysis of an arrangement of faults of Mars (Fig.6), the Moon (Fig.7) and Mercury has found out existence at Mars four depressions of meridian directions, at the Moon - three and at Mercury - two. On an arrangement of these depressions in an equatorial belts of planets and on meridian directions of their axes as at the Earth, their formation can be counted simultaneous to occurrence of cores at these planets. Conditions of formation of a continental and oceanic crust of these planets are same with the Earth conditions, probably.

References:

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3. Dolitsky A.V., Rodionova J.F., Kochetkov R.M., Ainietdinova A.F. *Mars: Movement of Geographical poles and deformation of its surface. Microsymposium 38, MSO15, 2003.*

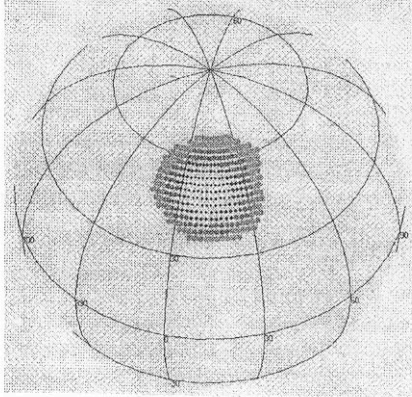


Fig. 1

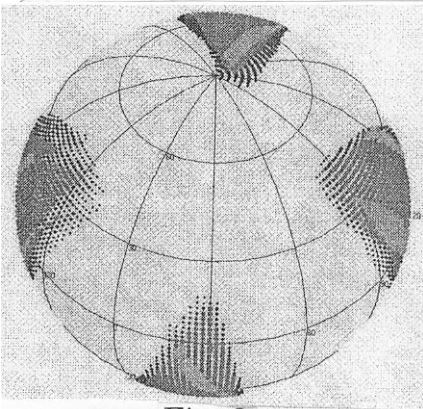


Fig. 2

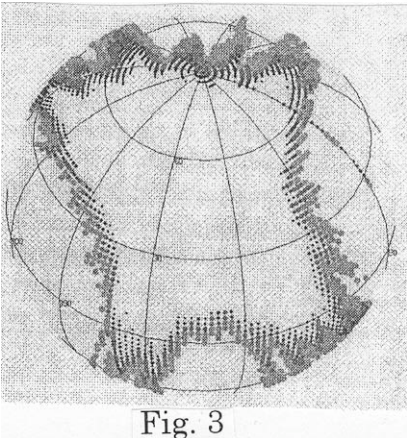


Fig. 3

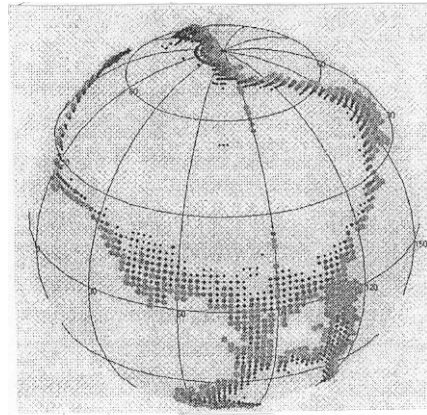


Fig. 4

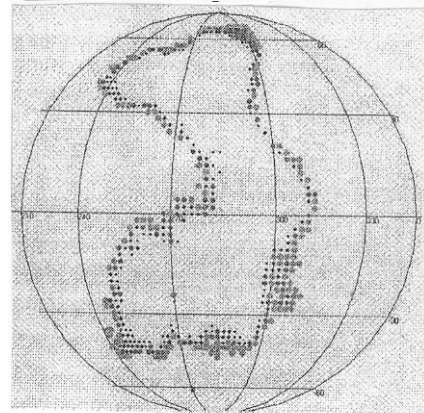


Fig. 5

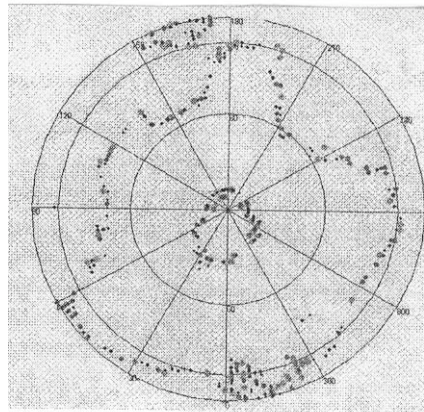


Fig. 6

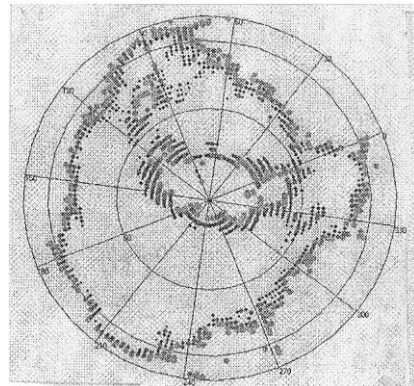


Fig. 7