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THE TECTONOSTRATIGRAPHIC FEATURES OF THE BELEMEDİK TECTONIC WINDOW AND ITS SURROUNDINGS

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ABSTRACT.- The study area includes Belemedik and its vicinity located in the eastern part of Ecemiş Fault Zone which constitutes the boundary between Central and Eastern Taurides.The area generally presents Belemedik sequence belonging to Aladağ Unit, ophiolithic melange and ophiolithic rocks belonging to Bozkır Unit and Tertiary sediments overlying all these units. Within Belemedik sequence, Late Devonian aged Küçükali, Carboniferous aged Belemedik, Early Permian aged Sarıoluk, Late Permian aged Kızılgeriş and Yellice, Early-Middle Triassic aged Katarası, Middle-Late Triassic aged Sarıyarma, Jurassic-Cretaceous aged Çamlık and Yavça Formations were differentiated. In the previous studies on the vicinity of Belemedik, it was suggested that an incomplete Mesozoic series overlaying the Palaeozoic core and as a result of the erosion of this cover, a tectonic window was exposed. However, in this study, it was demonstrated that a complete Mesozoic series of Early Triassic-Late Cretaceous age overlaying the Palaeozoic rocks in the vicinity of Belemedik are presented and hence a tectonic window does not exist in the vicinity of Belemedik. In addition, it was determined that Belemedik Sequence displayed similar features with the rock associations of Aladağ Unit in terms of lithological properties and the ages of the units it comprises. In the region, at the bottom of the Bozkır Unit, which tectonically overlies the Belemedik Sequence, Late Senonian aged Kızılcadağ Ophiolithic Melange and olistostrome are present. And, at the top of the Bozkır Unit, Late Cretaceous aged Pozantı-Karsantı Ophiolithic Nappe is located. While the Pozantı-Ecemiş Corridor formed by Ecemiş Fault Zone is represented by Oligocene-Miocene aged units, the Adana Basin is represented by Paleocene-Late Miocene units.

Key words: Belemedik Sequence, Tectonostratigraphy, Aladağ Unit, Pozantı, Taurides.

INTRODUCTION

The study area generally covers Ecemiş Fault Zone which constitutes the boundary between Central and Eastern Taurides, and the area in the east of this zone (Figure 1). The major settlement units in the region are: Tekir Plateau (J2), Belemedik (H12), Eskikonacık (C7), Keşli (S9), Kıralan (S18) and Karakılıç (L19) villages (Figure 2). The study area has been studied by many researchers for various purposes until today. Paleozoic aged rock associations in the region were first introduced by Blumenthal (1947) under the name of 'Belemedik Tectonic Window'. In this study, the existence of an anticline has been shown, which Devonian and Permian aged units in the core and Mesozoic aged limestones in surrounding are situated. Üşenmez (1981) and Üşenmez et al. (1988) defined Late Devonian-Middle Cretaceous aged Belemedik-Köserelik and Late Cretaceous aged Akdağ formations during their work in the vicinity of Belemedik. They asserted that Triassic and Jurassic were absent in the area and Belemedik-Köserelik formation was covered by Early- Middle Cretaceous aged marbles and dolomitic limestones. Gül et al. (1984) defined Aydos, Namrun, Belemedik, ophiolite and Niğde tectonic slices obducted on to the continental platform following the emplacement of ophiolitic mélange by a compressive tectonics at the end of Late Cretaceous. Their studies aimed to find out the tectonic and stratigraphic situations of the Bolkardağı and Belemedik in the Taurides and to observe the exten-

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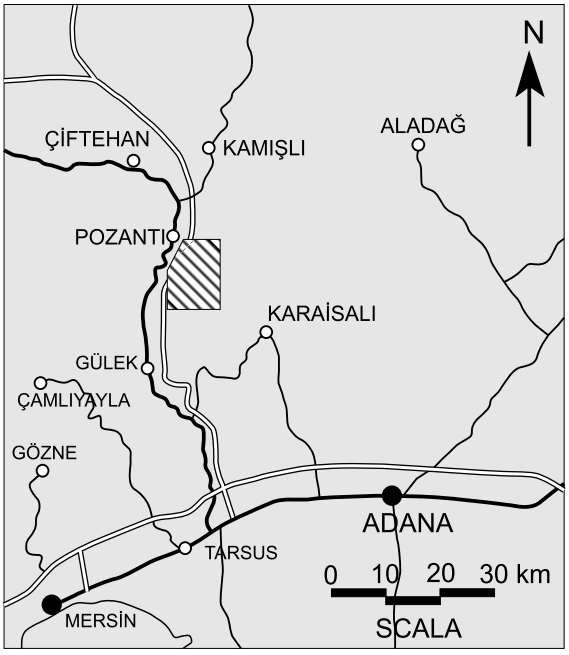

Figure 1- Location map of the study area.

sion of this units into the Adana basin. The researchers also stated also that Late Devonian aged units were conformably overlain by Carboniferous aged units, and Late Permian aged Köşkdere formation unconformably overlay these units in the Belemedik region. No findings related to Early Permian could be demonstrated in the study. Later, Flügel and Kahler (1988), who conducted researches in Palaeozoic aged units in the vicinity of Belemedik for biostratigraphic purposes, determined the presence of *Girvanella*-bearing Lower Permian in the region by examining Late Devonian-Permian facies.

The objective of this study was to determine the tectonostratigraphic features of Belemedik and its surroundings known as tectonic window, and to establish the position of the rock associations outcropping within the units defined by Özgül (1976) in the Taurides.

REGIONAL GEOLOGY

The study area in a regional scale covers Ecemiş Fault Zone which constitutes the boundary between Central and Eastern Taurides, and the sector lying to the east of this zone. In this study, the rock associations outcropping in the region were assessed within the units defined in the Taurides by Özgül (1976). According to this, generally, while in the western sectors of Ecemiş Fault Zone, Bolkar Mountain and Aladağ Units (Özgül, 1976) and the rock associations constituting Namrun Tectonic Slice redefined by Alan et al. (2004*b*) are observed, in the area lying to the east of Ecemiş Fault Zone, again Aladağ Unit defined by Özgül (1976) and the rocks belonging to the Bozkır Unit which tectonically overlies Aladağ Unit are observed.

Middle Carboniferous-Late Cretaceous aged rocks, the outcrops of which are observed in the western sectors of Ecemiş Fault Zone and that are not situated in the study area, constitute the basement in the region (Alan et al., 2004*a*).The Namrun Tectonic Slice comprising Carboniferous-Late Cretaceous aged rocks tectonically overlies Bolkar Mountain Unit (Alan et al., 2004*b*). To the north of Namrun and Aslanköy, the Namrun Tectonic Slice is tectonically overlain by the rocks belonging to the Aladağ Unit. Bolkar Mountain Unit, Namrun Tectonic Slice and Aladağ Unit face with the units belonging to the Bozkır Unit and Oligocene-Miocene aged deposits along the corridor formed by Ecemiş Fault Zone in the near west of Pozantı. At the base of the Bozkır Unit, late Senonian aged Kızılcadağ Ophiolithic Melange and Olistostrome are present. And, at the top of it, Late Cretaceous aged Pozantı-Karsantı Ophiolithic Nappe is located. In the area to the east of Ecemiş Fault Corridor, Belemedik sequence comprising Late Devonian-Late Cretaceous units constitutes the basement, and further east, this basement is overlain with angular unconformity by the deposits of Adana Basin consisting of Paleocene-Late Miocene aged units (Figure 2, 3).

STRATIGRAPHY

In the study area covering Belemedik and its surroundings, in general, Belemedik Sequence,

