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Research Article

STRUCTURE FEATURES OF JURASSIC DEPOSITS WESTERN ARAL UPLIFT ACCORDING TO SEISMIC DATA

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ABSTRACT
The former waters of the Aral Sea, located in the northern part of the Republic of Uzbekistan, where the Western Aral oil and gas condensate field was discovered, is an area where it is necessary to carry out work to identify oil and gas promising objects in Mesozoic and Paleozoic sediments. The first geophysical studies to study the territory of the Aral Sea were carried out in the middle of the last century, when it was covered with surface waters. As a result, it was proved that a thick thickness of the sedimentary cover within the western part of the sea was about 4.5-5 km, and in the Paleozoic complex objects of presumably reef origin were identified for the first time. Subsequently, at the beginning of this century, after the drainage of the sea area, combined seismic work was carried out, including both offshore and onshore studies of the deep structure of the sea, as a result of which a number of new structures were identified and the Western Aral field was discovered.

Keywords**:** *Ustyurt Region, Western Aral Uplift, Jurassic, Paleozoic, Reflecting Horizon*

INTRODUCTION
The geological structure of the Kosbulak trough, where the West Aral uplift is located in the eastern part, is characterized by three structural floors. The lower one is a crystalline foundation composed of strongly dislocated metamorphosed sedimentary and metamorphosed Precambrian rocks, an intermediate floor composed of heterogeneous formations of Devonian-Permian age and a platform cover composed of weakly dislocated sediments of Mesozoic-Cenozoic age (Akramkhodjaev *et al.*, 1979, Khegai *et al.*, 2012). Since the main productivity within this territory was identified in Jurassic deposits, to clarify the structure of this territory, search for new objects, including structural and non-structural types, develop further directions for geological exploration, the West Aral uplift, identify promising oil and gas objects, as well as planning further geological exploration work in this area, studies were carried out to study the structure of the main reflecting horizons in Jurassic and Paleozoic deposits.

MATERIALS AND METHODS
Interpretation of CDP-2D and 3D geophysical data using deep well drilling data and vertical seismic profiling, which includes the following algorithms: creation of a database of geological and geophysical information, linking of seismic data performed in different years, stratigraphic binding of reflecting horizons using one-dimensional modeling on seismic time sections and marks of stratigraphic taps in wells, identification and correlation of reflecting horizons in the seismic field, identification of tectonic disturbances for the next stage, which consists of creating a velocity model, constructing structural maps based on reflecting horizons.

RESULTS AND DISCUSSION
Within the territory of the Western Aral uplift and the adjacent territory, seismic exploration work CDP-2D and 3D was carried out, six wells were drilled, geological and geophysical data were used to study the morphology of the main reflecting horizons (Fig. 1). It should be noted that due to the low resolution of seismic data at depths below the inferred base of the Middle Jurassic sediments, as well as the background of multiple waves from contrasting reflective boundaries, a detailed interpretation was used.
When visually analyzing the wave field, reflections from the bottom of the sedimentary cover on the ledges of Paleozoic formations and from the roof of Kimmeridgian-Tithonian limestones of Upper Jurassic age

are quite reliably observed (Urazalyev *et al.*, 2009, Boykobilov *et al.*, 2022). The first boundary is decisive for the separation of stratigraphic levels.

