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## **OIL AND GAS PROSPECTS RELATED TO THE HISTORY OF GEOLOGICAL DEVELOPMENT OF AGBURUN-DENIZ-DARWIN FIELDS**

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**Summary:** In the article, paleoprofiles of Agburun-Deniz-Darwin areas were constructed and analyzed based on modern seismological profiles. Paleotectonic analysis was carried out on the cross-section of the productive strata and the formation of structures in geological time intervals and the subsequent structure-development characteristics were investigated. According to the paleoprofiles established for the Darwin fold, it should be noted that near the end of the productive series, a sharp increase was observed in the rate of sediment accumulation. The thickness of the sediments accumulated in the area was 2-3 times greater than in the previous intervals, and the thickness decreased towards the arch. The Agburun-deniz fold nearly took its modern structural form near the end of the Productive series. The decrease in the thickness of the layers from the limbs to the arch indicates that the fold is developing in syndepositional.

**Key Words:** Productive strata, oil, gas, syndepositional, Structure of Darwin, Agburun-deniz

The Darwin bank is a submeridional brachyform uplift located in the central part of the anticlinal zone formed by the Shurabat-deniz-Goshadash-Agburun-deniz-Darwin-Gurgan-deniz structures.

A mud volcano developed near the arch of the fold. In the limb of the fold, the layers lie at a large angle, the North-North West limb is less than that in South-South West.

Now, let's analyze the paleoprofiles built to clarify the development features of the Darwin fold.

Thus, as can be seen from the paleoprofile established at the end of the Pontian age, the process of sediment accumulation took place during this geological time, but the local

uplift of the Darwin Bank did not have a noticeable development during the mentioned age. Although the process of sediment accumulation takes place in the North-West limb of the fold, the layers are pinching out towards the arch. This is a sign that the rate of sediment accumulation is significantly lower than the rate of folding. The process of sediment accumulation is not observed in the southeastern limb of the uplift.

As can be seen from the paleoprofile established at the end of the Gala suite, the process of sediment accumulation did not occur at the same level during this geological time. The thickness of the sediments from the North-North West periclinal direction of the fold to the arch part decreases to zero, and the sediment accumulation process took place in the South-East direction. This situation indicates a low rate of sedimentation.

From the paleoprofile established at the end of the century Pre-Kirmaki suite, it appears that the fold began to develop more intensively in this geological time interval and was already complicated by disjunctive dislocations. The tectonic fracture developed in the arch of the fold is a fault type, the amplitude reaches 25-30 m. Compared to the Gala suite, the process of sediment accumulation in the area of the Pre-Kirmaki suite took place throughout the area. Within that, a gradual decrease in the thickness of the Pre-Kirmaki suite sediments is observed from the limbs towards the arch.

It can be seen from the paleoprofile, established at the end of the lower PS that the nature of the sediment accumulation process at the end of the Post-Kirmaki sand suite is the same as in the previous interval, and a certain increase in the dip angles of the layers in the direction of the arch is observed. The fault that started developing from the previous stratigraphic intervals has developed further, so the real amplitude of the fault is 80-100 m.

As can be seen from the paleoprofile constructed at the end of the Balakhany suite, the fold developed significantly during this geologic time and resembled its modern structural plan to some extent. The thickness of the sediments collected at the end of the Balakhany suite is almost twice as much as that of the Post-Kirmaki sand suite, and the fact that the thickness of the layers in its limbs is relatively greater towards the arch is an indication of the fact that this local uplift had a sedimentation development.

The amplitude of the tectonic fault, which began to develop at the end of the Pre-Kirmaki suite, reaches 800-900 m in the mentioned geological time interval.

A sharp increase in the rate of sediment accumulation was observed near the end of the productive series. From the paleoprofile constructed for the end of the Sabunchi suite, it is clear that the thickness of accumulated sediments in the area is 2-3 times greater than in the previous intervals, and this thickness decreased slightly toward the arch.

