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New revision of the previously revealed mantle transition layer at the depth of 795-1505 kilometers

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The study on correlation of number of registered earthquakes with their epicentral distances, magnitude and depths has been made. We revealed two particular regions within which only few deep-focus earthquakes are registered. One is well-known Gutenberg's shadow zone, which is observed at the distances of 11,000 km and caused by existence of the outer core. We focused our attention at another zone, observed at epicenter distances 3,500 - 6,000 km range, analysis of which led to the creation of a new model of the Planet structure, with a newly-discovered layer in the mantle at the depth of 795-1505 km. Hereby, this study provided us with an opportunity to developed a method of analyzing the deep structure of the Earth mainly on the basis of the quantity of registered events. To develop this method we have analyzed tens of thousands earthquakes, recorded by a large number of seismic stations, covering the whole Globe. The studied events stating with magnitude from $M = 4.0$ with range of epicentral distances of 250 kilometers. Thus, it was revealed that mantle, as well as the Earth crust and core, has three layers. Moreover, analyzing seismic data we came to conclusion that that the newly-discovered layer is manifested through lower density and relatively greater plasticity in comparison with the above-placed mantle layer.

The discovery of this layer has important scientific significance because using it, it can be also explained why earthquakes, as well as mantle convection, are limited to maximum depths of 600 -700 km.

However, initially 500 events were taken to study this distribution. Abnormal changes of seismic noises on the edge of the earthquakes' main shocks have been observed in these events. These events were the evidential basis of the revealed regularity of abnormality of seismic noises. It was registered as a scientific discovery by the State Committee on Discoveries and Inventions of the USSR in March, 1988, with a priority from May, 1979. In addition to the above-mentioned studies, intensity distribution of seismic noises abnormalities on epicentral distances within the frequency ranges of 0.7 - 1.0 Hz, 1.0 - 2.0 Hz, 2.0 - 4.0 Hz and 0.7 - 16.0 Hz has been studied by Doctor N. Akhmadov. It was revealed that weak high-frequency seismic noises were also a sensitive tool to explore many issues, including studies on the medium structure. This confirmed the previously made conclusions on existence of mantle transition layer in the Earth structure.