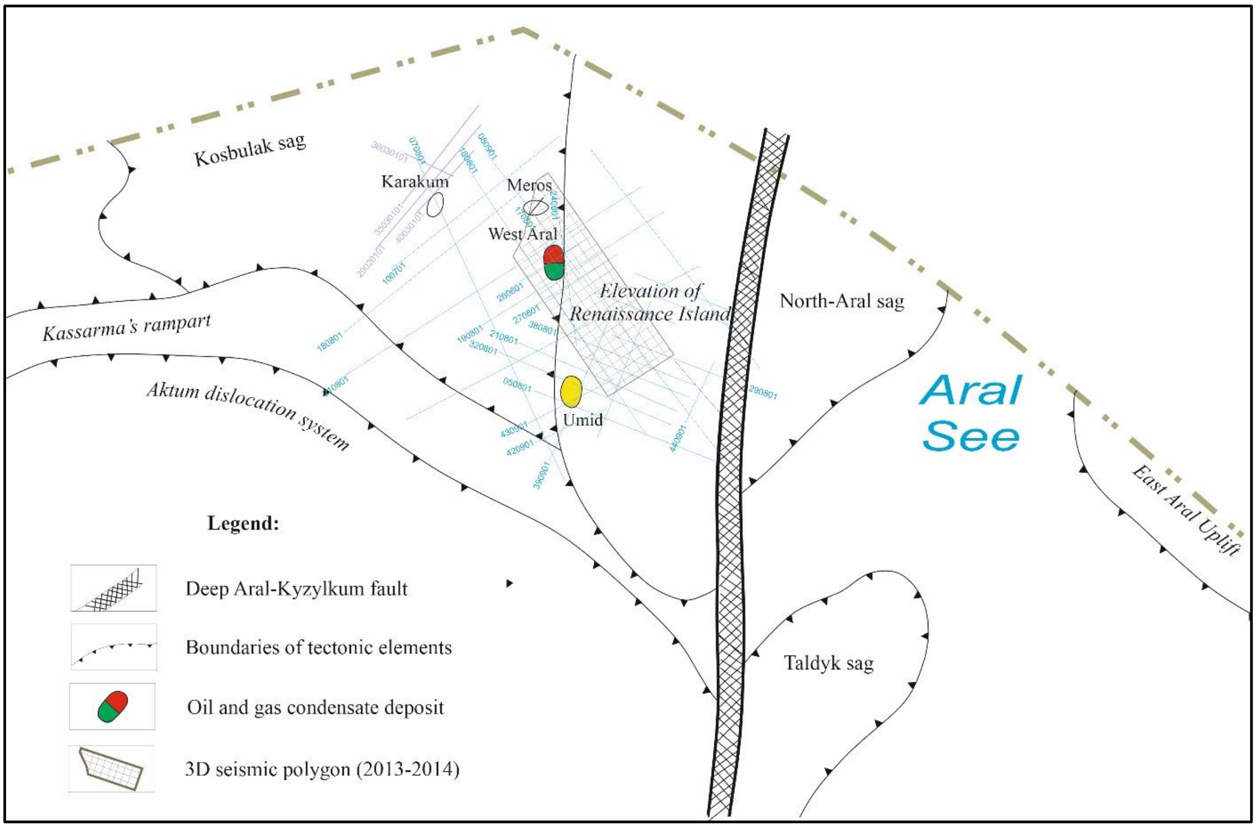

Figure 1: Scheme of geological and geophysical study of the Aral Sea water area

The lower one belongs to the intermediate structural floor, covering a complex of rocks of Paleozoic age and which was studied by deep wells in the roof part, where it is composed of red Permian-Triassic deposits (Fig. 2, 3). The time interval of this floor is characterized by predominantly chaotic high-frequency seismic recording. The wave field contains dynamically pronounced hill-like or strongly inclined low-frequency reflections, which indicates active tectonic processes during which large structural elements, compression folds and paleopreactions were formed. In the upper roof part, it is characterized by subparallel and inclined seismic recording of varying dynamic severity.

The upper floor, represented by sedimentary deposits of terrigenous-carbonate genesis of Mesozoic-Cenozoic age, in the wave field is characterized by subparallel seismic recording of varying dynamic severity, i.e. low-amplitude, subparallel, weakly chaotic reflections higher up the section turn into dynamic, extended, well-correlated ones. This wave pattern indicates different conditions of sedimentation in the Jurassic, when terrigenous material of continental origin accumulated in the bottom part of the complex, which was overlapped by coastal-marine sediments due to sea transgression or floodplain and lacustrine-marsh terrigenous sediments enriched with organic inclusions.

