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Study of relations of P-and S-waves velocities in the vicinity of large gas-oil field Gazli, Uzbekistan

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THE STUDY OF RELATIONS OF P-AND S-WAVES VELOCITIES IN THE VICINITY OF LARGE GAS-OIL FIELD CAN HELP TO OBTAIN NEW DATA ON THE PROPERTIES OF COLLECTOR LAYER'S ROCK.

FOR CALCULATIONS WE USED RECORDS OF 215 SMALL GAZLI EARTHQUAKES RECORDED WITHIN 1 MONTH TIME PERIOD AT LEAST BY 6 DIGITAL STATIONS. DURING THE SATURATION OF A ROCK WITH FLUID ALONG WITH THE GENERAL PRESSURE RAISE, A STRONG INCREASE OF P-WAVES VELOCITY IS OBSERVED. AT THE SAME TIME S-WAVES VELOCITY CHANGES VERY SLIGHTLY OR DOES NOT CHANGE AT ALL. THE CALCULATION OF THE RELATIONS OF P-AND S-WAVES ALLOWED US TO HAVE AN IDEA OF THE V_p/V_s CHANGES WITH DEPTH. THE INCREASED VALUES OF V_p/V_s ARE TYPICAL FOR DEPTH 2 KM AND DEEPER. IN THE DEPTH INTERVALS OF 0 TO 1 KM, 2-6 KM, AND 10-12KM, V_p/V_s VALUES ARE SIMILAR TO THE AVERAGE VALUES FOR THE REGION. LOW VALUES OF V_p/V_s VELOCITIES RELATIONS ARE OBSERVED AT DEPTHS OF 6-10KM AND 10-12KM. A SPECIAL ESTIMATION OF THE P- AND S-WAVES VELOCITY RELATION CHANGE FOR THE GAZLI STRUCTURE HAS BEEN CARRIED OUT.

THE RESULTS SHOW THAT SOME REGULARITIES CAN BE REVEALED IN SPITE OF A LARGE DIFFERENCE IN VALUES. IN THE DEPTH INTERVAL OF 1.5 TO 4 KM, WITHIN THE REVEALED DEEP CHANNEL OF INCREASED SEISMICITY, EARTHQUAKES DO NOT USUALLY OCCUR; AND THE ABRUPT CHANGE IN V_p/V_s VELOCITIES RELATION ALSO TAKES PLACE HERE. THE CAUSE OF THIS DIFFERENCE MAY BE DETERMINED IF

A MORE DETAILED GEOPHYSICAL INVESTIGATIONS ARE CARRIED OUT IN THE REGION.

SEISMIC TOMOGRAPHIC CROSS SECTION OBTAINED FOR THE DEPTH 5 KM WAS CORRELATED WITH EARTHQUAKE EPICENTERS LOCATION AT THE SAME DEPTH. RESULTS SHOWED THAT MOST EARTHQUAKES OCCURRED IN LOWER VELOCITY LAYER AND BOUNDARY BETWEEN LAYERS. STRONGEST EVENTS WERE LOCATED AT BOUNDARIES BETWEEN LOWER AND HIGHER VELOCITY LAYERS.