

## FEATURES OF THE STRATIGRAPHY OF THE EARLY PALEOZOIC DEPOSITS OF THE MALGUZAR MOUNTAINS (SOUTHERN TIEN SHAN)

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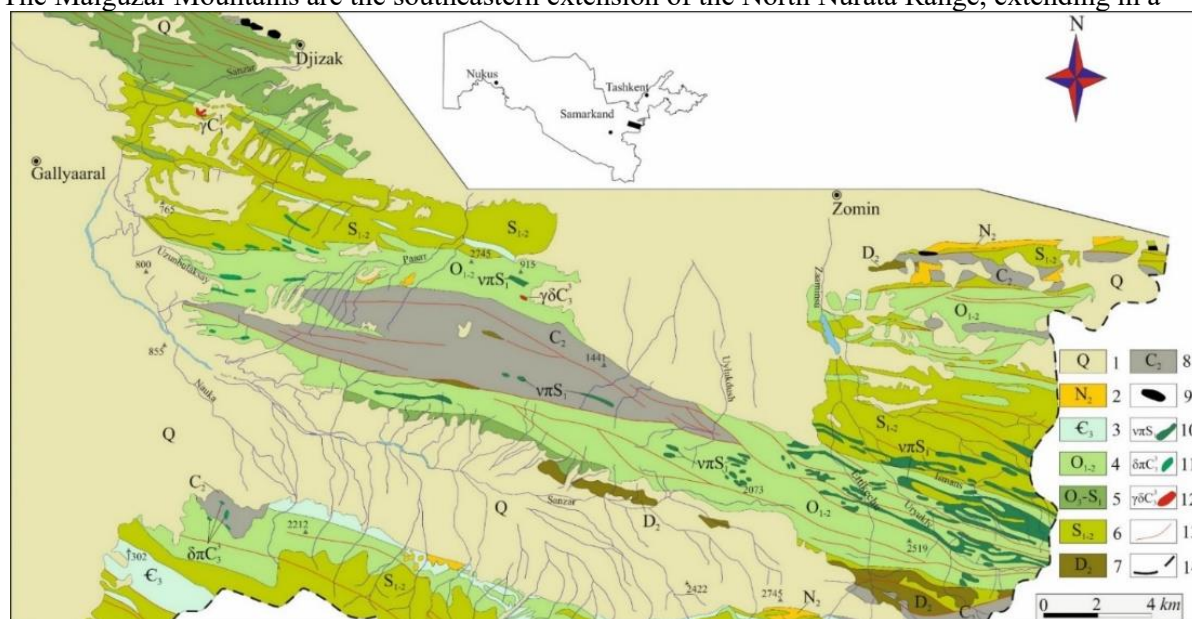
### ABSTRACT

The article examines the stratigraphic features of the Early Paleozoic deposits of the Malguzara Mountains, which include the sequence from the Upper Riphean to the Silurian. The analysis of the lithological and facies structure, paleontological complexes, and tectonic relationships of the formations is carried out. Patterns of sedimentary environment change have been established, expressed by the transition from the carbonate platform to deep-water flysch basins. Signs of tectonic dissection of the section, stratigraphic repeats and facies variability caused by cover-scale tectonics have been revealed. The correlation of formations is substantiated and the stratigraphic sequence of the region is clarified.

**Keywords:** *Malguzar, stratigraphy, Early Paleozoic, flysch, carbonate formations, conodonts, graptolites, Southern Tien Shan.*

### INTRODUCTION

The Malguzar Mountains are the southeastern extension of the North Nurata Range, extending in a



**Fig. 1. Schematic geological map of the Malguzar Mountains.**

1 – Quaternary sediments, 2 – Neogene sediments, 3-6 – siliceous-carbonate-sandy-shale and sandy-shale strata €3, O1-2, O3-S1, S1-2, 7 – breccia-like light gray limestones with lenticular interlayers and nodules of siliceous rocks, 8 – interlacing of dark gray organogenic-clastic limestones with clay-ferruginous calcareous mudstones and lenticular interlayers of black flints, 9 – remnants of protrusions of hyperbasites, 10 – sills and dikes of gabbro-dolerites, diabases, 11 – small intrusions of diorites, diorite porphyrites, 12 – small intrusions of granite, granodiorite porphyry, 13 – faults, 14 – the state border with Tajikistan

### **Research Article**

southeasterly direction for 100 km from the Sanzar riverbed to its junction with the Turkestan Range, their width ranges from 20 km to 35 km, and their area is about 2500 km<sup>2</sup>. The range is composed of Lower and Middle Paleozoic terrigenous-carbonate deposits collected in the eponymous mega-anticline, which is complicated by shallow folding and a series of large faults of the NW, sublatitudinal, meridional and NE strike (Fig. 1). (Ziyodulloev *et al.*, 2024).