From the paleoprofile established at the end of the Surakhany suite, the fold has almost completed its development. The amplitude of the fault reaches 1400-1500 m in the mentioned time period and cuts through the sedimentary layer with a thickness of 2000 m and more from the Pontian to the modern sediments.

Agburun-deniz uplift had a brachyanticlinal fold extending to the north-west and south-east according to the bottom of the PS, contains the size of 11x3.25 km according to the 1400 m isohypse, 3.5x12.5 km according to the upper surface of the Cretaceous (according to the 2000 m isohypse).

The arch part of the fold is complicated by a large longitudinal fracture. The arch part of the rise is raised in the form of a horst.

Now, let's analyze the paleoprofiles built to clarify the development features of the Agburun-deniz fold.

Thus, from the paleoprofile established at the end of the Pontian age, it can be seen that the fold began to develop in that period, and the accumulated sediment layer is pinching-out in the arc direction.

Looking at the graph constructed at the end of the next sub-productive layer, two fault-type fractures are noticeable in the central part of the local uplift, which further complicates its tectonic structure. The fact that the arch has a graben-like structure, and at the same time, the accumulated rock complex is pinching-out towards the center of the fold, suggests that fold formation took place here at a very high speed, and in return, the process of sediment accumulation was slow.

At the end of the Balakhany suite, Agburun-deniz fold changed its graben-like structure and continued its development in the form of a horst. Here, the Fasila suite is characterized by its large thickness (2-3 times more than Balakhany suite). The process of sedimentation took place both in the North-West and South-East limbs. Here, the amplitude of tectonic faults has reached 250-300 m.

By the end of the Productive series, the fold was almost taking its modern structural form. When analyzing the thicknesses of the layers involved here, it is observed that the

thickness decreases from the limbs to the arch, which indicates that the development is a syndepositional type.

Thus, the actual thickness of the accumulated sediments reached 350-400 m already at the end of the Surakhany suite. The high speed of sediment accumulation in such a short time interval, the compensation of folding, and the high probability of the migration time of hydrocarbons overlapping with the opening of traps is a clear example of the fact that this area has a favorable structural tectonic structure from the point of view of oil and gas prospects.

### **Conclusion**

1. Darwin basin and Agburun-deniz are syndepositional type folds. The fact that they have this type of development dynamics and the presence of a mud volcano in their basin is a direct indication of hydrocarbon accumulations that may exist here.

2. The pinching out of rocks of the same age of the Pontic, Gala suite and Pre-Kirmaki suite from the limbs of the fold to the arch indicates that the rate of uplift development was greater than the rate of sedimentation during that geological time period.

3. The fold is complicated by a large number of transverse, longitudinal, and radial fractures, which suggests that the oil-gas accumulations that may exist in between are mainly related to lithological-wedged and tectonic-screened type traps.

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## **ASTARA RAYONUNDA EKZOGEN GEOLOJİ PROSESLƏRİN – SÜRÜŞMƏLƏRİN BAŞ VERMƏ SƏBƏBLƏRİNİN ÖYRƏNİLMƏSİ VƏ BUNA QARŞI MÜBARİZƏ ÜSULLARININ SEÇİLMƏSİ**

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**Xülasə.** Astara rayonunda ekzogen geoloji proseslər, xüsusən də, denudasiya, uçqun-töküntü, sürüşmələr və s. geniş yayılmışlar. Sürüşmələr, əsasən, bir çox təbii amilin təsiriylə əlaqədar formalaşmışlar. Bu amillər ayrı-ayrılıqda hər biri həlledici rola malikdir. Bu amillərə misal olaraq, kəsilişi təşkil edən çöküntülərin litologiyasını, tədqiqat ərazisinin oroqrafiyasını, tektonikasını, həmçinin, seysmikliyini, iqlimini, hidrogeoloji şəraitini və bunlar yanaşı, insanların mühəndisi fəaliyyətini də göstərmək olar. Tədqiqat ərazisində olan fəal müasir sürüşmələr, əsasən, yamaclarda toplanmış olan