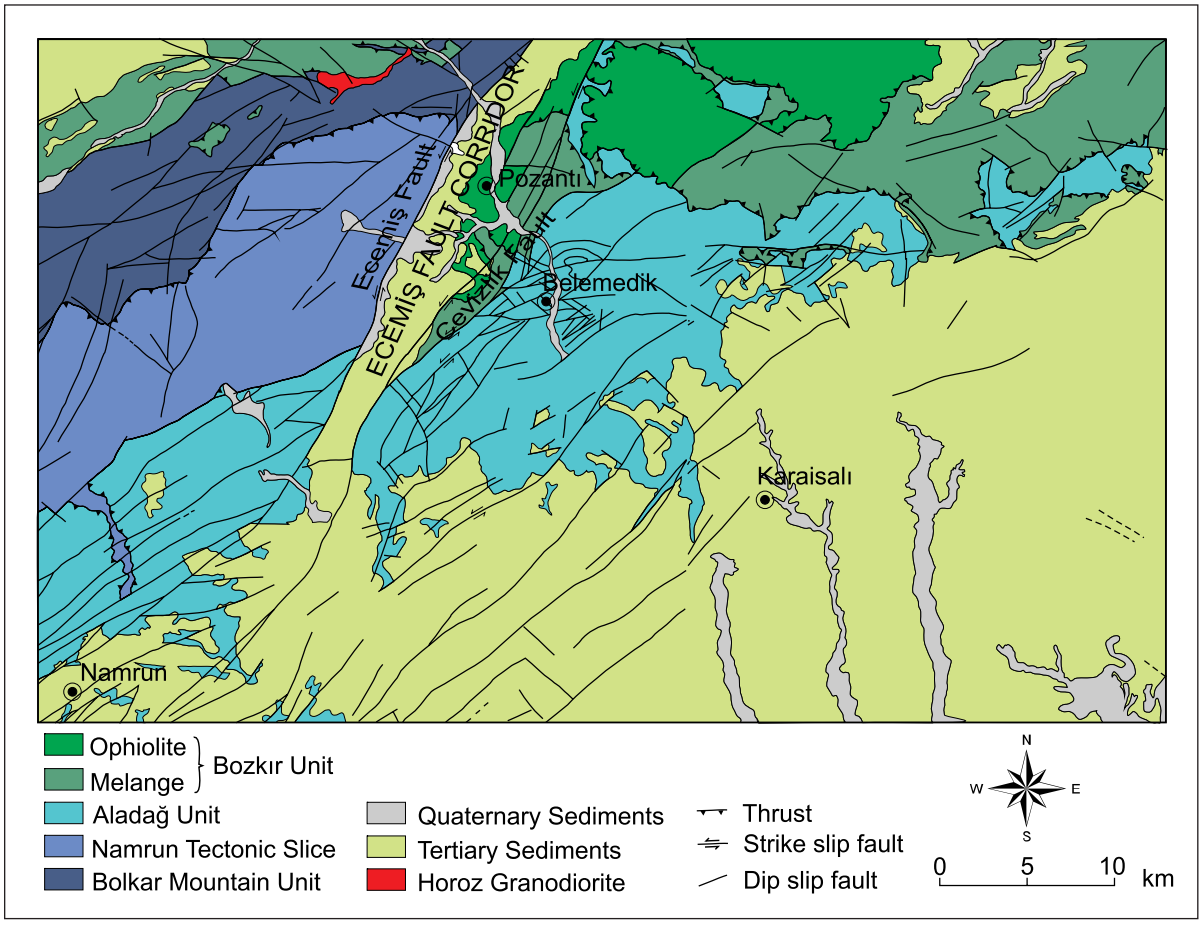

Figure 2- The settings of the units and tectonic slice defined in study area.

Ophiolithic melange and ophiolithic rocks belonging to the Bozkır Unit, and Tertiary aged deposits overlying all these units are observed. Belemedik Sequence, which constitutes the basement in the study area, is tectonically overlain by the ophiolithic rocks belonging to the Bozkır Unit along Ecemiş Fault Zone, between Tekir Plateau (J2) and Pozantı. And, it is unconformably overlain Paleocene-Eocene aged Güzeller Formation to the southwest of the Gülek Strait (O1), by Oligo-Miocene aged Çukurbağ Formation and Early Miocene aged Burç Formation between the Gülek Strait and Eskikonacık village (B7). And, it was determined that, to the east of the Ecemiş Fault Corridor, Belemedik Sequence is overlain by Paleocene-Miocene aged sediments deposited in Adana Basin. Considering that Belemedik Sequence is the equivalent of the Aladağ Unit; the presence of Paleocene-Eocene aged units over the Aladağ Unit was introduced for the first time in this study (Figure 4).

BELEMEDİK SEQUENCE

Within the Belemedik Sequence, which outcrops over a large area in the study area; Late Devonian aged Gümüşali, Carboniferous aged Belemedik, Early Permian aged Sarıoluk, Late Permian aged Kızılgeriş and Yellice, Early-

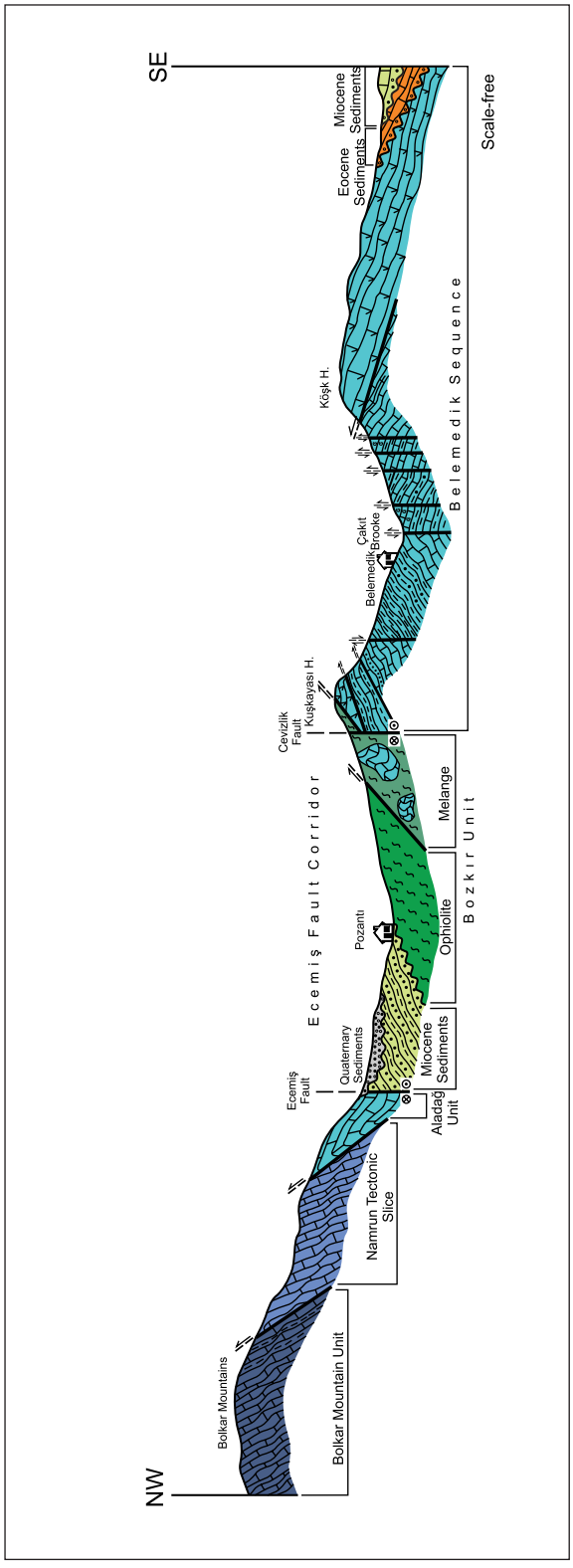

Figure 3- Geological cross-section showing the settings of the units and tectonic slices defined in the study area and its near vicinity.

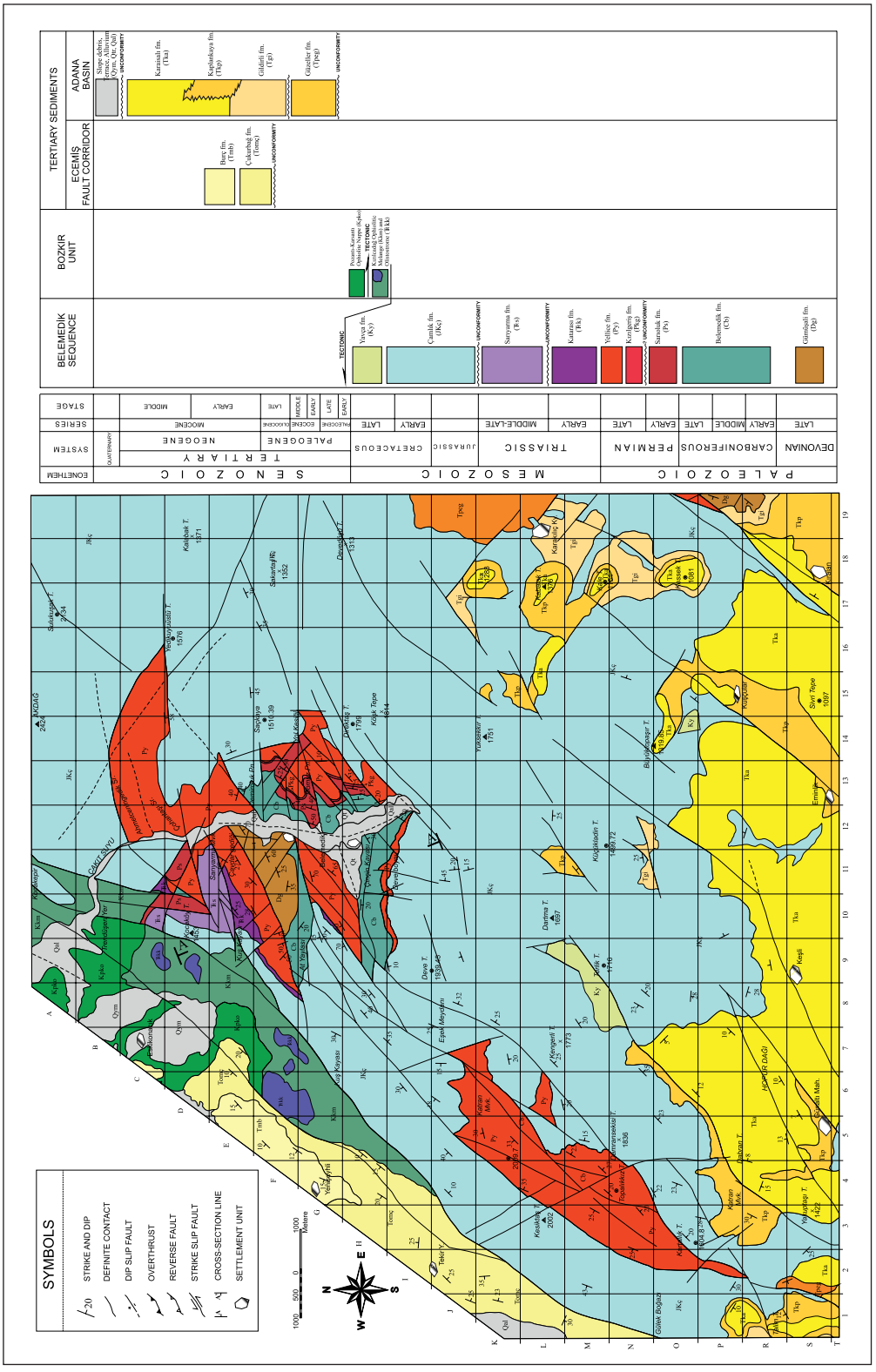

Figure 4- Geological map of the study area

Middle Triassic aged Katarası, Middle-Late Triassic aged Sarıyarma, Jurassic-Cretaceous aged Çamlık and Late Cretaceous aged Yavça Formations were defined (Figure 5, 6). Since it comprises Early Permian aged rock association, in this study Belemedik Sequence was correlated with the rock associations defined as the Aladağ Unit by Özgül (1976). However, since the name 'Belemedik' has long been used in the literature for the region and is well-known, in this study the name 'Belemedik Sequence' was adopted for the rock associations outcropping in Belemedik and its near vicinity and ranging in age from Late Devonian to Late Cretaceous.

