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THE CASE OF EAST OF ALANYA ABOUT SOIL GROWING ON THE GNEISS BEDROCK

GNAYS ANAKAYASI ÜZERİNDE TOPRAK GELİŞİMİNE ALANYA'NIN DOĞUSU ÖRNEĞİ

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ABSTRACT

The research area in the southern part of the Central Taurus is located in the central Taurus karst area due to its location. Therefore, in addition to the limestones, dolomitic limestones and dolomites, the marbles and crystallized limestones are very common. However, in addition to these soluble rocks, rocks such as schist, gneiss and metachonglomera have also been extensively spread. Particularly, the Upper Cambrian and the Lower Triassic schists and gneisses, which were formed under a strong compression regime and have undergone metamorphism, are important in the field. Therefore, the eastern part of Alanya, which is located within the central Taurus karst area, was frequently interrupted by impermeable rocks such as schist, gneiss, and it was observed that most of these rocks developed together in the ground. Therefore, the areas where soluble rocks are located in the research area create a separate environment in terms of ecosystem while the lands where rocks such as schist and gneiss are located create a separate environment. On these rocks, environmental characteristics such as topography shapes, soil structure, plant development, hydrographic development are completely different from soluble rocks. Among the differences, especially because of the physical and chemical properties of soil, developed soils on gneisses were evaluated in this research. For this purpose, the physical and chemical properties of soil samples taken from the field were analyzed in the laboratory and the results were quantified.

Key Words: Ecosystem, gneiss bedrock, Alanya.

ÖZ

Orta Torosların güney kesiminde yer alan araştırma sahası konumu nedeniyle orta Toros karst alanında bulunmaktadır. Dolayısıyla sahada kireçtaşları, dolomitik kireçtaşları ve dolomitlerin yanı sıra kristalize kireçtaşları ile mermerler önemli yayılışa sahiptir. Ancak, bu çözünebilir kayaçların yanı sıra şist, gnays, metakonglomera gibi kayaçlar da geniş sahalı yayılış göstermiştir. Özellikle de, kuvvetli sıkışma rejimi altında oluşmuş ve metamorfizma geçirmiş Üst Kambriyen ve daha sınırlı olarak Alt Triyas şist ve gnayslar sahada önem arz etmektedir. Bu nedenle, orta Toros karst alanı içerisinde yer alan Alanya'nın doğu kesimi şist, gnays gibi geçirimsiz kayaçlarla sık olarak kesintiye uğramış, bu kayaçların çoğu yerde bir arada geliştikleri gözlenmiştir. Dolayısıyla, araştırma sahasında çözünebilir kayaçların bulunduğu kesimler ekosistem açısından ayrı bir ortam oluştururken şist, gnays gibi kayaçların bulunduğu araziler ise ayrı bir ortam meydana getirmiştir. Yani, bu kayaçlar üzerinde topoğrafya şekilleri, toprak yapısı, bitki gelişimi, hidrografik gelişim gibi ortam özellikleri çözünebilir kayaçlardan tamamen farklıdır. Bu farklılıklardan özellikle toprağın fiziksel ve kimyasal özelliklerinin çarpıcı olması nedeniyle gnayslar üzerinde gelişmiş topraklar bu araştırmada değerlendirmeye tabi tutulmuştur. Bunun için de, sahadan alınan toprak numunelerinin fiziksel ve kimyasal özellikleri laboratuvar ortamında analizleri yapılarak sonuçlar kantitatif olarak ortaya konulmuştur.

Anahtar Kelimeler: Ekosistem, gnays anakayası, Alanya

1. INTRODUCTION

The research area is located to the east of the central Alanya in the Mediterranean Region, and a very small part of the area is located within the boundaries of Alanya and within the boundaries of Gündoğmuş district (Figure 1). The hills with various elevations on the area are commonly located and have different lithological structures. It is observed that the elevation values of these hills increase as they move towards the east from the coast (Figure 2). The vertical movements, which were effective in the field a few times, caused the slope values to increase. In addition to the young tectonic movements, these hilly areas are divided by the Dim River and the Oba River and its tributaries, as well as much more in some depths by the Sapardere Stream and some side branches of the Kargı River. As a result of this stiuation the morphology gained a defective appearance. As a matter of fact, the observed steep slopes, various types of folds, the valley of the canyon with the valley and the hanging valleys are evidence of this stiuation.

