

## SOME TOPOGRAPHIC BASINS NEAR ZONGULDAK (TURKEY)

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**Summary:** A description is given of two topographic basins near Zonguldak (Turkey), which occur for the greater part in sandstones and shales, but which are drained through holes in the limestone which cover only a small part of the surface.

In the Zonguldak coal field, which is situated on the Black Sea coast of Turkey, the Carboniferous is covered by limestones and marl of the Cretaceous. The steep coast here is for the greater part formed by limestones on the northern part of an anticlinal structure of the Cretaceous.

Of the phenomena which are a result of the solution of these limestones, topographic basins are the most important. In general a sink hole is the most common type of rock solution phenomenon, originated by the caving in of a chamber in limestone which is covered by soil, as a rule. These sink holes occur in this region, but because their dimensions are small, another type of topographic depression is much more striking. They are basins which occur in general on those contacts where limestones overlie marls. Sometimes it is not clear which is the most important: erosion or solution.

But basins are found of still greater dimensions (up to 700 by 1000 m diameter). The only role solution played here is the existence of holes in the

limestones, which provided a possibility of drainage for the water, which by erosion caused the basins.

As examples for this paper two twin valleys, both without surface drainage, were chosen, while also in both cases only a minor part of the surface is formed by limestone, by far the greater part by sandstone, conglomerate and shale, mostly of the Carboniferous.

Only the most necessary indications were put on the map and no writing at all, in order to keep the illustrations as clear as possible. But by doing this, a description in text is inevitable.

### **Description of the situation of fig. 1.**

The Cretaceous limestones in the NW of the illustration lie unconformably on red sandstones and conglomerates of probably Permian age (with a thickness of about 200 m at the outcrop) which are not indicated separately on the map. These lie again unconformably on conglomerates and sandstones of the Westphalian B-C. The dip of the limestones (Cretaceous) is about 35°, of the Permian here about 50°, of the Carboniferous changing from 35-70°, all to the North. The outcrops at the limits of the above mentioned formations are about parallel. This block is limited in the

South by the Midi Basamağı (South fault), which occurs here as an almost W-E fault in the middle of the map. The fault plane is dipping 75° to the North.

The Cretaceous limestones in the middle of the left side of the map have a dip of 25-35° to the NW and lie on almost vertical conglomerates and sandstones of the Westphalian A (Kılıç series). In the extreme South some Namurian (of the Kılıç series) occurs, which is not indicated separately. The very important Öküşne Basamağı (fault), which forms the limit between the above mentioned block and the Visean limestones (Carboniferous), is just visible in the extreme SW corner.

the subjects of our interest here are the two valleys without surface drainage, which occur on the limit of the limestone and the Carboniferous in about the middle of the map. The basin + 184 has a pass of + 215 m in the SW which leads to the second basin + 173, which has a pass of + 195 m leading to Öküşne valley. The surface of the region which drains into these basins is 0,606 km<sup>2</sup> of which 0,089 km<sup>2</sup> is limestone, the rest sandstone, conglomerate and some shale. The drainage of the + 184 valley is not as good as it has been, because the bottom is rather flat, caused by sedimentation.

The water can flow in the limestones only in western direction, towards



Fig. 3 The basin of fig. 1, seen in westernly direction, k is limestone.

Fig. 4 The basin of fig. 2, seen in south • westernly direction, k is limestone.