Gümüşali formation (Dg)

Belemedik Sequence presents similar age and lithological characteristics as the Gümüşali formation determined for the first time by Demirtaşlı (1967) in the Geyikdağı Unit. That's why, Late Devonian siltstone, shale, quartzite and limestone lithologies within Belemedik Sequence are introduced under the same name in this study as well.

In the study area, the unit is the best observed at a place 100 meters northwest of Belemedik village (Figure 4). (Both in the above mentioned place and in other areas, because of the outcrops of the unit take place in the close regions to Ecemiş fault zone, presenting of adequate type section is prevented due to the related deformation). The outcrops of the Gümüşali formation in the vicinity of Feke outside the study area carry reference section feature for the unit.

Gümüşali formation is mainly represented by sandstone, dolomitic limestone, limestone, siltstone-quartzite and shale lithologies in the study area. At the base of the unit, the weathered surface of which is brownish-dark gray and the fresh fracture surface of which is yellowish-gray colored, thin-medium bedded, fine-medium grained, moderately sorted, hard-rugged, carbonate cemented and highly macrofossiliferous sandstones take place. On this level the alternation of dolomitic limestones of which the weathered surface is brownish-dark gray, fresh fracture surface blackish gray thin to thick bedded ,hard micritic and fractured with the calcide fillings and reefal limestone of which the weathered surface is bluish-dark gray, fresh surface is gray, medium to thick bedded, hard, micritic and with a high content of brachiopods and corals take place. The defined dolomitic limestone and the limestone horizons are in lenticular shape in the unit. After the limestone-dominant levels, the formation continues with levels which are siltstone-dominant and having limestone lenses in places. In the upper levels of the formation, the alternation of black colored shale; thin-medium bedded, beige-cream colored siltstone and quartzite is observed.

In the uppermost level of the unit, shales; the weathered surface of which is brownish-dark green, the fresh fracture surface of which is gray beige colored, and which are thin bedded, with splinter-like cracks and mica flakes; alternate with clayey limestones the weathered surface of which is gray, the fresh fracture surface of which is light gray, beige colored, and which are thin-medium bedded, moderately competent, highly jointed. After this level comes Carboniferous aged Belemedik formation.

In this study, the Gümüşali formation was given the age of Late Devonian based on its general lithological features, its macrofossil content of brachiopod and coral, and on the fact that Carboniferous aged Belemedik formation conformably overlies it and Flügel and Kahler (1988) obtained the age of Late Devonian in the vicinity of Belemedik.

Since Gümüşali formation is situated at the bottom of the Belemedik formation which constitutes the basement in the study area, the base of the Gümüşali formation cannot be observed. That's why; its real thickness could not be given.

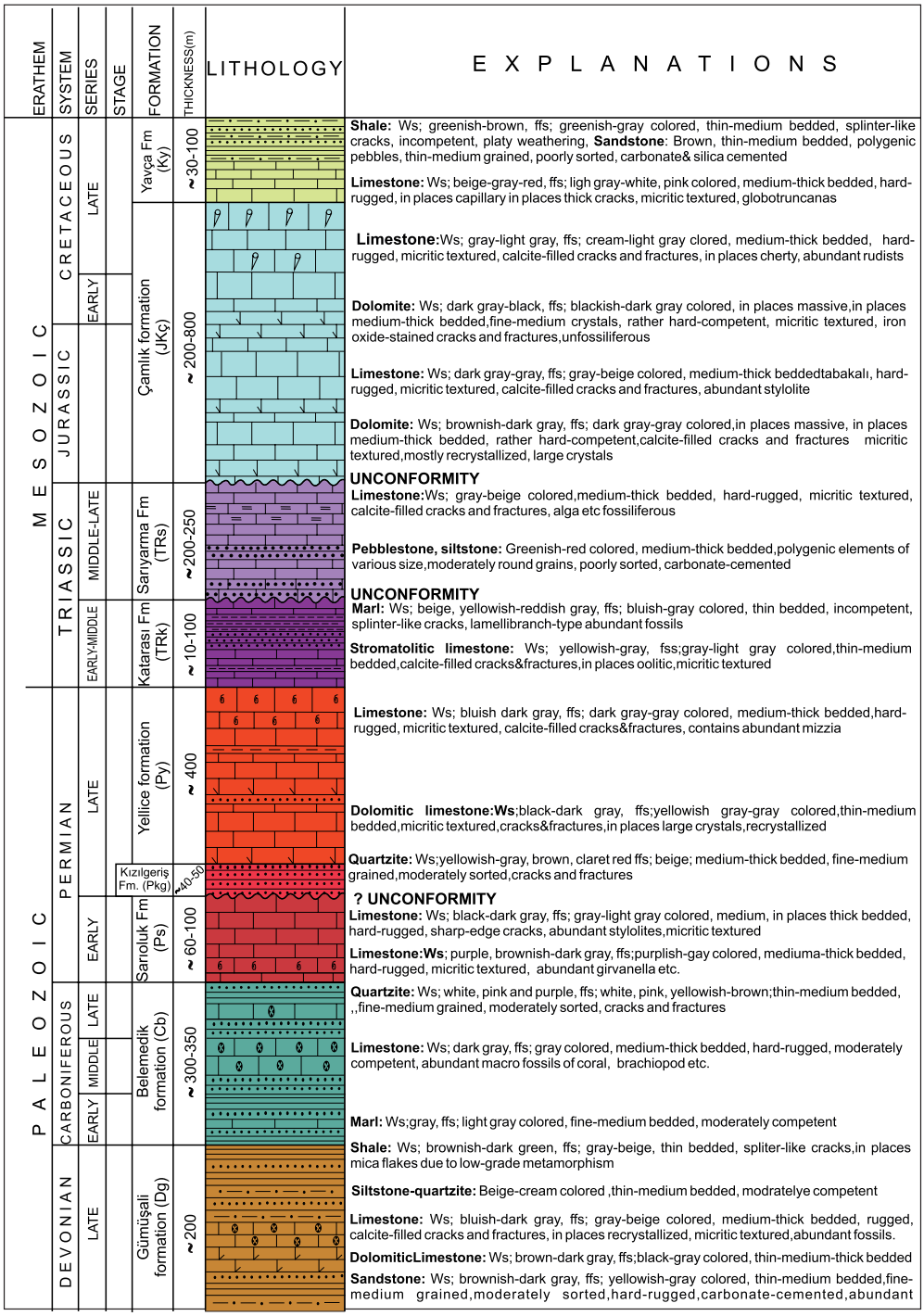

Figure 5- Generalized stratigraphic section of Belemedik Sequence (scale-free) (Ws: weathered surface; ffs: fresh fracture surface).

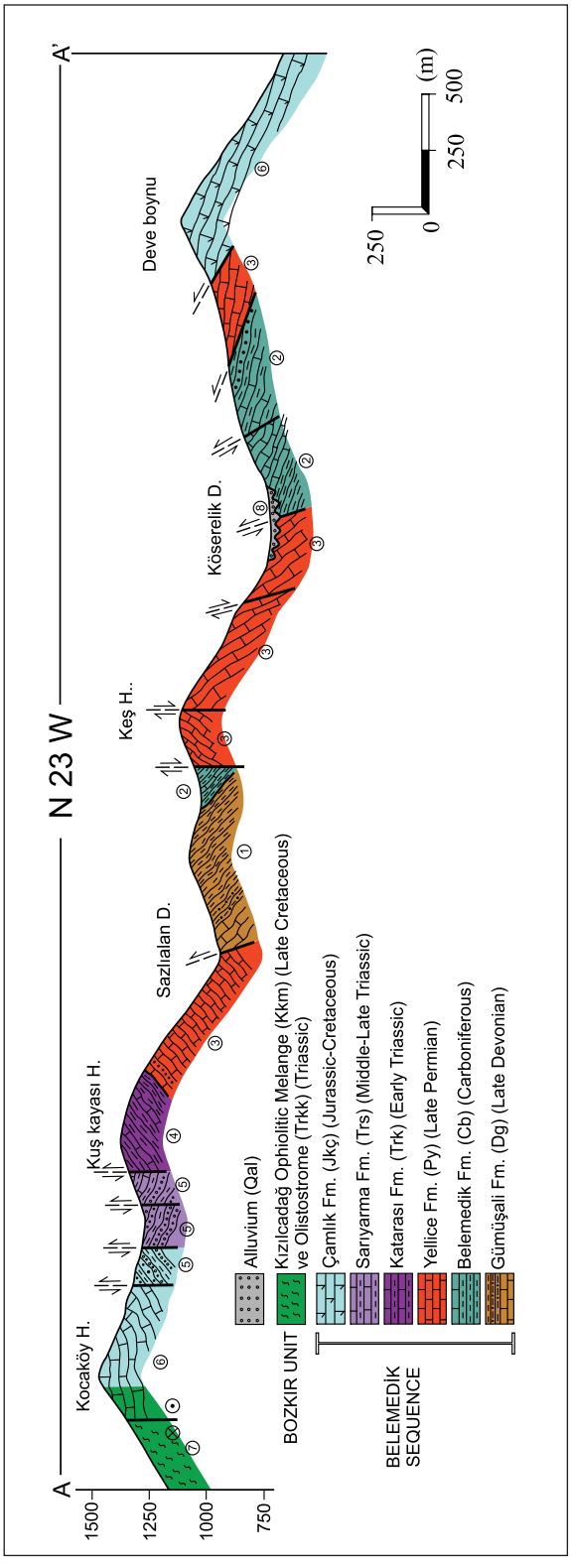

Figure 6- Geological cross-section of Belemedik Sequence

However, it can be said that the apparent thickness of the Gümüşali formation in the study area is approximately 200 meters.