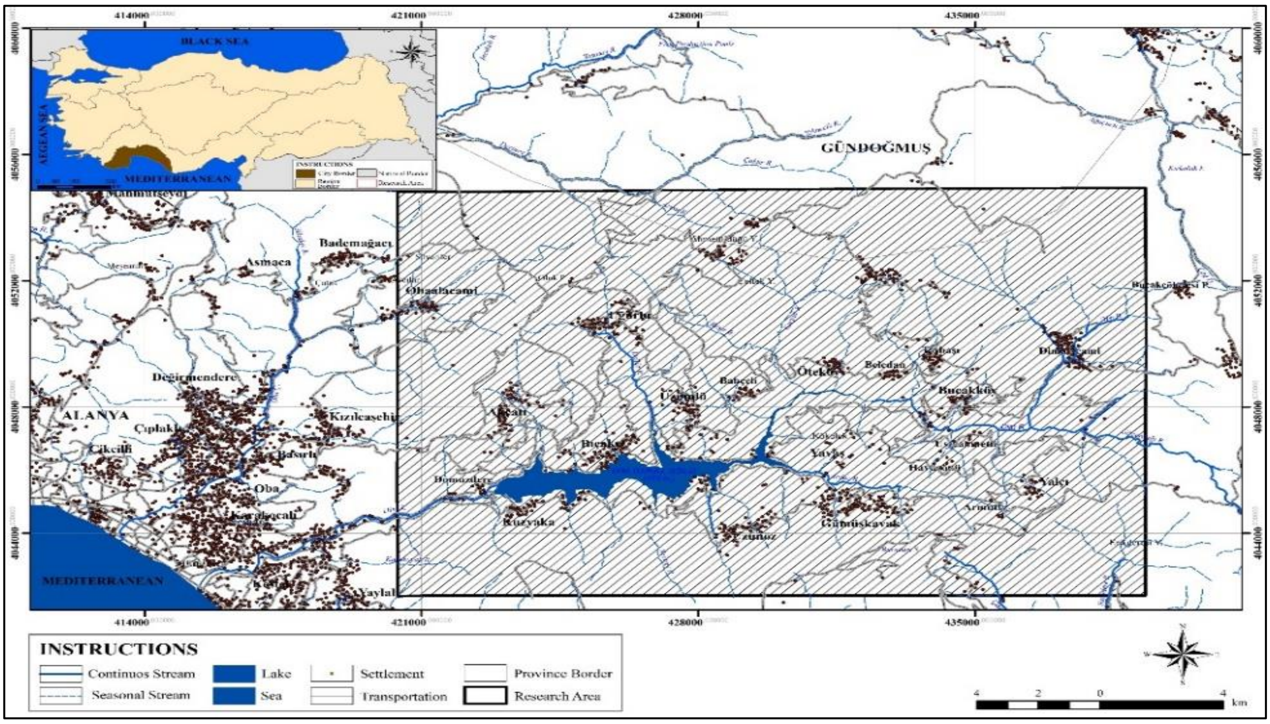

Figure 1. Location Figure of the research area.

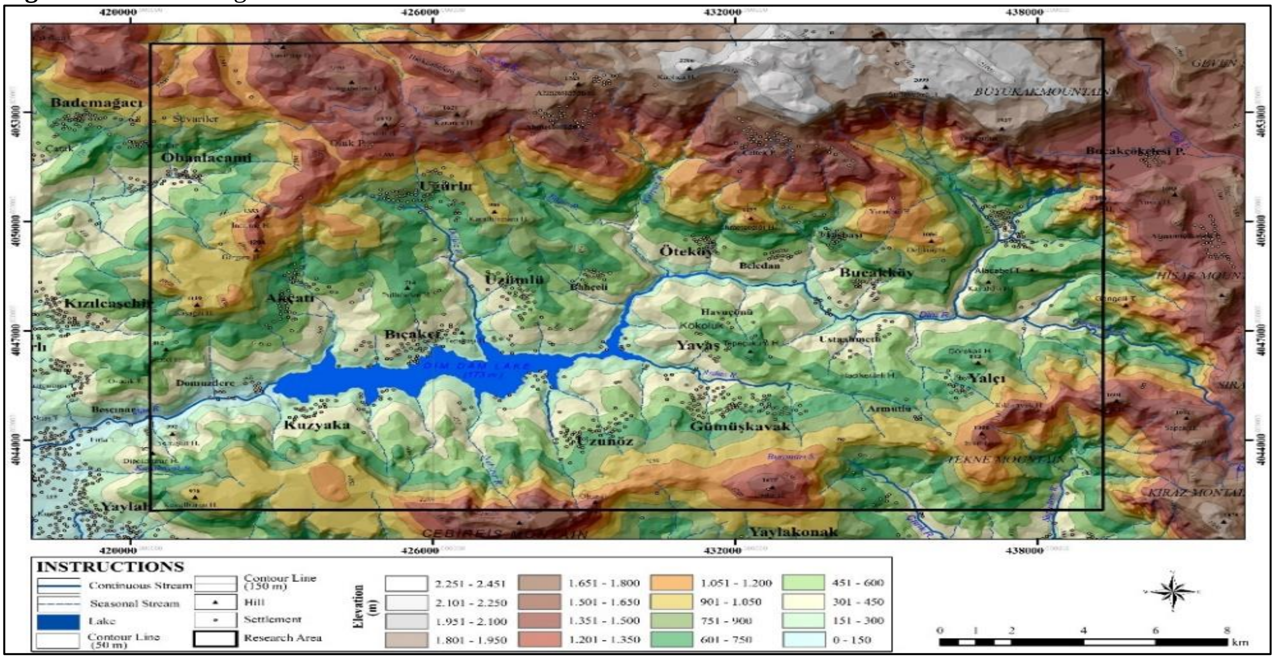

Figure 2. Physical Figure of the research area (General Directorate of Figures, prepared by taking advantage of 28 sheet of 1/100 000 scaled Figure).

The research area has different environmental conditions due to its lithological structure. Thus, the physical and chemical properties of the soils that develop on the gneisses that make up the subject of the research differ significantly from the soils which develop on the field of dissolvable rocks spread over wide area. For example, the slope values in these lands are partially reduced compared to the other rocks and there is soil formation on the surface. These soils are mostly in the form of brown forest lands depending on the structure of the bedrock. In addition, while the soils developed as shallow in regions where gneisses were not well decomposed, soils with thick profile development were observed on well separated gneiss bedrock. Therefore, in this study, samples taken from the soil on the gneiss bedrock are analyzed by taking samples (pH, color, texture and cation exchange capacities, as well as lime, organic matter, changeable cations / Ca, Mg, Na, K micro element / Fe, Cu, Mn, Zn, B, Ni, Cd) and thus physical and chemical properties have been quantitatively supported.

