Geophysical Research Abstracts
Vol. 21, EGU2019-2198-1, 2019
EGU General Assembly 2019

Regularities in orientation and length distributions of the Earth's crust faults and lineaments

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The rose-diagrams for orientation and distribution curves for the fault and lineaments lengths of the Earth's crust are constructed. The Russian Platform, Marginal seas of Japan, Barents, Chukotka and the Magellan Mountains in the Pacific Ocean were studied. It is found that there is a clear correspondence of the directions of the systems of faults and lineaments to the directions of the regmatic Earth's crust network. This correspondence is explained as the action of mechanical stresses caused by irregular axial rotation of the Earth. The Cumulative and PDF distribution curves for the fault lengths and lineaments are constructed and studied with different statistical distributions such as: log-logistic, log-normal, and power-law with stretched exponential cut off. It is shown that log-normal and power-law with stretched exponential cut off distributions describing statistics of multiplicative processes are most successful in modeling the Earth's crust faults and lineaments lengths distributions. Considering that the areas mentioned above are in different regions of the globe, in different tectonic zones, and are in the crust of different types, one can speak of a global fault formation mechanism(s). The regularities described above make it possible to explain the connection of the fault length with its depth, which (connection) may depend on the geological history of the region and its deep structure. Since lineaments and faults are a surface manifestation of a variety of deep processes, the regularities found can be useful in the study the deep geodynamic processes with regard to metallogenic, seismic and other features of the regions.