Its lithology mainly composed of quartzite, siltstone, shale and lenticular limestones, its sedimentary structures and fossil content indicate that the Gümüşali formation may have deposited under conditions of shallow marine-coastal environment.

The Belemedik formation (Cb)

The Carboniferous aged rock association represented mainly by limestone, shale, marl and quartzite lithologies have been introduced under the name of Belemedik formation first time by Gül et al. (1984) and using of the same name was considered appropriate for similar lithologies in this study as well.

Due to many deformations developed during different periods, the different levels of the Belemedik formation are observed in different sections of the study area. For the bottom section of the unit Çınçın Kayası Locality (H11), At Plateau (G9), for medium levels At Plateau (G9), Çınçın Kayası (H11), Demiroluk spring (E13) and for the upper levels the surroundings of Demiroluk spring can be proposed as type section localities. In addition, At Plateau (G9), Çınçın Kayası (H11) and Demiroluk spring (E13) localities are places where different lithologies belonging to the Belemedik formation can be observed and thus can be reference section areas for the unit (Figure 4).

The Belemedik formation generally represented by shale, sandstone, clayey limestone, quartzite and limestone lithologies, starts with the alternation of shale-siltstone-sandstone and limestone, conformable with the clastic levels of Late Devonian aged Gümüşali formation. Over the transition level are observed marls the weathered surface of which is gray, the fresh fracture surface of which is light gray colored, and which are fine-medium bedded, moderately competent. Within this level, by its soft topographical appearance and brown-dark brown color limestones are observed of which the weathered surface is gray, the fresh fracture surface is light gray colored, thin bedded, micritic textured, and is considerably rich in brachiopods, corals and crinoids. Overlying this level limestones take place of which the weathered surface is dark gray, the fresh fracture surface is gray colored, medium-thick bedded, hard-rugged, and contain solitary coral and brachiopod. Further up, thin bedded marls the weathered surface of which is brownish-gray, the fresh fracture surface of which is yellowish gray colored alternate with limestones the weathered surface of which is dark gray, the fresh fracture surface of which is gray colored, and which are thin-medium bedded, hard-rugged. In the uppermost levels of the formation is present an alternation of medium-thick bedded quartzites which display colors varying from white to purple; thin bedded, brownish-green colored shale and medium-thick bedded, gray-beige colored limestones.

Belemedik formation, which has a conformable contact with the underlying Gümüşali formation, is conformably overlain by the Sarıoluk formation. However, the cross-bedded sandstone levels observed at the uppermost section of the Belemedik formation in some places indicate that deposition environment became considerably shallower from time to time and thus, there may be some local unconformities in some sections of the contact between the Belemedik and the Sarıoluk formations.

The Belemedik formation was highly affected by the structural elements developed depending on the deformations that were active in the region during different periods and thus, its real thickness could not be determined. But its apparent thickness is around 300-350 meters.

As a result of the examinations performed on the samples collected from the outcrops of the

Belemedik Formation in different areas, the following fossil assemblages and ages were obtained. From the outcrops in the localities of Çınçın Kayası (H11) and Domuz Spring (G13) *Koninckopora* ex. gr. *inflata* (Koninck), *Brunsia* sp., *Endothyra* sp., *Mediocris* sp., *Millerella* sp., *Kameana* sp., *Koninckopora* sp., *Eostaffella* spp. fossils and Early Carboniferous age; from the outcrops in the localities of At Plateau (G9) and Çınçın Kayası (H11) *Archaediscus* sp., *Palaeotextularia* sp., *Eotuberitina* sp., *Bradyina* sp., *Earlandia* sp., *Brunsia* sp., *Forschia* sp., *Ozawainella* sp., *Schubertella* sp., *Beedeina* sp., *Climacammina* sp., *Ungdarella* sp., *Profusulinella* ex. gr. *rhomboides* (Lee and Chen) fossils and Middle Carboniferous age; from the outcrops in the locality to the east of Belemedik Village (H12) *Tetrataxis* sp., *Triticites* sp., gastropods, ostracods and echinite shell particles and Late Carboniferous age; in the locality of Demiroluk Spring (E13) *Palaeonubecularia uniserialis* Reitlinger, *Globivalvulina* sp., *Earlandia* sp., *Nodosinelloides* sp., *Pseudoepimastopora* sp., *Palaeonubecularia* sp. fossils were determined for the same time interval Accordingly the age of the unit named as the Belemedik formation in this study is Carboniferous.

According to its general lithological features and fossil content, Belemedik formation must have deposited in a marine environment which could become considerably shallower from time to time.

Sarıoluk formation (Ps)

The name Sarıoluk formation was used for the first time by Ayhan and Lengeranlı (1986) for rock types composed of *Girvanella*-bearing clayey limestones and limestones, the best outcrops of which were observed in the vicinity of Sarıoluk Plateau (M34) situated to the west of Başyayla Corridor of Yahyalı (Kayseri) township outside the study area. The use of the same name was considered appropriate for similar lithologies observed in restricted areas, in this study as well. In the study area, the unit displays outcrops mainly at the east slopes of the Belemedik Valley and to the north of Topalıkkız Hill (N4). In addition in the study area, the west of Yolkesiği Locality (F14) situated to the east of Belemedik Village and Domuz Spring Locality (G13) can be defined as reference section places for the formation (Figure 4).

Sarıoluk formation is represented by a lithology composed mainly of Girvanella-containing clayey limestones and limestones. At the base of the formation are situated limestones and large Girvanella-containing clayey limestones the weathered surface of which is purplish-brown and gray; the fresh fracture surface of which is purple-dark gray colored; and which are medium-thick bedded, solid, micritic textured, having calcite-filled cracks, with a total thickness reaching up to 40-50 meters. Overlying this unit is a *Pseudofusulina* Zone having a total thickness of 2-3 meters, the weathered surface of which is dark gray-black, the fresh fracture surface of which is grayish-black colored, and which is medium-thick bedded, hard-rugged, containing calcite-filled cracks and large fusulinids. This level grades into limestones the weathered surface of which is brownish-black, the fresh fracture surface of which is black colored, and which are thin-medium bedded and containing large amounts of crinoids and pseudoschwagerinids. The uppermost levels of Sarıoluk formation are composed of limestones the weathered surface of which is dark-gray, the fresh fracture surface of which is grayish-black colored, and which are medium-thick bedded, rugged and containing calcite-filled cracks.

Sarıoluk formation, which conformably overlies Carboniferous aged Belemedik formation is overlain by Late Permian-aged Kızılgeriş Formation. In the study area, no field data was obtained to indicate that the contact between Sarıoluk and Kızılgeriş formations is unconformable. However, the fact that Kızılgeriş for-

mation, overlying Sarıyarma formation that ends with limestones at the top, is represented totally by quartzite lithology supports the opinion that the contact between these two units is unconformable.

In this study, it was determined that the thickness of Sarıoluk formation varied from 60 to 100 meters.

In the samples collected from the localities of Domuz Spring (G13) and Yolkesiği (F14) *Nankinella* sp., *Claracrusta catanoides* Homan, *Pseudofusulinoides* sp., *Zellia* sp., *Girvanella subparallela* Flügel and Flügel-Kahler, *Pseudofusulina* sp., *Eotuberitina* sp., *Pseudoepimastopora* sp., *Globivalvulina* sp., *Geinitzina* sp., *Tetrataxis* sp., *Palaeonubecularia* sp., *Hemigordius* sp., *Earlandia* sp. fossil assemblage was determined and Early Permian age was given to Sarıoluk formation.

The general rock type features and fossil content of Sarıoluk formation indicates that it may have deposited in a low-energy, shallow marine environment in which oxidation functions were effective due to becoming too shallow from time to time.

Kızılgeriş formation (Pkg)

This unit, which was first defined as Kızılgeriş member by Özgül (1997) during the study performed in the vicinity of Taşkent and Hadim, was upgraded to Formation rank and introduced as Kızılgeriş formation in this study.

Kızılgeriş formation, type section place of which is located to the southwest of Taşkent and Hadim region of Central Taurides outside the study area, exhibits outcrops having the quality of reference section in the vicinity of Domuz Spring Locality (G13) on the slopes of Belemedik valley in the study area (Figure 4).