The Malguzar Mountains are an important link in the stratigraphic and tectonic structure of the Southern Tien Shan. Early Paleozoic deposits are widely developed here, which are highly informative due to a combination of lithological, paleontological and structural features.

Despite a fairly good study, a number of issues remain controversial. First of all, this concerns the boundaries between individual formations, their correlation and the conditions of formation. The difficulty is due to the fact that the section is almost universally tectonized. (Shayakubov TS. *et al.*, 1998)

The section of the Early Paleozoic deposits of the Malguzar Mountains includes the Suyaltash (R<sub>3</sub>) Kalsara and Zhivachisai (Є<sub>3</sub>-O<sub>1</sub>), Jalatar and Kaltadavan (O<sub>1-3</sub>), Karatash (S<sub>1</sub>), Dzhazbulak (S<sub>1</sub>-W<sub>1</sub>) and Naukatsai S<sub>1V</sub>. A common feature is the gradual change of lithological types of rocks and conditions of their accumulation. However, this sequence is often disturbed in real sections. (Kim A.I., Salimova F.A. *et al.* 2007; Abduazimova Z.M, 2001).

### **FEATURES OF THE STRATIGRAPHIC STRUCTURE**

1. The Riphean base. The Suyaltash formation stands out sharply against the background of the overlying strata. It is composed of dolomites and dolomitic limestones with siliceous interlayers and biogenic structures. The presence of microstromatoliths, microphytoliths, and acritarchs is characteristic. According to the totality of features, these deposits were formed in a shallow carbonate basin, stable platform environment.

2. Transitional Cambrian-Ordovician deposits. The Kalsara and Zhivachisai formations reflect a transitional stage. They are characterized by the alternation of limestones and shales, the appearance of siliceous rocks, and signs of unstable sedimentary conditions. The sections show turbidite structures, underwater landslide textures, and a gradual decrease in the role of carbonates.

The boundary between the Cambrian and Ordovician is poorly defined and is mainly based on fauna.

3. Ordovician terrigenous strata. The Jalatar and Kaltadavan formations are mainly represented by terrigenous rocks. The main features are mudstones, siltstones, sandstones, rhythmic interlacing, gradation stratification, and numerous traces of bottom currents. (Ziyodulloev G. 2025).

Turbidites are widely developed in these sediments, which indicates the formation of a slope-basin zone. The stratigraphic feature consists in significant thickness with weak faunal saturation and strong dependence on tectonics.

4. Silurian flysch complexes. The Karatash, Dzhazbulak, and Naukatsai formations form a single Flysch stratum. The Karatash entourage is represented by a classical flysch with well-defined rhythmicity. Jazbulak is characterized by the presence of volcanogenic material (basalts, tuffs). The Naukatsai formation is composed of finer-grained sediments.

Silurian sediments are characterized by an abundance of graptolites, good biostratigraphic fragmentation, and relative stability of the section compared to the Ordovician.

### **THE ROLE OF TECTONICS**

The stratigraphy of the area is complicated by tectonic contacts, the absence of primary boundaries, and contacts are more often thrust. The repeatability of the section due to folding and due to cover tectonics. Scaly structure - fragmentation of formations and disruption of sequence. As a result, the observed sequence of layers often does not correspond to their original occurrence. (Konopelko D., Seltmann R., Mamadjanov Y. *et al.*, 2017).

### **FACIES ZONALITY**

Three main facies zones are distinguished in the section:

