P2-3	PRACTICE OF CONDUCTING SEISMIC PROSPECTING WORKS USING REFLECTION METHOD- CDP 2D, REFLECTION METHOD- CDP 3D, MULTI-WAVE SEISMIC EXPLORATION (MWT) METHOD IN TRANSITION ZONES IN THE SOUTH OF RUSSIA

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Transition zones are the areas where on any type of the Earth' s crust are preserved the main features of a geological structure and oil and gas accumulations discovered on the adjacent land but covered with waters of marine, lake or estuary basin.

Thus the transition zone is marked as specific shallow water area of a "land-sea" transition. The existing technologies of offshore and onshore geological exploration works are not effective (or not sufficiently effective in such areas. On the whole transition zones include: areas of shallow water at a depth of less than 5m as well as marginal with them areas of estuaries, lakes, marshes, which are practically inaccessible for ordinary marine and onshore transport carriers of geophysical equipment.

As a rule geological-geophysical study of such areas is practically not lighted.

In the south of Russia the shelf and transition zones -"land-sea"- of the Azov, Black Sea basin and the North Caspian Sea are regional promising for oil and gas.

Practice of seismic exploration works.

Since 1993, the NPO "Yuzhmorgeologiya" has been involved in the development and introduction of the technologies of geophysical works in shallow water transition zones of the Azov Sea and Black Sea basins including the region of coastal estuary.

Technological peculiarity of conducting seismic works in transition zones is that standard offshore and onshore seismic exploration methods are not applicable, so one should apply modern equipment that will allow to acquire seismic data over the whole region under investigation.

Sesimic investigations in transition zones include the following works:
- prospecting in the transition zone to reveal contour local objects being of interest with regard to oil and gas content seismic exploration methods (2D, MWT);
- assessment of the revealed promising objects using multi-wave seismic exploration technology (MWT) which allows to predict a geological section (porosity, lithology) and a phase state in the reservoir rocks. The latter allows to assess potential and to allocate priorities of drilling of objects, prepared for deep drilling and thus to reduce the risk of unjustified expenses for "dry well" drilling.

Arrangement and assembly of observation system is carried out using feet of a small size in the water areas (Fig. 1) and cross-country vehicles on land.

Energy sources are based on a fleet of a small size. Purpose-oscillation of seismic signals in shallow water areas including on bottom as well as in marshes, peatbogs, shallow wells:
- air gun "Mins-1", operating pressure-up to 150 atm., volume of one chamber- 0.4-06P, signal spectrum -to 100 Hz.
- air gun "Puls-6", operating pressure -to 240 atm., volume of one chamber-to 10L, signal spectrum -to 200 Hz.

Air guns have pure seismic signals without recurring pulses and a strong high-frequency energy.

Effective operation of the group is possible when all the air guns are synchronous and stable, which is possible when a mean square deviation in action of air guns is not less them 0.1 ms and the system of inverse connection is absolutely error-proof.

Air guns are equipped with "Astra-5" controller.

The results of works. Regions of shallow water of the Sea of Azov, coastal estuaries, cane estuaries have been studied by order of oil companies. A series of anticline structures as well as traps of non-anticline type have been revealed. The materials obtained allow predicting areas of development of reservoir rocks as well as the presence of hydrocarbon deposits and their phase state. At present one of the revealed structures is being prepared for drilling.

Production works have shown high efficiency of the developed technology and high informative value at low cost.

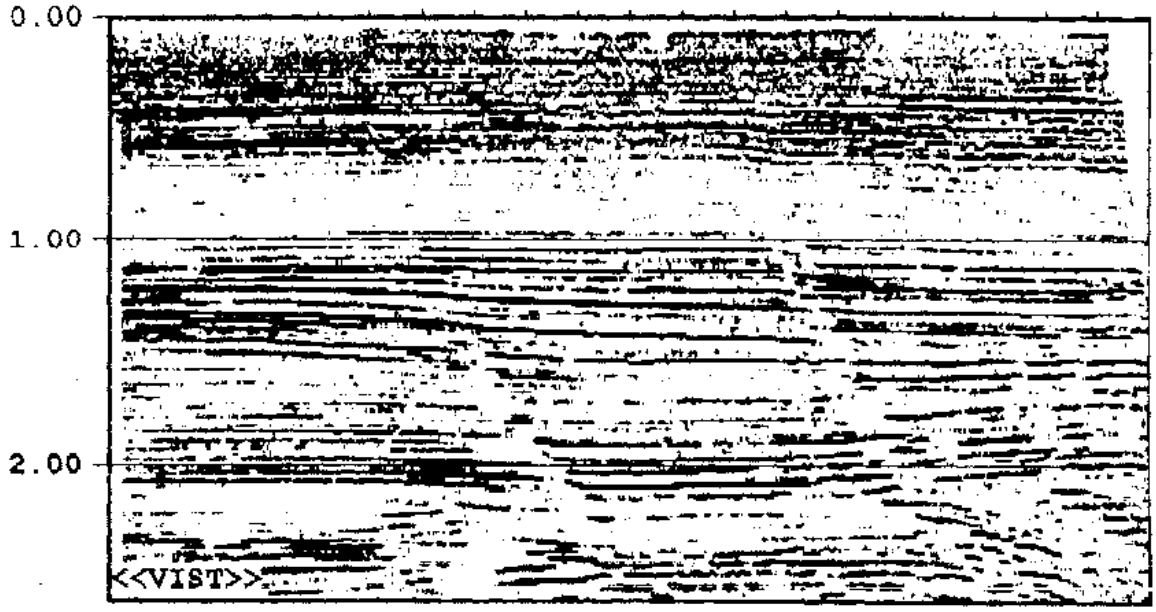

Fig. 1.