The dominant lithology of Kızılgeriş formation is composed of quartzites the weathered surface of which is yellowish-gray, brownish-claret red; the fresh fracture surface of which is beige colored and which are medium-thick bedded, hard-rugged, coarse grained. In some areas, in addition to the dominant quartzite lithology, shales are observed at the bottom sections of Kızılgeriş formation.

The unit, which unconformably overlies Early Permian aged Sarıoluk formation at the bottom, is conformably overlain by Late Permian aged Yellice formation at the top.

Although the unit generally presents apparent thickness values varying between 40 and 50 meters, it was determined that it became thinner in the lateral direction and the apparent thickness could decrease down to 5-10 meters.

Kızılgeriş formation does not contain any fossil findings due to its lithological composition composed of quartzites. Thus, taking into account its stratigraphic relation with the units underlying and overlying it and the ages of these units, Late Permian age was given to it.

When the lithofacies characteristics of Kızılgeriş Formation are taken into account, it must have deposited in a beach environment of a high-energy sea where nourishment from the land is high.

Yellice formation (Py)

Mizzia-bearing limestones outcropping in the region of Taşkent and Hadim situated outside the study area were introduced for the first time by Özgül (1997) under the name of Yellice member. In this study, similar lithologies were redefined using the name Yellice formation. In the study area, the best outcrops of the unit are observed on the slope between Kuşkayası (E9) and Çakıt Brook to the west of Belemedik Village. In addition, the west of Belemedik Village, Yolkesiği Locality (F14), Çavdar Gediği Locality (E11), Çohantaşı Ridge (D12) and Kat-

ran Locality (K6) are other areas where outcrops can be well observed and thus, they can be reference section areas (Figure4).

Yellice formation is generally represented by recrystallized dolomitic limestones, the weathered surface of which is black-dark gray, the fresh fracture surface of which yellowish-gray colored and which are thin-medium bedded, solid, having cracks and fractures and micritic textured; and *Mizzia*-bearing limestones the weathered surface of which is bluish dark gray, the fresh fracture surface of which is dark gray-gray colored and which are medium-thick bedded, hard-rugged, micritic textured. At the uppermost levels of the unit is observed a thick quartzitic horizon similar to Kızılgeriş formation at the bottom of Yellice formation.

Since the bottom and top contacts of Yellice formation are tectonic in many sections of the study area, the real thickness of it could not be determined in this study. However, it can be said that the apparent thickness of the unit in the study area is around 400 meters.

In the samples collected from the outcrops of Yellice formation at Çavdar Gediği (E11) and Yolkesiği (F14) Localities, the fossil assemblage comprising *Ammodiscus* sp., *Agathammina* sp., *Bradyina* sp., *Chusenella* sp., *Climacammina* sp., *Dagmarita* sp., *Dagmarita chanakchiensis* Reitlinger, *Dunbarula* sp., *Eutuberitina* sp., *Frondina* sp., *Hemigordiopsis* sp., *Hemigordius* spp., *Hemigordius* sp., *Geinitzina* sp., *Globivalvulina* sp., *Geinitzina* spp., *Kamurana* sp., *Langella* sp., *Mizzia* sp., *Nankinella* sp., *Paradagmarita* sp., *Parafusulina* sp., *Paraglobivalvulina* sp., *Permocalculus* sp., *Pseudovermiporella* sp., *Pachyphloia* sp., *Pseudovidalina* sp., *Reichelina* sp., *Schubertella* sp., *Staffella* sp., *Tetrataxis* sp. and *Ungdarella* sp. was obtained. According to the defined fossil assemblage, the age of Late Permian was given to Yellice formation.

Yellice formation, the dominant lithology of which is composed of highly microfossiliferous and macrofossiliferous limestones must have deposited in a low-energy shelf environment.

Katarası formation (TRk)

The name Katarası formation was first used by Demirtaşlı (1967) for the rock association composed of stromatolitic limestone, sandy limestone, marl and mudstone alternation. The use of the same name was considered appropriate for similar lithologies in this study as well.

In the study area, the outcroppings of Katarası formation which can be places for type sections are observed to the east of Kuşkayası Hill (E9) and in the vicinity of Çavdargediği Locality (E 11) (Figure 4).

Katarası formation starts at the base with stromatolitic limestones the weathered surface of which is gray-beige, fresh fracture surface is gray-light gray colored and which are thin-medium bedded, hard-rugged, having calcite-filled cracks and fractures and showing oolitic character in places. Overlying this level is a sandy limestone lithology which is brownish-gray colored, medium-thick bedded and hard-rugged. In the uppermost sections of Katarası formation are observed yellow-beige colored marls defined as mottled marls in the Taurides and claret red colored mudstone lithologies. Limestone levels which are observed in lenticular shape between marl layers are highly fossiliferous.

Katarası formation has a conformable contact with Yellice formation that it overlies. To the northeast of Kuşkayası Hill (E9), Katarası formation is unconformably overlain by Middle-Late Triassic aged Sarıyarma formation. And, to the east of Kuşkayası Hill (E9), Katarası formation is overlain by Jurassic-Cretaceous aged Çamlık formation. It was determined that Çamlık formation moved on Katarası formation depending on the deformations which were active in the

region during different periods and thus, the contact between these two units lost its original position.

It can be said that the apparent thickness of the Katarası formation in the study area varies between 10 and 100 meters.

In the samples compiled from the outcroppings of Katarası Formation in the east of Kuşkayası Hill (E9) and Çavdargediği (E11) locality; the fossil assemblage composed of *Spirorbis phlyctaena* (Brönnimann and Zaninetti), *Rectocornuspira kalhori* (Brönnimann, Zaninetti and Bozorgnia), *Cornuspira mahajeri* (Brönnimann, Zaninetti and Bozorgnia), *Glomospira facilis* Ho, *Glomospira* sp., *Earlandia* sp., *Ammodiscus* sp., *Calcitornella* sp., gastropods and lamellibranch shells was determined. Although the defined fossil assemblage gave the age Skythian (Induan), taking into account Middle Triassic age obtained by Ayhan and Lengeranlı (1986) from Dişdöken Formation which corresponds to Katarası formation in the vicinity of Yahyalı, Katarası formation was given the Early-Middle Triassic age.

Taking into account the general lithofacies characteristics and fossil content of Katarası formation, it can be said that it deposited on a tidal flat, in a low-energy marine environment.

Sarıyarma formation (TRs)

The rock association composed mainly of pebblestone, siltstone, clayey limestone and limestone and the best outcroppings of which are observed at Sarıyarma Locality (E11) was introduced for the first time by Alan et al. (2004*a*) under the name of Sarıyarma Formation.

Sarıyarma formation, the type section place of which is situated on the west slope of Belemedik Valley to the south of Pozantı township of Adana province, exhibits outcrops having the character of reference section to the west of Kuşkayası Hill (E9) in the study area (Figure 4).

At the base of Sarıyarma formation; between yellow-claret red colored, thin bedded marls lies a pebblestone level which is green-yellow-brown and red in color, middle-thick bedded, poorly sorted, ungraded, moderately rounded, with polygenic elements having dimensions varying from large blocks to silt. Within this level, Late Permian aged pebbles containing conspicuous *Mizzia* fossils. Overlying this defined level are limestones the weathered surface of which is gray-beige in color, and which are middle-thick bedded, hard-rugged, having calcite-filled cracks and fractures, containing fossil shell traces (alga, etc) and bituminous shale intercalations in places.

The contact between Sarıyarma formation and Early-Middle aged Katarası formation, which is stratigraphically at the base of it, is faulted in the study area. However, Özgül (1997) stated that Çamiçi and Dikenli Members of Gevme formation, which is the equivalent of Sarıyarma formation in the region of Taşkent and Hadim, are unconformable over Skythian - Anisian aged units. That's why, it was accepted that Sarıyarma formation unconformably overlies Katarası formation in the study area. And, Sarıyama formation is unconformably overlain by Jurassic-Cretaceous aged Çamlık formation. However, It was determined that Çamlık formation moved on Sarıyarma formation underlying it depending on the deformations in the region and thus, the contact between these two units lost its initial position as well.

Özgül (1997) stated that the total thickness of Çamiçi and Dikenli members corresponding to Sarıyarma formation in Taşkent and Hadim region is between 450 and 500 meters. As to the apparent thickness of Sarıyarma formation in the study area, it is around 200-250 meters.

No paleontological findings which can give an age to Sarıyarma formation were detected in the samples collected from the limestones within the formation. However, Erdoğan stated that with

regard to facies characteristics, the collected samples probably reflected a shallow marine environment belonging to Triassic-Jurassic period (Oral Com; Kemal Erdoğan, MTA). In addition to the fact that at the base of Sarıyarma formation lies Early Triassic aged Katarası formation and at the top of Sarıyarma formation lies Jurassic-Triassic aged Çamlık formation, Sarıyarma formation displays significant lithological similarities to Çamiçi and Dikenli members of Gevne formation defined by Özgül (1997) in Taşkent and Hadim region. Depending on these reasons, (?) Middle-Late Triassic age was given to the unit introduced as Sarıyarma formation in this study.

When its general lithological characteristics are taken into account, Sarıyarma formation must have deposited in a shallow marine environment where there was from time to time heavy material feeding from the land and tidal effect and lagoons were present in places.