2. MATERIAL-METHOD

First of all, geological units and accordingly field of study are stated by using 1/25.000 and 1/100.000 scaled topographic Figures that is prepared by General Commond of Figureping and geological Figures that is prepared by General irectorate of Mineral Research and Exploration. After the field was determined, the literature about the study area and the study subject was detailed. In addition to office work, field observations were also made and the geomorphological features of the site were investigated in detail 3 rock samples were taken from the area and XRF (CaO, MgO, SiO_2 and other ratios) and mineralogical-petrographical analyzes of these samples (crack sizes, primary and secondary minerals forming rocks, their dimensions, color, porosity, fossil content etc.) were determined in Afyon Kocatepe University, Accredited Natural Stone Analysis Laboratory (DAL). Chemical properties of rock samples were determined by X-ray fluorescence analysis (XRF). Chemical analyzes of the samples were made according to TS EN 15309 January 2008 Characterization of Waste and Soil-Determination of Elemental Composition by X-ray Fluorescence. The rock samples to be taken into the XRF were first sampled from various processes (laboratory dusting, glow loss test, pressing, etc.). The first powdered samples were then subjected to a loss of loss test to determine the loss of mass (which occurs when the volatiles in the minerals are exposed to high temperatures such as hydrates, carbonates). In order to quantify these samples, the samples were pressed and pelleted after drying and grinding. The prepared samples were placed on the XRF instrument. By using X-ray propagation by the machine, the values of the oxides in the samples in terms of mass percentages were obtained. Besides, the values of the major and minor elements in the rock samples were determined in mg / kg. Thus, the chemical analysis processes of these rock samples were completed and the structures of these samples and the rock groups were proved to be practical.

The mineralogical-petrographical investigation of the rock samples was carried out in accordance with the TS EN 12407 January 2008 Natural Stones - Experiment Methods - Petrographic Study Guide. First of all, the samples taken from the field were cut in the thin section workshop on an aqueous system stone cutting machine. The rock samples and the specimens are numbered to avoid mixing. The cut samples were smoothed with aluminum etching powders (280 and 400 powders). The samples were polished with 280 grams of powder to remove the blade traces. Samples were passed through 400 grams of dust to make them smoother. The smoothed samples were placed in the oven and allowed to dry at 80 ° C for three hours. Meanwhile, the coverslip is matted with 400 etching powder to ensure better adhesion to the surface. In addition, double-component adhesive was prepared for gluing the laminate with smoothed rock samples. The lamella with the samples taken from the oven is glued so that no air is left with the prepared mixture (glue). After the samples were glued, they were put back into the oven again and left to stand at 80 ° C for one hour. After the samples were removed from the oven, they were cut to a thickness of 0.5 mm on a thin section machine. The cut samples were diluted with 280 grams of abrasive powder on the drum. After reaching a sufficient thickness, it was passed through 400 dust. Slices made thinner than paper were finalized and prepared for examination under microscope. Prepared thin sections are placed in the microscope, the general color or color range of the samples in question, tissue, grain size (large, medium or thin), open and refilled macroscopic cracks, pores and cavities, components (minerals/grains, matrix/dough, organic origin residues), macroscopic and microscopic description of the rocks were investigated by examining the properties such as discontinuities (pores, microcavities, cracks and open fractures, filled cracks and veins) and alterations (decays).

In addition, soil samples were taken from the sections where the rock samples were taken. PH, color, texture and cation exchange capacities of these soils, as well as analyzes of lime, organic matter, interchangeable cations (Ca, Mg, Na, K) and micro element (Fe, Cu, Mn, Zn, B, Ni, Cd) ratios was built in

Erciyes University Seyrani Faculty of Agriculture, Soil-Plant Analysis Laboratory. In order to determine the physical and chemical properties of soil samples, the samples were first allowed to dry in the drying room in the laboratory. These samples were then sieved through 2 mm sieves and kept in polyethylene bags for use in analysis processes. The reaction of the soil samples (pH) was determined using the calibrated electrode and Wheatstone bridge principle at the pH meter with a pH of 4.7 and 10 in the soil-water suspension at a ratio of 1: 2.5 (McLean, 1982). Electrical conductivity (EC) values were measured with an electrical conductivity instrument in soil-water suspension at a ratio of 1: 2.5 prepared for pH measurement (Bayraklı, 1987). In order to determine the organic matter content of the samples, Walkey-Black wet burning method was followed and the obtained values were expressed as% (Kacar, 1994). Again, the amount of lime contained in the samples, Scheibler calcimetres with 10% HCl mixed with the amount of CO2 from the soil volumetric determination of the result and the method of conversion to CaCO3 was used (Nelson, 1982). The surfaces of the CIB which were saturated with Na using the sodium acetate solution adjusted to 1 molar pH 8.2 firstly were determined by replacing the surface with Namolar neutral ammonium acetate (Rhoades, 1982a).

In order to determine the sand, clay and silt ratios (%) of the soil samples, the Hydrometer Method of Bouyoucos was used. Thus, soil types were determined according to international soil texture groups. Accordingly, dried soil samples were sieved through a 2 mm sieve. These samples were weighed 50 g of air-dry soil on the sensitive scale and 10 ml of 10% chalgone solution (Sodium hexamethyl phosphate) and 100 ml of water were added and then allowed to stand for 24 hours. After the samples were shredded for 10 minutes in the mechanical mixer, 1130 ml was completed by dipping the hydrometer into the Bouyoucous cylinder. Initial readings were made for 40 sec, second readings after 2 hours. So, the numerical values (taking into account the thermometer values) were applied to the structure table and the soil texture was calculated (Bouyoucous, 1951). In addition, the air dried soil samples were determined by ICP method (Soltanpour et al., 1979). Also, the samples were extracted with 1 N neutral NH4OAc to determine the varying cation ratios such as Ca, Mg, Na, K. Variable amounts of Na and K of samples can be determined by spectroscopy; The amount of Ca and Mg was determined titratetrically with EDTA (Sağlam, 1997). Determination of the amount of micro elements such as Fe, Cu, Mn, Zn, B, Ni and Cd in soil samples were determined in mg / kg by using DTPA + TEA + CaCl2 method.(Sağlam, 2008).

