P077 SEISMIC REFRACTION INVESTIGATIONS OF SALAIR MULTIMETALLIC DEPOSIT

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High and variable values of velocity gradient are usual for seismic cross section in ore deposit regions. Refraction traveltime curves interpretation is very hard by using traditional methods. This paper illustrates possibility of new refraction interpretation technique using local approximation of real velocity fields by homogeneous functions of two coordinates. This 2-D inversion method is simple inversion method for two reversal traveltime curves. Final cross section for complex traveltime curves system is constructed by superposition of local velocity fields corresponding to different pairs of reversal traveltime curves. This is full automatic technique not interactive.

The seismic profile is disposed at the north-east of Salair deposit which contains multimetallic ores. The deposit is located on the slope of a large anticline fold, disposed near conjuction of Salair ridge and Kuznetskaya trough (Russia). The ore field is oval lense of magmatic and methamorphosed rocks, enclosed in limestones. The area enriched by metalls and barit are formed above intrusive bodies along transversal faults. Chemical and physical weahtering crusts and karst troughs are developed there.

The seismic works were carried out by Central Geophysical Expedition (Novokuznetsk, Russia). The profile length is 750 meters. Many wells have drilled along the profile. The fourteen wells have terminated at the limestones top. The two wells have reached the karst trough bottom. The four wells have passed the whole seismic cross-section depth near karst trough.

Refraction traveltime curves (Fig.1) have complex form and the vertical contacts presence are found there. The traveltime curves were interpretated by homogeneous function technique by using "Godograf" PC program developed in the Moscow State University.

The velocity contour lines are drown with constant (200 m/s) interval on the cross section (fig.2), so a distance between isolines is reverse proporsionate to velocity gradient value which is approximately constant inside every layer. Therefore velocity values and velosity gradient values are known for every cross section points and it allows to distinguish geological layers on the 2-D seismic cross section. Next layers and structures are distiguished on the cross section (from top to bottom): loose subsurface rocks, terrigeneous rocks, limestones, marble limestones, karst trough, disturbed schist and schist. Disturbed schists include the ore bodies.

Fig.2 shows very good coincidense between the seismic cross sections and wells data.

References

Piip V.B.(1984) New methods of interpreting of seismic time fields in media with variable velocities. Moscow University Geology Buletin 3: 86-95.