Çamlık formation (Jkç)

Çamlık Limestone name was first used by Monod (1977) for Jurassic- Cretaceous aged limestones within Aladağ Unit in the Middle Taurides to the west of Beyşehir. But, in this work, the use of the name Çamlık formation was considered appropriate for lithologies of similar age.

The unit displays outcrops in a large area in the study area. Its best outcrops carrying reference section character are observed to the north of Belemedik Village (12), Akdağ district (A14) to the north of Keşli (S9) and Kuşçular (P15) villages (Figure 4).

At the base of Çamlık formation lie micritic textured dolomites the weathered surface of which is brownish dark gray, the fresh fracture surface of which is dark gray- gray colored, and which are medium-thick bedded, rather hard-rugged, having calcite-filled cracks and fractures, and large crystals. Overlying this level are micritic limestones the weathered surface of which is dark gray, the fresh fractured surface of which is gray-beige colored, and which are medium-thick bedded, hard-rugged, having abundant stylolites, containing alga etc fossils. Overlying these defined limestones are dolomites the weathered surface of which is dark gray-black, the fresh fractured surface of which is blackish-dark gray colored, and which are in places massive, in places medium-thick bedded, rather hard-rugged, micritic textured, having medium crystals, containing no fossils. In the uppermost sections of the unit are observed limestones the weathered surface of which is gray-light gray, the fresh fractured surface of which is cream-light gray colored, and which are medium-thick bedded, in places having nodular or banded chert, and with a rich content of rudists.

The initial contact of Çamlık formation with Triassic aged units is unconformable at the base. It was determined that in some sections of the study area Çamlık formation was conformably overlain by Late Triassic aged Yavça formation, and in some sections it was tectonically overlain by the melange and ophiolithic units without Yavça formation.

The real thickness of Çamlık formation in the study area could not be determined. However, it can be said that the apparent thickness of the unit varies between 200 and 800 meters.

In the samples collected from the outcrops of Çamlık formation to the north of Belemedik (H12) and Kuşçular (P15) Village the fossil assemblage composed of: *Mesoendothyra croatica* Gusic, *Cayeuxia piae* Frollo, *Valvulina lugeoni* Septfontaine, *Siphovalvulina* sp., *Nautiloculina* sp., *Thaumatoporella parvovesiculifera* (Raineri), *Praekurnubia crusei* Redmond, *Satorina apulensis* Fourcade and Chorowics, *Pfenderina trochoidea* Smout and Sudgen, *Salpingoporella selli* Cresconti, *Clodocoropsis*

mirabilis Felix, *Praechrysalidina infracretacea* Luperto and Sinni, *Debarina hahounerensis* Fourcade, Raoult and Vila, *Haplophragmoides joukowskyi* Charollais, Brönnimann and Zaninetti, *Orbitoides* cf. *tissoti* Schlumberger, *Globotruncana linneiana* (d'Orbigny), *Stoniosphaera sphaerica* (Kaufmann), *Discocylina schlumbergeri* Munier-Chalmas, *Moutcharmontia apenninica* (De Castro), *Haurania* sp., *Verneuilina* sp., Textulariidae, *Trocholina* sp., *Ophthalmidium* sp., *Pseudocyclammina* sp., Lageniidae, *Favreina* sp., *Chrysalinida* sp., *Pfenderina* sp., *Nezzazata* sp., *Bolivinopsis* sp., *Chrysalinida* sp., *Everticyclammina* sp., *Quinqueloculina* sp., *Involutina* sp., *Earlandia* sp., *Orbitolina* sp., Rotaliidae and *Siderolites* sp. was determined. Depending on the fact that the defined fossil assemblage represents the age range of Aalenian-Bajocian (Early-Middle Jurassic) and Maastrichtian (Late Cretaceous), Çamlık Formation was given the age Jurassic-Cretaceous.

When its general lithofacies characteristics and fossil content are taken into account, it can be said that Çamlık formation deposited in a shelf environment belonging to a shallow and calm sea where platform type carbonates deposited.

Yavça formation (Ky)

The rock association composed of mudstone-siltstone-sandstone alternation and limestone interbeds was introduced for the first time by İlker (1975) under the name of Yavça formation. The best outcrops of the unit that can be type section localities are observed in Yavça Village, situated 10 km east of Arslanköy Municipality of Mersin. North of Terlik Hill (M9), 1 km northwest of Kuşçular (P15) Village are areas where the outcrops of Yavça formation having the character of reference section are observed in the study area (Figure 4).

Yavça formation is generally composed of beige-claret red-brown-gray colored sandstone, mudstone and siltstone-shale alternation. Crinkly limestones lying at the base, the weathered surface of which is beige-gray, the fresh fracture surface of which is light gray-white-pink colored, and which are medium-thick bedded, hard-rugged, micritic textured, having calcite-filled fissures and globotruncanas; are overlain by brown, thin-medium bedded, polygenic pebbly, fine-medium grained, poorly sorted, carbonate and silica cemented sandstones and shales the weathered surface of which is greenish brown, the fresh fracture surface of which is greenish gray colored, and which are thin-medium bedded, incompetent, showing platy weathering and splinter-like fractures.

Yavça formation, which conformably overlies Jurassic-Cretaceous aged Çamlık formation at the base, is tectonically overlain at the top by Kızılcadağ Ophiolitic Melange and Olistostrome. It was determined that the limestones present within sandstone, siltstone and shale levels wedged out to form lenses in the lateral direction. The apparent thickness of Yavça formation in the study area varies between 50 and 100 meters.

The following nannofossil assemblage that gave the age of Campanian-Maastrichtian was defined from the samples taken from the clastic levels observed at Çetinlik Locality of Hamidiye Village located to the near north of the study area:

Arkhangelskiella cymbiformis Vekshina, *Chiastozygus amphipons* (Bramlette and Martini), *Ceratolithoides aculeus* (Stradner), *Biscutum constans* (Gorka), *Cretarhabdus crenulatus* (Bramlette and Martini), *Prediscosphaera cretacea* (Arkhangelsky), *Cribrosphaera ehrenbergi* (Arkhangelsky), *Watznaueria barnasea* (Black) Perch-Nielsen, *Microshabdulus decoratus* Deflandre, *Zeugrhabdotus embergeri* (Noel), *Micula decussata* Vekshina, *Calculites obscurus* (Deflandre), *Reinhardtites anthophorus* (Deflandre), *Glaukolithus diplo-*

grammus (Deflandre), *Lithraphidites quadratus* (Bramlette and Martini), *Micula concava* (Stradner) Verbeck, *Quadrum gothicum* (Deflandre).

In addition, the following foraminiferal fossil assemblage was obtained which gave the age of Late Cretaceous (Senonian-Maastrichtian) in the examinations performed on the rock samples taken from the limestone levels of the unit in the vicinity of Kuşçular (P15) Village:

Globotruncana linneiana (d'Orbigny), *Rosita fornicata* (Plummer), *Globotruncana bulloides* Vogler, *Marginotruncana pseudolinneiana* Pessagno, *Dicarinella concavata* (Brotzen), *Globotruncanita stuartiformis* (Dalbiez), *Stomiosphaera sphaerica* (Kaufmann), *Pithonella ovalis* (Kaufmann), Globigerinidae, Heterohelicidae, *Globotruncana* sp. *Siderolites* sp., *Ophthalmidium* sp., Anamolinidae, Rotaliidae. According to these fossil assemblages, the age of the Yavça Formation was accepted as Late Cretaceous.

Yavça formation, which presents a lithology composed of limestones at the base, and in the continuation of it, sandstone-mudstone intercalated with siltstone and shale alternation, must have deposited in an environment which extended from neritic to deep sea.

BOZKIR UNIT

Kızılcadağ Ophiolitic Melange and Olistostrome (Kkm, TRkk)

The name 'Kızılcadağ Ophiolitic Melange' was used for the first time by Poisson (1977) for the rock association observed in Western Taurides to the southwest of Korkuteli and composed of serpentinite, radiolarite, chert, limestone, cherty limestone, dunite and harzburgite. The use of the same name for similar lithologies was considered appropriate in this study as well.

Kızılcadağ Ophiolitic Melange and Olistostrome exhibit outcrops in the northwest sections of the study area, at Kocakepir Hill (A11), to the northeast of Tekir Plateau (J2) and to the west of Kocaköy Hill (D10) (Figure 4).

The unit is mainly composed of dunite, harzburgite, serpentinite, radiolarite, limestone, cherty limestone and pillow lavas. Kızılcadağ Ophiolitic Melange and Olistostrome, which tectonically overlie Yavça formation at the base, comprise dunite, harzburgite, serpentinite, radiolarite and different limestone blocks. At the base levels, brownish-green, in places red colored limestone blocks of various dimensions are conspicuous. And, at the uppermost levels of the unit are observed Triassic and Late Cretaceous aged limestones disseminated within dunite, harzburgite and limestones. Kızılcadağ Ophiolitic Melange and Olistostrome tectonically overlie Jurassic-Cretaceous aged Çamlık formation in the study area. And, it is overlain tectonically by Pozantı-Karsantı Ophiolite Nappe and unconformably by Tertiary aged sediments.

