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# Die Geologie der West-Firuzkuh-Area (Zentralelburz / Iran)

Abhandlung  
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Doktors der Naturwissenschaften

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## SUMMARY

The present work handles a formerly very little known area of the central Elburz. The principle aim of the study was the preparation of a geological map on a scale of 1 : 50'000. A simplified version of this is here published on a scale of 1 : 100'000. The formations of the studied area range from the Precambrian to the Quaternary.

The oldest formations, the Bayandor, Soltanieh - Chapoghlu and Barut Formations are described in a more general way. Evidence has been found, that the Barut Formation is belonging to the Lower Cambrian. In the Zaigun-Lalun Formation tendencies have been determined which indicate a progressive peneplanation of the source area and an associated increase in transport distance during the sedimentation (although the grains show an increase in size). Site and extension of the source area are still unknown. Trilobite-bearing beds are lacking in the Mila Formation, a fact which indicates an erosional phase of local extent in the Middle to Upper Cambrian. Furthermore, the Geirud Formation is only rudimentarily developed, although the series north of the Main fault zone can be correlated with the type section. The Mobarak Formation is dated by its fossil content, and is placed in the Upper Tournaisian - Viséan. The sandy Dorud Formation offers no indication of its age in the studied area but in correspondance with its fossil content outside the area is placed in the Lower Permian. The age of Middle Permian of the Ruteh Formation likewise rests on evidence from neighbouring areas. The Upper Permian is represented by a hardground. The distinctive feature of the whole Paleozoic of the studied area is its exceptional thinness in comparison to the rest of the Elburz. The triassic Elikah Formation may be divided into a lower and a upper unit, the latter characterised by a significant content of gypsum. The formations described above are restricted to the southern part of the studied area.

The Shemshak Formation appears to range from the Rhaetic into the Bajocian, but is developed in a marine facies only in the southern part of the area. The Dalichai Formation, with its type section on the Dalichai area contains a fauna limited to the Bajocian and Bathonian. The limestones of the Lar Formation may be allocated to three different facies areas, two of which are distinguished by bituminous sediments. No sediments of the Upper Tithonian are present. The Gypsum-"Melaphyre" Formation, which is limited to the northern part of the area, represents the Lower-Cretaceous and is overlain by transgressive sediments of Lower Aptian age in the N that become somewhat younger in the S. Age determination is made on the basis of Orbitolinae. Albian is not present. In the Cenomanian - Turonian there are various rudistid and ammonite-bearing sequences. The Turonian - Santonian is represented by a predominantly pelagic limestone with a Globotruncana fauna. A biogenic - detritic complex likewise belonging to the Santonian forms the close of the purely marine Mesozoic. In the Upper Cretaceous a weak terrestrial volcanism may also be noted.

During the passage from Cretaceous to Tertiary, colored marls with a fresh-water algal flora were laid down in the southern part of the area; these compose the Fajan Formation. The volcanic influence in the Ziarat Formation is not so strong as in the type locality. In similarity to the type locality its basis falls in the Cuisian, and the upper beds, determined with the help of nummulites and a mixed pelagic-benthonic microfauna fall in the Middle Lutétian. This determination is valid also for the base of the tuffaceous Karaj Formation, which can be shown to lie completely in the Middle Eocene in the studied area. The younger Tertiary is represented by variegated Marls and chalky fresh-water limestones, for which an exact age and membership cannot be determined.

An interesting example of a Quaternary volcano is present in the southern part of the studied area. It appears to be somewhat older than Damavand and can be correlated with further exposures that lie between it and Damavand. It has received

the name of Little Damavand.

Various facts suggest that the Main Disturbance Line was active at an early date and has been continuously reactivated. The studied area has been subdivided into three tectonic zones, and an attempt is made to compare these with the subdivision of GANSSER and HUBER in the Alam Kuh cross-section. It is shown that the tectonic units of the Central Elburz become less pronounced from W to E. The northern part of the studied area is considered to be the equivalent of the "Paleozoic Central Range", the middle part combines the "Tertiary Central Zone" and the "Southern Paleozoic-Mesozoic Zone" and the southern part of this area, within the "Southern Tertiary Zone", exposes predominantly Paleozoic and Mesozoic rocks. In the N the tectonic style is gentle, presenting a simple fold-range. In the middle part tight folds with imbricated limbs and reversed faults are found. In the S, the anticlinal structure of Ainevarzan - Dalichai is overthrust by the Main Thrust, which shows a minimum displacement of 4 km. In the studied area two different strike directions can be discerned. One runs WNW-ESE to W-E and corresponds to the normal strike direction of the Central Elburz, the other runs WSW-ENE and corresponds to the typical strike of the eastern part. From W to E of the studied area there is a change from S to N vergence of the folds which is especially clear in the middle section.

Various indications suggest that the disposition of the tectonic styles is very old. The large recognisable disturbances were probably already differentiated in the Cambrian. The Main Thrust for example demonstrates that these disturbances must have been active at least before the deposition of the Shemshak Formation. The folds now seen in the Paleozoic and Mesozoic were formed before the deposition of the Ziarat Formation. The greatest thickness of Tertiary is found in the synclinoria, which in part do not have a corresponding strike with the general mountain structures. This appears to stem from tectonic subsidence, accentuated by erosion before deposition of the Ziarat Formation.