The most pronounced reflecting horizons are confined to the base of the Lower Jurassic, the base of the Middle Jurassic, the productive layer in the Middle Jurassic deposits, discovered in wells No. 1 and 2 of the Western Aral, the top of the Bathonian deposits of the Middle Jurassic and the top part of the Upper Jurassic deposits, represented by carbonate deposits, with which associated oil and gas potential in the Aral Sea (Khegai *et al.*, 2012, Yuldasheva *et al.*, 2020). These horizons can be traced in different directions, despite the anisotropy of the medium (Fig. 2, 3).

The most clearly expressed in the seismic field is the reflecting horizon confined to the top of the Upper Jurassic deposits, which can be traced within the western sector of the Aral Sea. In the wave field, it is represented by high-amplitude, dynamic, extended reflections, which are reduced until they completely disappear on paleoprotrusions.

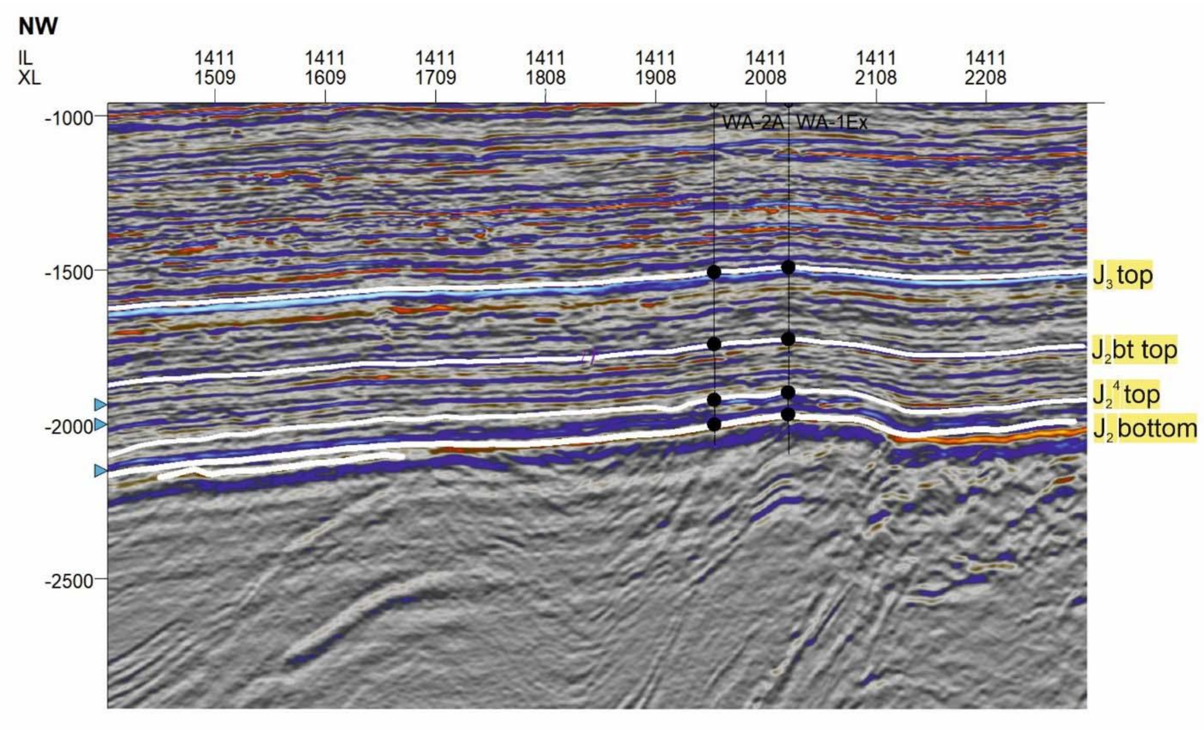

Figure 2. Isolation of reflecting horizons on the XLine time section

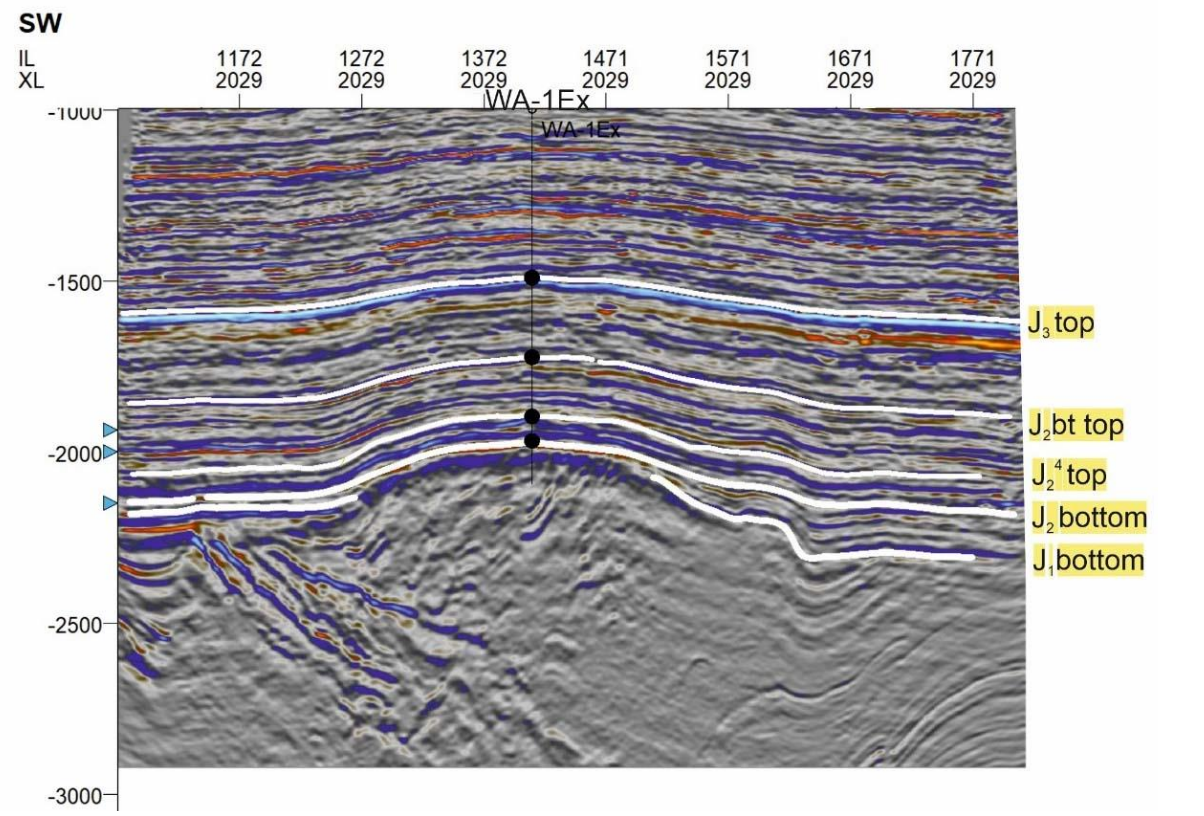

Figure 3. Selecting reflective horizons on an InLine time section

If the thicknesses of the Upper Jurassic and Middle Jurassic deposits are relatively consistent, then the thicknesses of the Lower Jurassic rock complex vary within different limits, reaching the highest values in the sagging parts (Fig. 2), and in the side and arch parts of the paleoprotrusion, composed of Paleozoic formations, they wedge out. Thus, it can be assumed that within this territory, Jurassic sedimentation began in deep troughs and erosional incisions.

Thus, the study of the morphology of the surface of reflecting horizons indicates that the West Aral uplift developed as a structure covering an ancient paleoprotrusion, within which local structures were developed in the Middle and Upper Jurassic rock complexes (Yuldasheva M.G. *et al.*, 2019), and in the Lower Jurassic rock complex, which developed in the slope parts, it is possible that zones of development of non-anticlinal traps such as clinoforms have been formed.

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