Pozantı-Karsantı Ophiolite Nappe (Kpko)

Ophiolite Nappe, which exhibits extensive outcrops between Pozantı and Aladağ (Karsantı) and which is mainly composed of harzburgite, dunite, pyroxenite, gabbro and diabase dikes and metamorphic sole rocks, was introduced for the first time by Bingöl (1978) under the name of Pozantı-Karsantı Ophiolite. Tekeli (1980) and Tekeli et al. (1981) introduced a similar rock association under the name of Aladağ Ophiolite Complex in the study they carried out in the region. In a different study carried out by Yetiş et al. (1991) in the same region, similar rock association was given the name of Faraşa Ophiolite. And, in this study the use of the name 'Pozantı-Karsantı Ophiolite Nappe' was considered appropriate for similar lithologies observed in the vicinity of Eskikonacık Village (C7) and Trendüşen Locality (B9). In the study area, widespread outcrops belonging to Pozantı-Karsantı Ophiolite Nappe can be observed to the east of Pozantı township (A-C 4-10) (Figure 4). The unit

is mainly composed of metamorphic sole rocks and harzburgite, dunite, pyroxenite, gabbro and diabase dikes. Metamorphic sole rocks are composed of green-blue-pink colored amphibolites and amphibolites, schists, calcschists and marbles that have undergone metamorphism in the greenschist facies.

In the study area, Pozantı-Karsantı Ophiolite tectonically overlies Kızılcadağ Ophiolitic Melange and Olistostrome, and Jurassic-Cretaceous aged Çamlık formation of Aladağ Unit to the west of Belemedik Valley. And, the Ophiolite Nappe is unconformably overlain by Tertiary aged sediments. In this study, no assessment could be made directed to the thickness of the ophiolitic rocks. However, in the previous studies conducted in this area by Bingöl (1978) and Parlak (2002), it was stated that the total thickness of the ophiolite section varied between 8000 and 11000 meters.

TERTIARY SEDIMENTS

ECEMİŞ FAULT ZONE

Çukurbağ formation (Tomç)

The fluvial sediments composed of marls, mudstones and pebbly sandstones filling Ecemiş Fault Corridor were introduced for the first time by Yetiş (1978) under the name of Çukurbağ formation. And, in this study the use of the same name was considered appropriate for similar lithologies. The type locality of the Çukurbağ formation, outside the study area, is the vicinity of Çukurbağ Village of Çamardı Township belonging to Niğde province. And, in the study area, all levels of the unit can be observed in an area between Pozantı Township and Tekir Plateau (J2) and Eskikonacık Village (C7) (Figure 4).

Çukurbağ formation is mainly composed of marls, mudstones and pebbly sandstones. At the base of the unit brown, green and claret red colored, medium-tick bedded, polygenic pebbly and pebbly sandstones are located. This level is overlain by green-gray colored, thin-medium bedded sandstones, siltstones and marls.

At the base, Çukurbağ formation unconformably overlies Bolkar Mountain Unit, Namrun Tectonic Segment, Aladağ Unit, Kızılcadağ Ophiolitic Melange and Olistostrome and the units belonging to Pozantı-Karsantı Ophiolite. And, at the top the unit is transitive to Early Miocene aged Burç formation.

The apparent thickness of the unit varies in the study area between 300 and 350 meters. Because of the Çukurbağ formation does not contain any paleontological findings the age estimation was made according to its stratigraphic position. The unit unconformably overlies Eocene age units in the Ulukışla Basin and has a gradational contact with the overlying Miocene aged Burç formation. Accordingly, the age of the Çukurbağ formation must be Oligocene-Early Miocene.

According to its general lithological properties Çukurbağ formation must have deposited in a fluvial environment.

Burç formation (Tmb)

The lithology composed of coal-seamed marls, claystones and siltstones and the typical outcrops of which are observed in the vicinity of Burç Village, Çamardı township of Niğde province was introduced for the first time by Yetiş (1978) under the name of Burç formation. And, in this study the use of the same name was considered appropriate for similar lithologies. In the study area, only in Yenişeyhli (G4) district, to the south of Pozantı Township the outcrops of the formation are observed that can be reference section for the unit (Figure 4).

Burç formation which exhibits in general a morphological appearance with soft and flat

ridges, is mainly composed of marls, claystones, siltstones and coal seams. At the base sections of the unit green colored, thin-medium bedded and moderately competent marls, and in the upper sections an alternation of green and gray colored, thin bedded, weathered, coal-seamed claystone and siltstone take place. It was determined that in the unit there were coal seams the thickness of which varied between 50 cm and 1 m and which did not have lateral continuation; and gastropod and ostracoda type fossils.

At the base Çukurbağ formation is transitive to Burç formation, and at the top, it is unconformably overlain by Quaternary aged terraces. The apparent thickness of the Burç formation in the study area is around 200-250 meters.

During this study no paleontological data was obtained to give an age to the Burç formation. However, during their studies Atabey et al. (1990) and Yetiş (1978) determined the fossil assemblage that gave Miocene age from the samples they collected within the unit. That's why, in this study, the age of Burç formation was accepted as Early Miocene, taking into account its stratigraphic position.

Depending on its general lithological features and macrofossil content, the Burç formation must have deposited in a lacustrine - paludal environment.

ADANA BASIN

Güzeller formation (Tpeg)

Pebblestone, sandstone, clayey limestone and marl lithologies; the best outcrops of which are observed in the district of Güzeller (Çat) Village (N31), located to the south of Ayrancı township , Karaman Province outside the study area; were introduced for the first time by Demirtaşlı et al. (1973) under the name of Güzeller formation. And, in this study the use of the same name was considered appropriate for similar lithologies.

In the study area Güzeller formation exhibits outcrops mainly 3 km south of Gülek Strait (O1) and north of Karakılıç Village (L19).

Güzeller formation is mainly composed of pebblestones, sandstones, limestones and marls. The unit starts at the base with red-pink and gray colored, medium-thick bedded polygenic pebbly pebblestones. It continues upwards with beige colored, thin-medium-thick bedded, highly fossiliferous limestones and clayey limestones. In the uppermost sections of the unit an alternation of beige-green colored, thin-medium bedded sandstone, marl and sparse limestone is observed. The pebblestone and limestone levels of the unit which is generally rich in fossils show lensing in lateral direction. The apparent thickness of the Güzeller formation in the study area varies between 500 and 550 meters.

In the study area, the Güzeller formation unconformably overlies the units belonging to the Aladağ Unit, and it is unconformably overlain by Oligocene-Miocene aged Gildirli formation.

In the samples collected from the outcrops of the Güzeller formation north of Karakılıç Village (L19) and 3 km south of the Gülek Strait (O1) the fossil assemblage comprising: *Distichopplax biserialis* (Dietrich), *Ranikothalia sindensis* (Davies), *Missippina binkhorsti* (Reuss), *Hottingerina anatolica* Sirel, *Elazıgella altıneri* Sirel, *Alveolina* (Glomalveolina) *primaeva* (Reichel), *Haymanella paleosenica* Sirel, *Nummulites* cf. *exilis* Douville, *Valvulina* sp., *Rotalia* sp., *Discocyclina* sp., *Miscellanea* sp., *Planorbulina* sp., *Belzungia* sp., *Vania anatolica* Sirel, *Caskinolina* (Caskinon) *rajkae* Hottinger and Drobne, *Smoutina* sp., *Crysalidina* sp., *Globorotalia* sp., *Nummulites* spp., *Assilina* sp., *Operculina* sp., *Sphaerogypsina*, *Cuvillerina* sp., *Miscellanea miscella* (d'Archiac ve Haime), *Distichoplax biserialis*, *Fabiania cassis* (Openheim), *Nummulites* gr. *laevigatus* (Bruguiere), *Assilina* gr. *exponens* (Sowerby), *Orbitolites* sp., *Opertorbitolites* sp., *Lockhartia* sp., *Asterigerina*

sp., *Alveolina* sp., *Heterostegina* sp., *Morozovella* sp., Discorbidae, Rotaliidae, Textulariidae, Miliolidae, Algae and bryozoa was obtained and accordingly the unit was given the age of Late Paleocene (Thanetian)- Middle Eocene (Lutetian).

Depending on its general lithological features and fossil content, the Güzeller formation must have deposited in an inner shelf environment where reefs could also form.

Gildirli formation (Tgi)

The lithologies, which outcrop in the vicinity of Gildirli Village north of Karaisalı, are composed of pebblestone, sandstone, siltstone and mudstone and were introduced for the first time by Schmidt (1961) under the name of Gildirli formation. And, in this study the use of the same name was considered appropriate for similar lithologies. Gildirli formation exhibits outcrops showing all levels, between Tekir Plateau (J2) and south of Gülek Strait (O1); in the old highway cuts between Gülek Township and Adana, north of Karaisalı, in the vicinity of Karakılıç Village (L19), in the study area (Figure 4).

Gildirli formation is mainly composed of pebblestone, sandstone, siltstone and mudstones. The unit starts at the base with red-blackish-pink colored, thin-medium- in places thick bedded pebblestones. Overlying this level an alternation of pink-beige colored, thin-medium bedded, sandstone, siltstone and mudstones is obseved. Within the sandstones of this level, tabular and trough cross-beddings are observed.

At the base, the Gildirli formation unconformably overlies Aladağ Unit, Bozkır Unit and Paleocene-Eocene aged units, and at the top it has a contact with Kaplankaya formation, gradational in lateral and vertical directions. It was determined that the apparent thickness of the unit in the study area was around 350 meters.

As the Gildirli formation is of terrestrial character no fossil finding which can indicate an age was obtained; thus, estimation was made taking into account its stratigraphic position. At the base of the unit is present unconformably Paleocene-Middle Eocene aged Güzeller formation and at the top lies Early-Middle Miocene aged Kaplankaya formation, gradational in lateral and vertical directions. Accordingly, the age of the Gildirli formation must be Oligo-Miocene.