As it is understood from the above statements, pH, color, texture, KDK, lime, organic matter, soil and soil samples taken from the field, micro elements with varying cations (Ca, Mg, Na, K) (Fe, Cu, Mn, Zn, B, Ni, Cd) ratios were determined by various methods in laboratory environment and expressed with statistical values. The physical and chemical properties and types of soil samples were determined by taking the obtained values into consideration.

Thus, the physical and chemical properties of soils on the gneisses are explained by the fact that the impact of the bedrock is based on concrete data. In other words, the field observations were supported by the analysis results and the bedrock-soil relation, which forms part of the ecosystem in the field, has been determined. In addition, the importance of climate in soil formation was taken into consideration in all these associations, and climate (Mediterranean climate) - bedrock - soil correlation was made.

3. FINDINGS AND DISCUSSION

3.1. Lithology

The region of the research area exposed to strong mountain formation movements of the Taurus Mountains, and then the vertical elevations that occurred in the region, led to the formation of the nappe structure belonging to the Alanya Union in a large part of the field. Özgül (1976) stated that the unity shows an increasing metamorphism characteristic depending on the depth. Thus, the Upper Cambrian and Lower Triassic gneisses formed under the strong compression regime and metamorphism have a wide distribution area (Figure 3). On the slopes of the Kuz Tepe, Firik Tepe, Husseyinkoas Hill; Kaşağzı Tepe, Gargara Tepe, Downloading Tepe, Sarıcılı Tepe, Karalharmanı Tepe, Püllübelen Tepe, Tepebaşı Tepe, Kesebeleni Ridge, Ketenbeleni Ridge, Işıktaşı Ridge, Tepeçukuru Tepe, Ahmetöldüğü Tepe, Kaplıca Tepe, Ahmetgediği Tepe slopes; and more limitedly, these rocks are observed frequently in Yaranbel Tepe, Deliktaş Tepe, Alacabel Tepe, Kayabaşı Tepe, Görekali Tepe, Hacıkerimli Tepe and Sivri Tepe, Sapak Tepe slopes (Figure 3). Among these the most widespread rocks are Upper Cambrian gneisses.

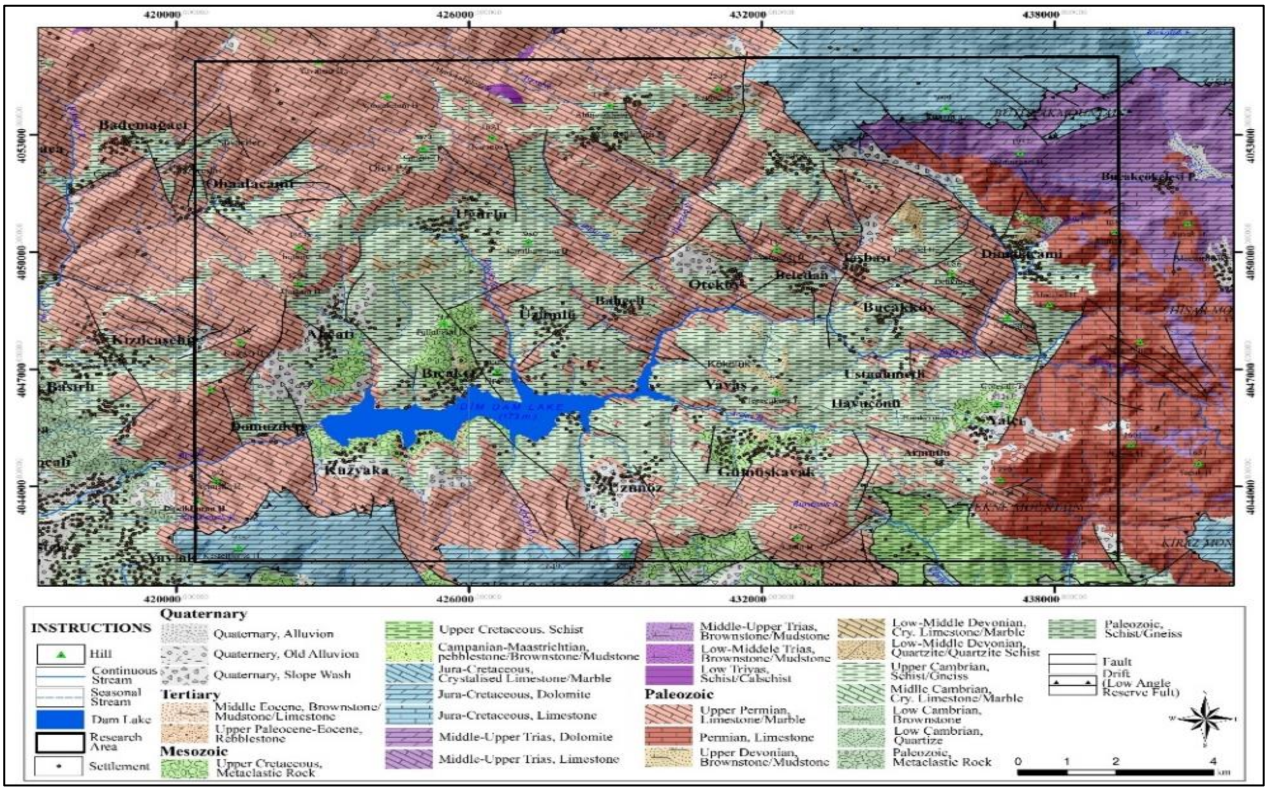

Figure 3. Geological Figure of the Research Area (prepared by using the 28-point Figure of the MTA Directorate, 1/100 000 scaled Figure).