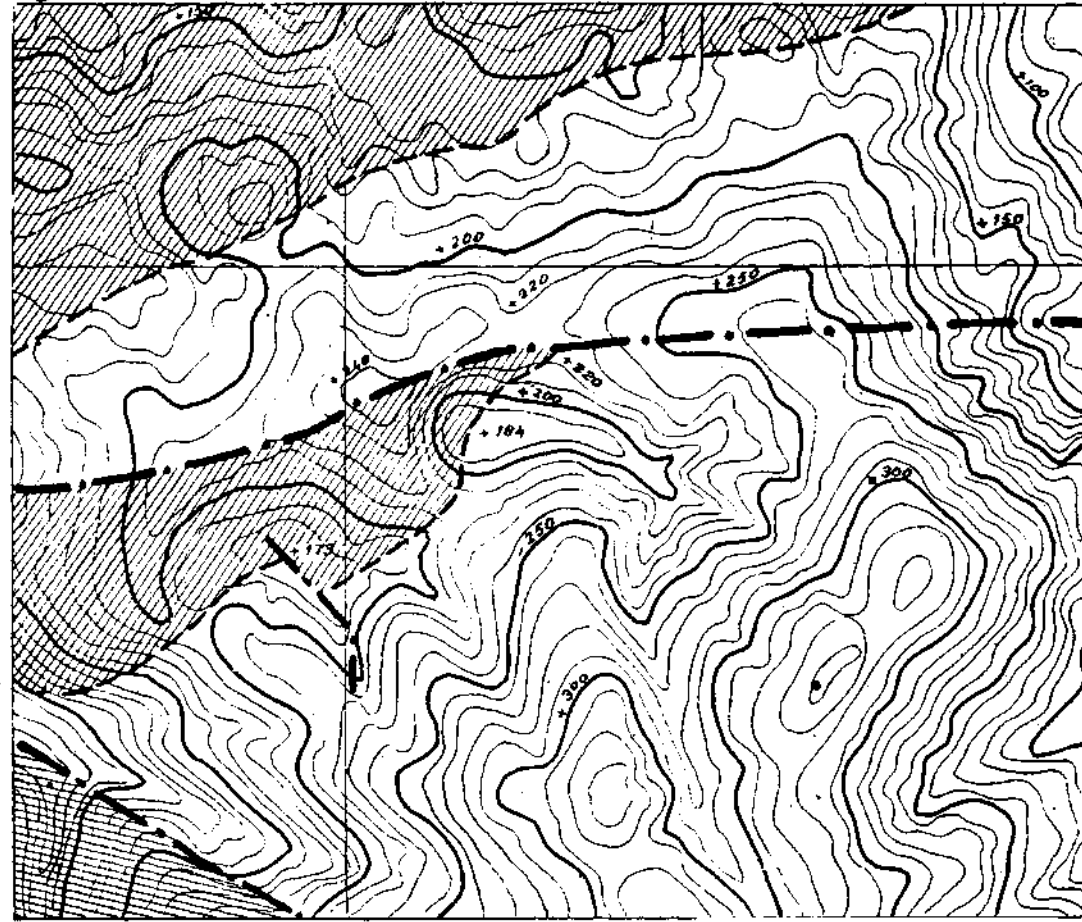


ZONGULDAK YAKINLARINDA BİRKAÇ TOPOGRAFİK TEKNE ÖRNEĞİ  
*Some Topographic basins near Zonguldak*