According to its general lithofacies and sedimentological properties, the Gildirli formation must have deposited in alluvial fan and braided river environment.

Kaplankaya formation (Tkp)

The rock association composed of pebbly sandstones, sandstones and limestones and the typical outcrops of which are observed at Kaplankaya Hill south of Karaisalı township of Adana, was introduced for the first time by Yetiş and Demirkol (1986) under the name of Kaplankaya formation. And, in this study the use of the same name was considered appropriate for similar lithologies.

Outcrops of Kaplankaya formation having reference section quality can be observed in the vicinity of Hacın Locality (P3), Günaltı Neighborhood (S5), Kuşçular Village (P15), Kıralan Village (S18) and Kabalak Hill (L17) in the study area (Figure 4).

Kaplankaya formation is mainly composed of limestones, pebbly sandstones and sandstones. At the base of it yellowish beige colored, thin-medium bedded pebbly sandstones are located. These pebbly sandstones are overlain by beige, in places reddish beige colored, thin-medium bedded, in places cross-bedded sandstones and limestones. The uppermost levels of the unit are composed of beige and light gray colored, thin-medium bedded clayey limestones.

Kaplankaya formation is gradational in lateral and vertical directions with Gildirli formation at the base and with Karaisalı at the top. The thickness of the Kaplankaya formation in the study area varies between 75 and 200 meters.

In the samples collected from the outcrops of the Kaplankaya formation in the vicinity of Kıralan (S18) and Keşli (S9) Villages, *Operculina* spp., *Heterostegina* sp., *Borelis* sp., *Amphistegina* sp., *Asterigerina* sp., *Elphidium* sp., *Gypsina* sp., *Globigerinoides* sp., *Globorotalia* sp., Textulariidae and Miliolidae fossil assemblage which gave the age of Early-Middle Miocene was determined. In addition, Yetiş and Demirkol (1986) gave the age of Burdigalian-Langhian to the Kaplankaya formation in their study. When the above defined fossil assemblage and the results obtained in previous studies were evaluated, the age of the Kaplankaya formation must be Early-Middle Miocene.

According to its general lithological features and fossil content, Kaplankaya formation must have deposited in a beach and back-reef lagoonal environment.

Karaisalı formation (Tka)

Early-Middle Miocene aged limestones which outcrop in the vicinity of Karaisalı township of Adana province were introduced for the first time by Schmidt (1961) under the name of Karaisalı Limestone. However, in this study the use of the name 'Karaisalı formation' was considered appropriate. Karaisalı formation forms high hills and extending ridges in the west parts of the Adana Basin. Its major outcrops having reference section quality can be observed north of Hopur Mountain (R6), Keşli Village (S9), Eminlik Village (S13) and southeast of Kuşçular Village (P15) (Figure 4).

It was observed that at the base of the Karaisalı formation, which is mainly represented by reefal limestones, in places is situated a level composed of pinkish beige colored, massive-looking, ungraded, poorly sorted, carbonate-cemented pebblestones having a sand matrix and polygenic elements. Apart from the above defined pebblestones, the formation is composed of limestones which are gray and beige colored, medium-thick bedded, massive in places, hard-rugged, with calcite-filled cracks and fractures, and containing abundant hermatrypic organisms such as coral, algae, mollusk, bryozoa and echinoderm.

Karaisalı formation is at the base gradational with Gildirli and Kaplankaya formations in lateral and vertical directions. In some sections of the study area, Karaisalı formation overlies Paleozoic-Mesozoic aged basement units as angularly unconformable. Outside the study area, the formation is overlain by Cingöz and Güvenç formations as gradational in lateral and vertical directions. The apparent thickness of the Karaisalı formation in the study area varies between 5 and 500 meters.

In the samples collected from the outcrops of the Karaisalı formation in the vicinity of Hopur Mountain (R6) and Keşli Village (S9) the fossil assemblage composed of *Globorotalia* gr. *archeomenardii* Bolli, *Globorotalia obesa* Bolli, *Globigerinoides trilobus* (Reuss), *Globigerinoides immaturus* Leroy, *Orbulina* cf. *bilolobata* (d'Orbigny), *Borelis* cf. *melo* (Fichtel and Moll), *Globorotalia* cf. *archeomenardii* Bolli, *Borelis* cf. *curdica* (Reichel), *Globoquadrina* sp., *Globigerinoides* sp., *Praeorbulina* sp., *Rupertina* sp., *Borelis* sp., *Gypsina* sp., *Sphaerogypsina* sp., *Operculina* sp., *Dentritina* sp., *Miyosorites* sp., *Amphistegina* sp., *Peneroplis* sp., *Rotalia* sp., Miliolidae, alga, bryozoa and lamellibranch shell fragments and which gave the Early-Middle Miocene age. However, Kop (2003) stated that the age of the Karaisalı formation went from Middle Miocene up to Late Miocene in the region, by determining the fossil assemblage composed of *Borelis* cf. *melo* Fichtel and Moll, *Amphistegina* sp., *Archaias* sp., Victoriellidae, Soritidae, Calca-

rinidae, Alveolinidae in the samples he collected from the unit during his study in the near east of the study area.

According to its general lithological features and fossil content, Karaisalı formation must have deposited in a reef facies of a shallow and turbulent sea.

Slope Debris, Terrace and Alluvium (Qym, Qtr, Qal)

In the study area, the youngest deposition is represented by alluviums in the Pozantı Valley, terraces hanging on the slopes, and slope debris accumulated in various plains on valley slopes and especially within Ecemiş Fault Zone. All of these three deposition types are generally from red to gray in color, thin-medium bedded, moderately cemented, carbonate-cemented and have sand matrix and polygenic elements.

RESULTS AND DISCUSSION

The results obtained in this study which covers Belemedik and its vicinity located in the eastern part of the Ecemiş Fault Zone which constitutes the boundary between Central and Eastern Taurides, and the discussion about the findings obtained in this study and in the previous studies are presented below.

The rock association outcropping in the study area is grouped under the main headings of Belemedik Sequence, Bozkır Unit and Tertiary Sediments.

The rocks in the Belemedik formation constitute the basement in the study area. Belemedik Sequence was introduced for the first time by Blumenthal (1947) under the name of Belemedik Tectonic Window and it was stated that the Devonian-Permian aged units were tectonically overlain by an incomplete Mesozoic rock association. In this study, it was determined that Belemedik formation was composed of Late Devonian-Late Cretaceous aged rock associations. In the study previously carried out by Gül et al. (1984) in the vicinity of Bolkar Mountains and Belemedik, it was stated that the sequence that they named 'Belemedik Tectonic Slice' contained rock associations of Late Devonian-Late Cretaceous age. However, the researchers asserted that within Belemedik Tectonic Slice, Early-Middle Carboniferous aged Belemedik formation was overlain by Late Permian aged Köşkdere formation with a contact that can be called as unconformity; and Early Triassic aged Dişdöken formation is overlain again with an unconformable contact by Middle Jurassic-Late Cretaceous Delikkaya formation; consequently, Late Carboniferous-Early Permian and Middle-Late Triassic-Early Jurassic aged units were absent in the region. The existence of Late Carboniferous-Early Permian aged rock formations within Palaeozoic aged units was determined for the first time in this study, apart from *Girvanella*-bearing Lower Permian stated by Flügel and Kahler (1988) who examined mainly Upper Devonian-Permian facies in their study. In addition, it was determined for the first time again in this study that Mesozoic aged units overlying the Palaeozoic sequence were not incomplete as asserted by Blumenthal (1947) and Gül et al. (1984) and it was composed of Early- Middle Triassic aged Katarası, Middle-Late Triassic aged Sarıyarma, Jurassic aged Çamlık and Late Cretaceous aged Yavça formations respectively. Under the light of these findings, it was determined for the first time that the Belemedik Sequence, which contains in general Late Devonian-Late Cretaceous aged rocks and can be characterized by the presence of Early Permian aged rocks, could be thoroughly correlated with the Aladağ Unit, which one of the units defined by Özgül (1976) in Taurides.

The fact that the Belemedik Sequence, located farthest west of the Eastern Taurides and bordered by Ecemiş Fault Zone similar to the Eastern Taurides, was described as a window without stating its setting within Tauride Units

until today, and caused difficulties in explaining the transition of the units defined by Özgül (1976) between the Central and Eastern Taurides. Depending on the correlation made in this study, it was determined what kind of extension the rock associations, defined as units in the Taurides, present between Eastern and Central Taurides separated by the Ecemiş Fault. The determination of the position of the Belemedik Sequence within The Tauride Units will make significant contributions to the grouping of the other rock associations overlying and underlying this sequence and their correlation with the units defined in the Taurides at the same time.

It was determined in the study area that the Belemedik Sequence was tectonically overlain by the rocks belonging to the Bozkır Unit, and the Tertiary aged rocks which unconformably covered the rocks of both Belemedik Sequence and The Bozkır Unit.

It was determined that owing to numerous deformation cycles the region underwent, the contact between Palaeozoic and Mesozoic aged rocks in the Belemedik region lost its initial position and Mesozoic aged rocks moved on Palaeozoic aged rocks. Consequently, it can be said that the units at the base of the Mesozoic sequence were subjected to tectonic erosion in some parts of the study area.

Late Paleocene (Thanetian) - Midde Eocene (Lutetian) Güzeller formation which unconformably overlies the units belonging to the Aladağ Unit in the study area was defined in Adana Basin for the first time in this study.

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