The chemical and mineralogical properties of the gneisses (Table 4-5-6) directly affected the soil formation, which is a part of the ecosystem. For example, the decrease in the CaO content of these rocks, whereas the increase in the SiO2 ratio caused the soil to be sandy. In addition, the properties of the minerals (muscovite, biotite, etc.) of the rocks and the fact that they did not contain any cracking system such as limestones caused the soil to be sandy and shallow on these bedrock. Again, due to the high silica content on gneisses, the acid ratio in soils has increased (Soil sample 1-2-3). Therefore, the ecosystem developed on these ecosystem is evident from the ecosystem on soluble rocks. In this study, the ecosystem properties on the gneiss bedrock were determined.

3.2. Climate

The fact that the research area is located in the south of the Mediterranean Sea, the seasonal changes of the air masses which are effective in the field and its close surroundings and the topographic structure of the site have been determinant on the climatic conditions. The average annual temperature is around 19.4 oC. Temperature values in January are 11.8 oC and in July it is 27.7 oC. The amplitude values were calculated as 16.2 oC (Table 1). Therefore, the research area is within the Marine Mediterrian Thermal Regime, which is one of the thermal regime types. According to Sezer's territoriality formula, the research area and its cloe surroundings are located in the marine climate type and the continentality value is 14.44% (Sezer, 1990).

Table 1. Temperature values of Alanya (DMI).

Meteorological items	M O N T H S												Annual	Sea Level Red.Tmp.(oC)	Amplitude (oC)
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII			
Average Temp.	11.8	11.9	13.9	17.0	20.9	25.0	27.7	28.0	25.3	21.2	16.6	13.4	19.4	19.4	16.2
Highest Temp.	16.2	16.4	18.3	21.1	24.8	28.7	31.6	32.2	30.3	26.6	21.8	17.9	23.8		
Lowest Temp.	8.5	8.5	10.1	12.9	16.6	20.4	23.1	23.5	21.0	17.2	13.0	10.1	15.4		

Table 2. Monthly and annual rainfall totals of Alanya, seasonal rainfall values (mm).

Meteorological items	M O N T H S												Annual
	XI	XII	I	II	III	IV	V	VI	VII	VIII	IX	X	
Average Precipitation (mm) and Rate (%)	168.6 15.3	234.0 21.2	211.8 19.2	157.9 14.3	99.4 9.0	67.4 6.1	35.2 3.2	7.8 0.7	3.9 0.4	2.3 0.2	20.9 1.9	94.5 8.6	1103.7
Seasonal Precipitation (mm) and Rate (%)	WINTER 939.1 mm % 85.1						SUMMER 164.6 mm % 15						

It is observed that the amount of rainfall in the winter where the rainfall is highest is around 939.1 mm and the amount of rainfall decreases in summer and it has been found that there is rainfall around 164.6 mm in this season and the annual average rainfall is 1103.7 mm. In the research area located in the Mediterranean climate region, 85.1% of the annual average rainfall falls in winter and 15% in summer (Table 2). As a matter of fact, the area is located within the “Mediterranean Rainfall Regime”. Considering the above statements, it appears that the area is under the influence of “Moist Mediterranean Climatic Type”. The rainfall efficiency of the research area and its immediate surroundings was established using the Formula of Erinç.

According to Erinç's rainfall efficiency; while the research area and its immediate surroundings is very humid for five months starting from November, three months are dry from June. According to this, the months in the summer are completely dry in the area. Spring months are perhumid- subhumid and subarid. Autumn months are arid- humid and perhumid. In terms of annual values, Alanya has humid climate (Table 3).

Table 3. Rainfall efficiency of Alanya (according to Erinç Formula).

Meteorological items	M O N T H S												Annual
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Average Precipitation (mm)	211.8	157.9	99.4	67.4	35.2	7.8	3.9	2.3	20.9	94.5	168.6	234.0	1103.7
Average High Temp. (oC)	16.2	16.4	18.3	21.1	24.8	28.7	31.6	32.2	30.3	26.6	21.8	17.9	23.8
Monthly Index	156.9	115.5	65.2	38.3	17.0	3.3	0.9	0.9	8.3	42.6	92.8	156.9	46.4
Category	**Perhumid**	**Perhumid**	**Perhumid**	**Subhumid**	**Subarid**	**Arid**	**Arid**	**Arid**	**Arid**	**humid**	**Perhumid**	**Perhumid**	**Humid**

3.3. Soil Formation

The parent material has a particularly important place in soil formation and development. As a matter of fact, this situation is clearly observed in the area. In the area, the soils occurring on the gneiss bedrock differ significantly from the developed soil on the limestone land depending on the characteristics of the bedrock. In other words, the forests on the gneisses are more developed (Figure 4). Atalay and Gökçe Gündüzoğlu (2015) stated that the amount of silica on gneisses is generally over 60%. Therefore, the ratio of silica in these main rocks is high and the acid ratio in soils increased due to washing. In addition, as Atalay (2011) states that the soil and some cations, which are carried from the upper floor depending on the precipitation values, are deposited on the lower floor (in B horizon), so the soils are mostly pale-brown in color. In addition, due to the fact that the dissociation event becomes more difficult due to the amount of silica, soils show a shallow feature in most places. In fact, soil samples taken from gneisses in different parts of the field confirm the above statements.