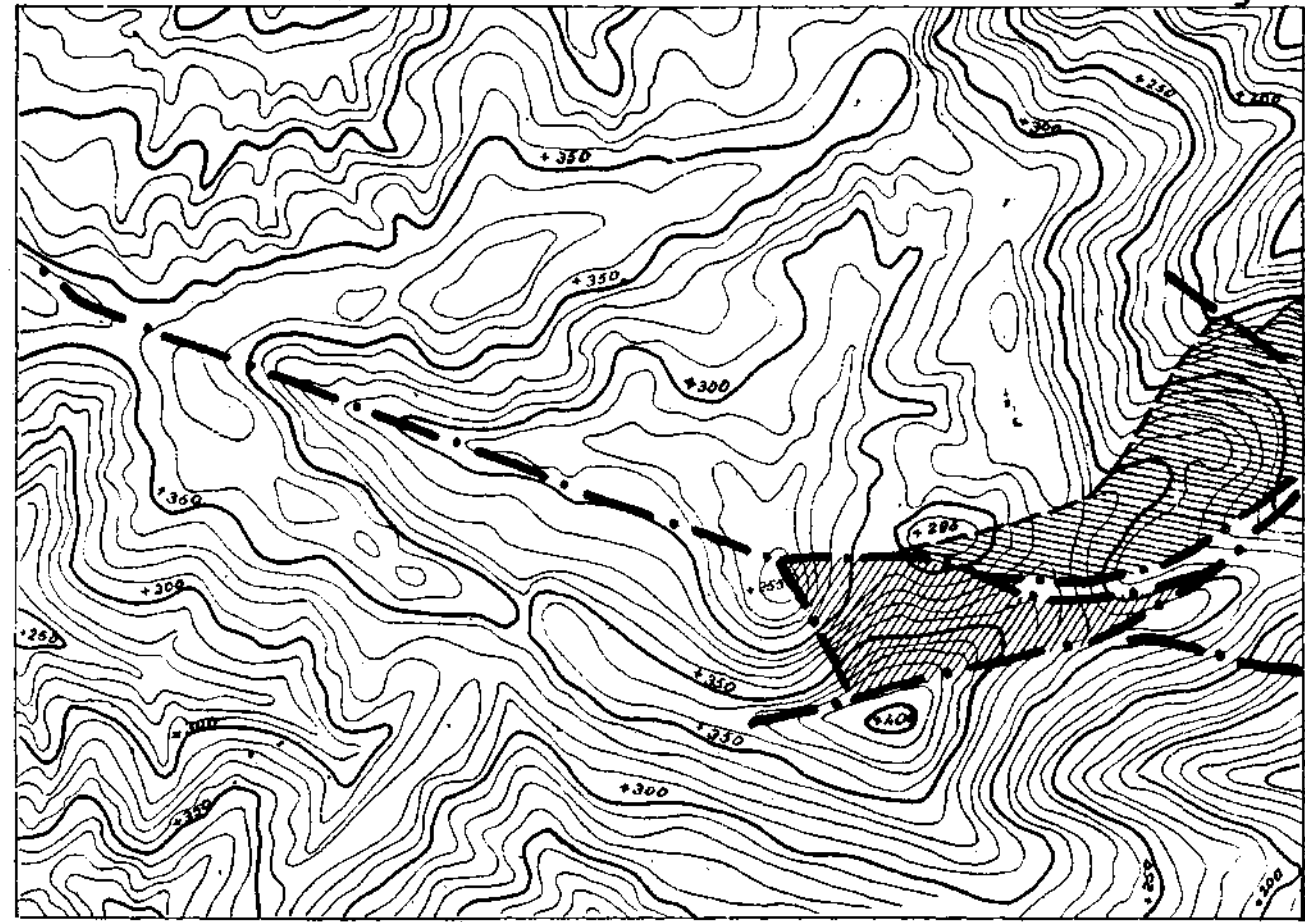
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Sek.  
Fig. 1



Sek.  
Fig. 2



Kretase Kalkerler  
Cretaceous Limestone



Karbonifer Kalkerler  
Carboniferous Limestone



Basamak  
Fault



Münhani  
Contour

the sea, and it does not give rise to a spring.

#### Description of the situation off fig. 2.

The WNW-ESE fault in the western half of the map is the Öküşne Basamağı. To the South of this fault and its complicated continuation we find Velibey sandstone of the Cretaceous (which covers the Under-Cretaceous limestones) and to the North we find shales and fine grained sandstones of the Namurian. The Velibey sandstones dip 20-40° to the SE, the Namurian 50-80° to the North. The contact between the Namurian and the Visean limestones is normal. The contact of the Visean-with the Cretaceous limestone together and the Velibey sandstone is however caused by a fault with a considerable downthrow of the southern block. The strike of this fault is WSW-ENE. There exists also a fault between the Visean-and the Cretaceous lime-

stones, because the Cretaceous limestone is also in contact with the Namurian, but this fault is by far not as important as the other two. In the open space between the two fault indications between the Carboniferous-and the Cretaceous limestones occurs a breccia. Of interest here are the two basins, one of + 285 m, leading with a pass of + 305 m towards the greatest basin of + 255 m. The pass leading from these twin basins is + 325 m.

The total surface of the basins is 0,604 km<sup>2</sup>, of which 0.051 km<sup>2</sup> is covered by limestone.

The hole in the limestone through which drainage takes place, can only be seen in the basin of + 255 m. These limestones have no direct communication with the sea. In the Virancık deresi (valley), which is close by to the East, and which crosses the Visean limestone, no spring could be observed.