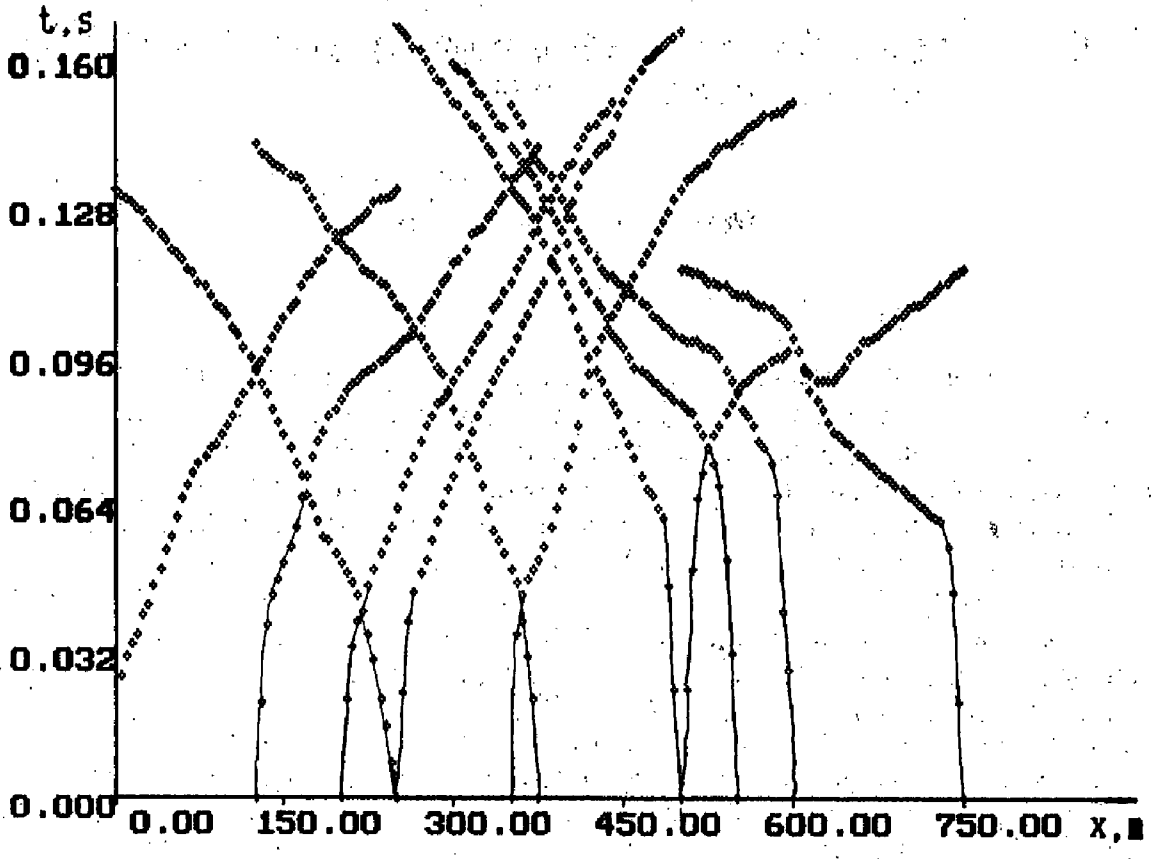

Fig.1. Refraction traveltime curves along the profile.

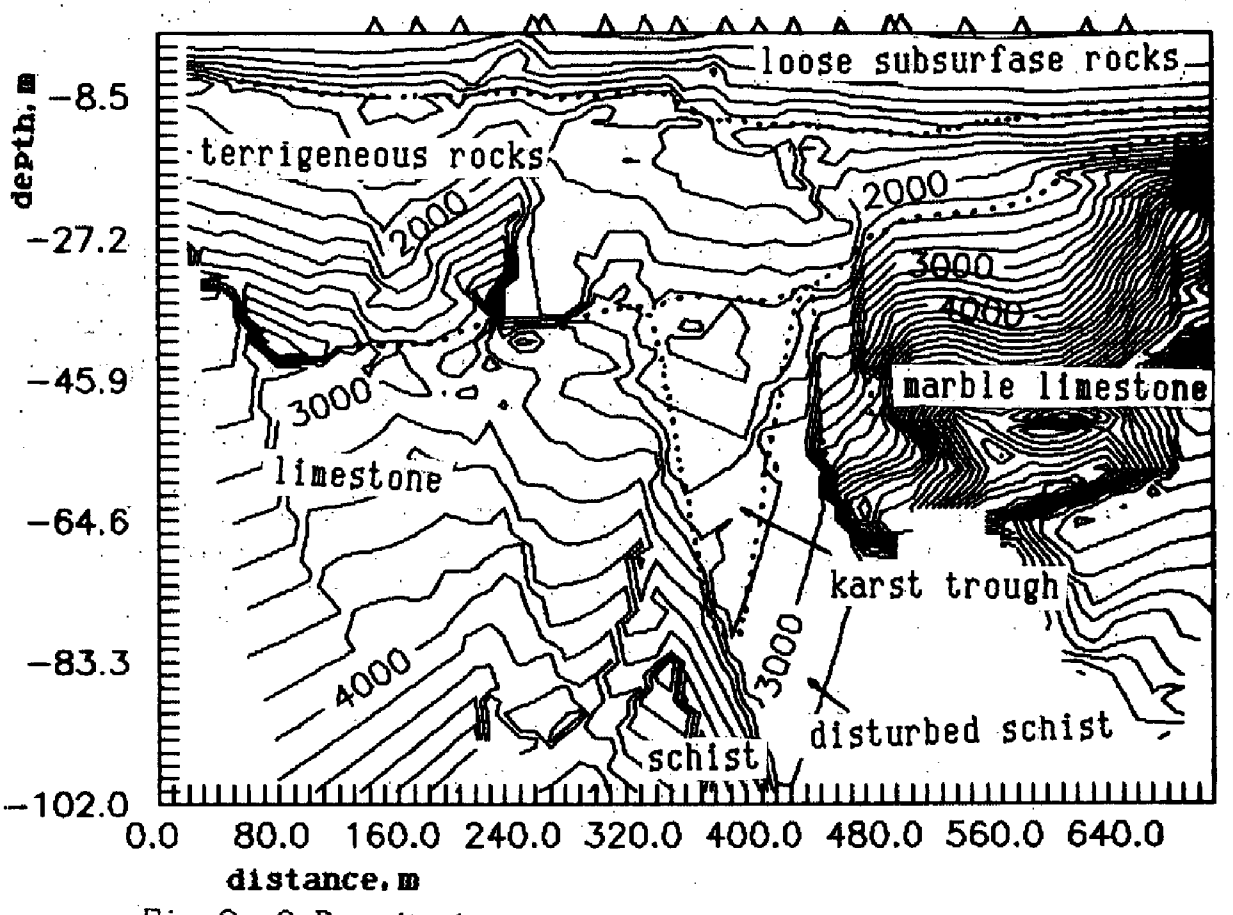

Fig.2. 2-D seismic cross-section along the Salair profile Thin lines indicate 200 m/s contour lines. Lithological bondaries on the wells data are shown by the points.