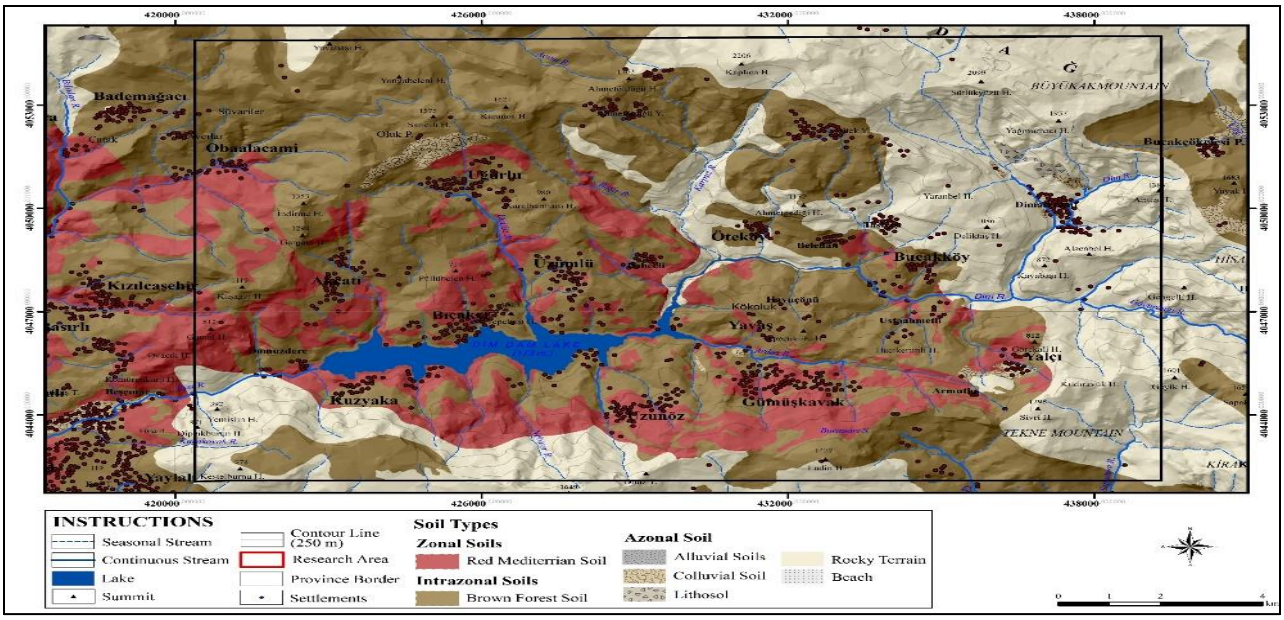

Figure 4. Large soil groups Figure of the research area (prepared by using the Soil Water General Directorate, 1/100 000 scale soil and land use Figure and field observations).

According to this, the first soil samples taken from the area (sample no. 1) are the example of (Brown Forest Ground sample formed on the gneiss bedrock (Rock sample-1) located approximately 100 m above the northeastern slopes of Kuz Hill. In addition to pine (Pinus brutia) and various scrub elements on the soil, there are also moss and ferns (Pteridium aquilinum) due to moisture (exposure effect). According to this, soil based on the effects of bedrock (gneiss) and the exposure has acid features and grayish color. Due to the shallow development of the soil, the sample was taken from two different depths, 0-15 and 15-30 cm. For soil texture, Bouyoucos's Hydrometer Method (Bouyoucous, 1951) has been used and it has been found that this soil has "silty clayey loam" structure at both depths and it has been found to enter into her medium heavy-heavy soil group in terms of workability. Soil color is 2.5 YR 5/2 on both layers and the color is ta dark gray. The amount of organic matter of the sample was calculated by following the Walkey-Black (Kacar, 1994) wet burning method at a depth of 0-15 cm (13%) and at a depth of 15-30 cm (12.87%).

Atalay and Gokce Gunduzoglu (2015) stated that according to the amount of organic matter contained in the soil if the soil sample contains more than 2.55% of the amount of organic matter is high, rich soil group has been differentiated. Accordingly, the amount of organic matter in the research area is determined to be quite high.

The pH of the soil is 6.80 at a depth of 0-15 cm, 6.58 at a depth of 15-30 cm and a 0 mild acid feature. Lime ratio is low and varies between 2.70% and 1.62%. As a matter of fact, "low calcareous with 2.70% at 0-15 cm depth and very low calcareous" with 1.62% at 15-30 cm depth.

Hence, on the pH and lime ratio of the soil, the structure of the bedrock was determined, as well as the washing event. As a result of the analysis of the amount of organic matter, which plays an important role in the soil of the soil, it is calculated as 28.31 me / 100 g between 0-15 cm and 24.96 me / 100 gr at a depth of 15-30 cm. The EC value is 98.90 micromhos / cm at the floor 0-15 cm and 95.60 micromhos / cm at 15-30 cm depth (Table 4).

Table 4. The soil sample no. 1, formed on the gneissic bedrock at about 100 m elevation of the northeastern slopes of Kuz Tepe.