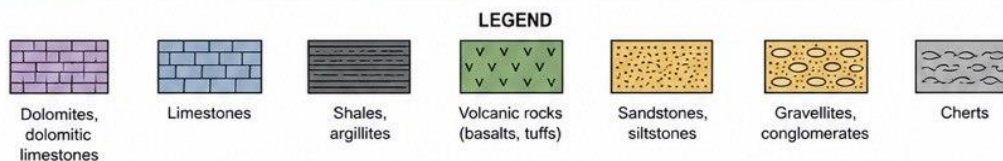
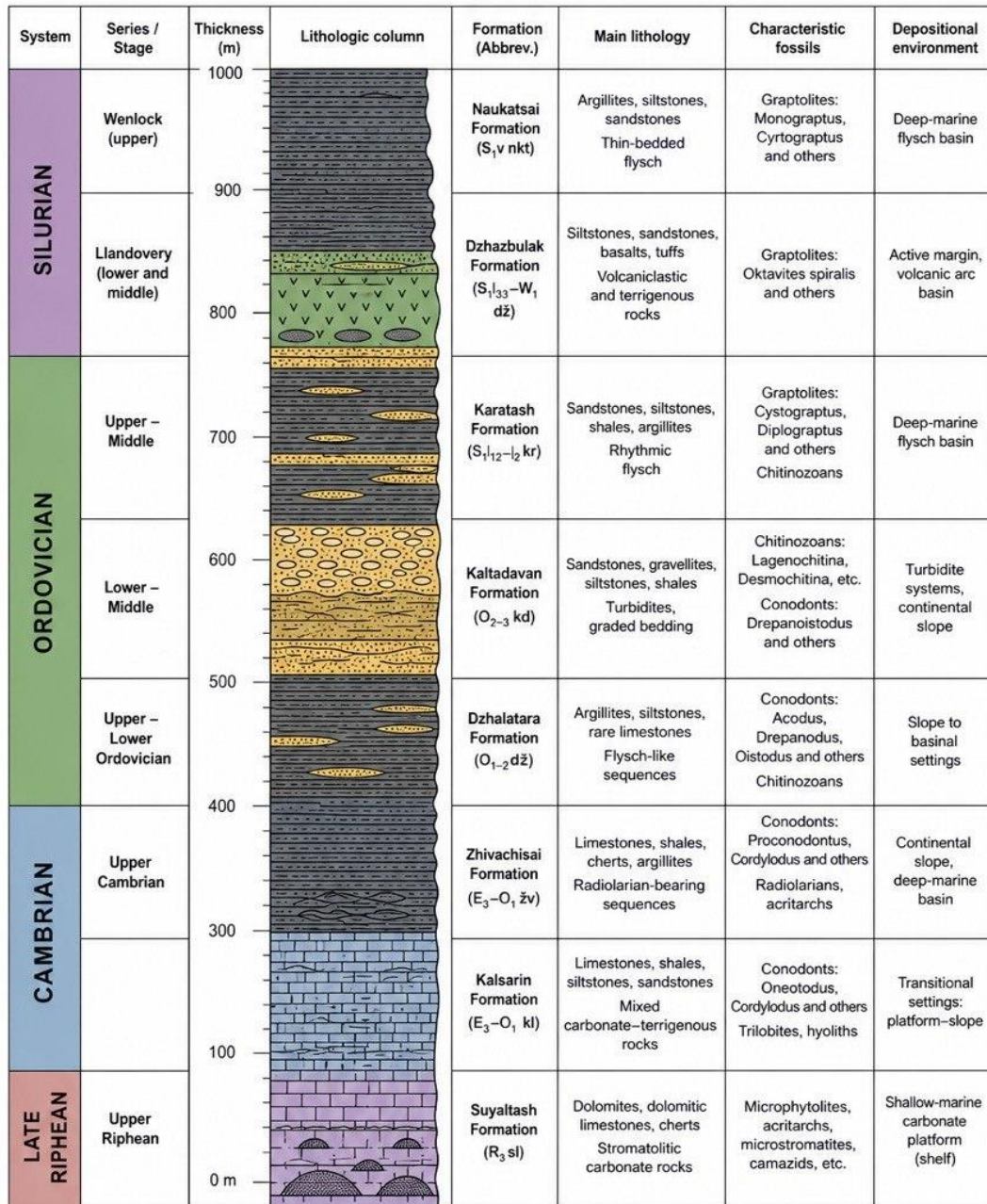
1. Carbonate (Riphean) shallow, biogenic.
2. Slope (Cambrian-Ordovician) mixed, unstable.
3. Deep-sea (Ordovician-Silurian) flysch, turbidites, clay-siliceous sediments.

The main patterns of correlation are presented in Table 1, as can be seen from the table "Correlations of the Early Paleozoic formations of the Malguzar Mountains"

**1. Continuity of the section**

The sequence from the upper Riphean to the Venlok is preserved in all regions, but in Malguzar it is most tectonically disrupted.

**STRATIGRAPHIC COLUMN OF EARLY PALEOZOIC DEPOSITS OF THE MALGUZAR MOUNTAINS (Southern Tien Shan)**



2. The facial analog : carbonate platforms (R<sub>3</sub>); transitional complexes (C-O); flysch systems (O-S).

3. Biostratigraphic comparability: Conodonts → Cambrian-Ordovician; Graptolites → Silurian which allow us to confidently correlate.

## RESULTS AND DISCUSSION

The stratigraphy of the Malguzar Mountains has a complex, tectonically disturbed structure. The section covers the interval from the Upper Riphean to the Silurian. The transition from the carbonate platform to deep-sea flysch basins has been established. The main feature is the facies variability and the lack of clear boundaries. Silurian sediments have a high biostratigraphic resolution. Stratigraphy is controlled by cover-type tectonics.

## CONCLUSION

The stratigraphy of the Early Paleozoic deposits of the Malguzar Mountains reflects the complex geodynamic evolution of the region. Its key feature is a combination of facies variability, tectonic processing, and high biostratigraphic informativeness. These features must be taken into account in geological mapping and metallogenic forecasting.

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