Parameter		Average Value	Parameter		Average Value Depth (cm)	
					0-15	15-30
Bedrock		Gneiss	Names of Soil		Brown Forest Soil	
XRF Analyze	CaO	0.662	Colour		2.5 YR 5/2	2.5 YR 5/2
	MgO	4.0	Texture		Silty clay loamy	Silty clay loamy
	SiO2	55.9	Organic matter (%)		13.00	12.87
	Other	36.866	Lime (%)		2.70	1.62
	Ig (Ignition loss)	2.58	P (kg/da)		148.78	46.98
Mineralogical-Petrographic Analyze	Colour	Light Olive Gray	pH (1:2.5)		6.80	6.58
	Tissue	Lapidoplastik	EC (mikromhos/cm)		95.60	52.60
	Grain size	Micro-macro crystalline	KDK		28.31	24.96
	Main Components	Feldspat, kuvars, biyotit, muskovit	changeable cations (me/100 gr)	Ca	18.76	15.44
	Porosity (%)	-		K	4.35	3.78
	Crack Width (µm)	-		Mg	2.70	2.72
				Na	0.70	0.65
			Micro Elements (mg / kg)	B	0.11	0.09
				Cd	0.004	0.008
				Cu	10.26	10.03
				Fe	11.34	6.78
				Mn	10.56	11.22
				Ni	0.10	0.12
				Pn	0.55	0.89
				Zn	8.12	7.68

The dominant cation in the soil is Ca. In fact, the amount of cation in question is 18.76 me / 100 grams in soil level between 0-15 cm and it is 15.44 me / 100 gr at 15-30 cm depth. The amount of K from the other cations is 4.35 me / 100 g, 3.78 me / 100 g, respectively; Mg amount is 2.70 me / 100 g, 2.72 me / 100 g; The amount of Na is determined as 0.70 me / 100 g, 0.65 me / 100 g. In addition P, one of the main elements varies in amount between the top and bottom soil layers. As a matter of fact, the amount of P is very high on the floor between 0-15 cm and it is 148.78 kilograms, but it has decreased considerably on the 15-30 cm floor compared to the upper floor and reached 46.98 kilograms (Table 4).

When the micro elements are evaluated, it is seen that the amount of Cu, Fe and Mn is high in the soil. The amount of CU is 10.26 mg / kg, 10.03 mg / kg, respectively, from the top to the bottom; The amount of Fe is 11.34 mg / kg, 6.78 mg / kg and the amount of Mn is 10.56 mg / kg, 11.22 mg / kg (Table 4).

When the other microelements are taken into consideration, the amount of B is again 0.11 mg / kg and 0.09 mg / kg respectively from the upper floor to the lower floor; the amount of Cd is 0.004 mg / kg, 0.008 mg / kg; The amount of Ni is 0.10 mg / kg, 0.12 mg / kg; The Zn content is 8.12 mg / kg, 7.68 mg / kg (Table 4).

Approximately 205 m of the northeastern part of the Kuzyaka neighborhood, the sample is taken from Brown Forest Soil (sample no. 2). The main bed is composed of gneisses (Rock sample-2). There are dense Turkish pine (Pinus brutia) forest on the soil and various maki elements on the lower floor. In addition, due to the fact that the slope is facing to the north and is open to humid air coming from the dam lake, it is noteworthy that hygrophilous plants especially the fern (Pteridium aquilinum) and moss are widespread as well as plant density.

Table 5. The soil sample No. 2 taken from the gneissic bedrock on the northern slopes of Kestelburnu Hill on Cebireis Mountain.

Parameter		**Average Value**	**Parameter**		**Average Value** Depth (cm) 0-10	10-15	15-30	30-60
Bedrock		Augen Gneiss	Name of the soil		Brown Forest Soil			
XRF Analyze	CaO	14.8	Colour		7.5 YR 4/4	7.5 YR 4/4	7.5 YR 4/4	7.5 YR 4/4
	MgO	1.38	Texture		Silty clay loamy	Clay loamy	Clay Loamy	Clay loamy
	SiO2	37.7	Organic matter (%)		12.26	3.78	3.17	3.22
	Other	32.733	Lime (%)		3.43	2.89	2.34	2.16
	Ig (Ignition loss)	13.4	P (kg/da)		17.09	75.82	80.90	48.90
Mineralogical-Petrographic Analyze	Colour	Gray	pH (1:2.5)		6.65	6.61	6.65	6.52
	Tissue	Porfiloblastik	EC (mikromhos/cm)		68.78	37.00	28.30	26.20
	Grain Size	Micro-macro crystalline	KDK		28.71	26.21	25.36	27.99
	Main Components	Feldspat, kuvars, biyotit, muskovit	**changeable cations (me/100 gr)**	Ca	18.99	18.12	17.65	17.12
	Porosity (%)	-		K	4.33	2.34	2.21	3.19
	Crack Width (µm)	-		Mg	2.25	2.30	2.33	2.79
				Na	0.70	0.56	0.48	0.44
			Micro Elements (mg/kg)	B	0.18	0.19	0.35	0.29
				Cd	0.028	0.025	0.031	0.026
				Cu	9.87	2.01	4.24	5.20
				Fe	6.49	4.92	4.08	3.90
				Mn	17.68	6.75	4.55	5.78
				Ni	0.07	0.13	0.12	0.08
				Pn	0.19	0.16	0.13	0.29
				Zn	6.63	5.02	4.48	5.37

The soil sample is taken from 4 different depths and consists of 0-10 cm, 10-15 cm, 15-30 cm and 30-60 cm depths. The soil layer between 0-10 cm is made of silty clay and other layers (10-15 cm, 15-30 cm and 30-60 cm depth) are clayey. Because the clay is mechanically transported from the A horizon and accumulates in the B horizon, the lower soil layer is heavier than the upper floors. Accordingly, when the soil is evaluated in terms of workability, it is included in the medium heavy-heavy soils group. The soil color is 7.5 YR 4/4 at each depth according to the Munsell color scale and is brown. The amount of organic matter is high in organic soil, which is between 0-10 cm, with 12.26%. Because the forest development due to humidity on this slope is at a good level. The amount of organic matter decreases as the lower layers go down. In fact, the depth of 10-15 cm, 3.78%, 15-30 cm between 3.17% and 30-60 cm depth and 3.22% of organic matter contains organic matter. The lime ratio was measured in Scheibler calcimetry (Nelson, 1982) and ranged from 2.16% to 3.43%. Lime ratio is between 0-10 cm 3.43%, 10-15 cm between 2.89%, 15-30 cm between 2.34% and 30-60 cm depth 2.16%. Accordingly, due to the development of soil on gneisses and lack of bedrock in terms of free carbonates, lime ratio is low. The pH of the soil is between 6.52 and 6.65 and shows a mild acid reaction. According to this, the pH of the topsoil between 0-10 cm is 6.65, between the 10-15 cm layer is 6.61, between 15-30 cm and 6.65 and the depth of 30-60 cm is 6.52 (Table 5). Hence, the structure of the bedrock as well as moisture on this slope facing the dam lake was effective on soil reaction.

The CEC of the soil is good and varies between 25.36 me / 100 gr and 28.71 me / 100 gr. KDK is 28.71 me / 100 gr on the floor between 10-15 cm, 26.21 me / 100 gr between 10-15 cm, 25.336 me / 100 gr between 15-30 cm and 27.99 me / 100 gr at 30-60 cm depth. The EC of the soil is quite low. The EC is further reduced as the lower ground level is lowered from the upper soil level, with a thickness of 68.78 micromhos / cm and a depth of 10-15 cm and a height of 37 micromhos / cm at a level of 0-10 cm, 28.30 micromhos / cm and 30-60 cm at a depth of 15-30 cm. It is determined as 26.20 micromhos / cm (Table 5). The dominant cation in the soil is Ca. It has been stated that the amount of Ca in the soil between 0-10 cm is 18.99 me / 100 gr, between the depth of 10-15 cm is 18.12 me / 100 g, between 15-30 cm is 17.65 me / 100 g and between the depth of 30-60 cm is 17.12 me / 100 gr. The amount of K from the other cations is respectively 4.33 m / 100 g, 2.34 m / 100 g, 2.21 me / 100 g and 3.19 me / 100 g; Mg amount was 2.25 me / 100 g, 2.30 me / 100 g, 2.33 me / 100 g and 2.79 me / 100 g; The amount of Na is determined as 0.70 me / 100 g, 0.56 me / 100 g, 0.48 me / 100 g and 0.44 me / 100 g. In addition P, one of the main elements differs between layers. As a matter of fact, the amount of P is very low on the floor between 0-15 cm, while it showes an increase and it is now 78.82 on 10-15 cm layer. It reaches 80.90 kg between 15-30 cm and it decreases to 48.90 kilograms on the lower floor between 30-60 cm (Table 5).

When the micro elements are considered, it has been determined that Fe content of the soil is between 3.90 mg / kg and 6.49 mg / kg; Cu is between 2.01 mg / kg and 9.87 mg / kg; The amount of Mn is from 5.78 mg / kg to 17.68 mg / kg; Zn amount is from 4.48 mg / kg to 6.63 mg / kg; the amount of B is 0.18 mg / kg to 0.35 mg / kg; The amount of Cd is from 0.025 mg / kg to 0.031 mg / kg; The amount of Ni varies between 0.07 mg / kg and 0.13 mg / kg (Table 5).

The soil samples (no 3) are collected from 419 m highs of the southwest slopes of the Deliktaş Tepe in the upper part of the basin. Due to the high slope, the development of horizon is not significant and the rate of stiffness is high on the area where the bedrock is composed of augen gneiss. However because of the formation of gneisses (Rock sample-3), the lime ratio is low and reflects the characteristics of the "Brown Forest Soil."

The texture of the soil is loamy. Therefore, the development of agragation and structure is at the maximum level. In terms of soil penetrability, it is located within the medium heavy-heavy soils group. The soil color is 7.5 YR 5/4 and is dull Brown. The amount of organic matter is high and 3.55%. The soil contains 1.98% lime. Therefore, the soil sample shows little lime in terms of the amount of lime. The soil has a pH of 6.28 and has a mild acid reaction (Table 6). About the low lime ratio of the soil and the mild acid reaction of the pH the bedrock also has a significant effect in addition to washing.

The CEC of the soil is 24.98 me / 100 gr and does not show a very high value. As it is known, organic matter and clay determine CEC in soil. In particular, the good decomposition of organic matter and its transformation into humus increases the CEC. (Atalay, 2011: 57). As a matter of fact, the low value of organic matter and clay in the soil taken samples has resulted in low CDE. Again, the EC of the soil is very low at 50.70 micromhos / cm (Table 6).

Ca forms the dominant cation in the soil and the amount of Ca in the sample is 16.44 me / 100 gr. In addition, the amount of K, which constitutes other cations is 3.44 me / 100 g, the amount of Mg is 2.65 me / 100 g and the amount of Na is 0.53 me / 100 gr. Thus, the base saturation is not high, expressing Ca, Mg, K and Na amounts of soil. Another major element, P, is found to be 26.62 kg in the soil sample, which indicates that the soil is quite low in terms of P (Table 6).

When the micro elements are taken into consideration, Fe content of the soil is 5.67mg / kg, Cu amount is 6.57 mg / kg, Mn amount is 4.98 mg / kg, Zn amount is 4.49 mg / kg, B amount is 0.11 mg / kg, Cd amount is 0.033 mg / kg, Ni amount is 0.06 mg / kg and the soil shows compliance with the micro elements (Table 6).

Table 6. Soil samples (no 2) taken from gneisses on Deliktaş Tepe slopes.

Parameter		Average Value	Parameter		Average Value
Bedrock		Augen Gneiss	Name of the soil		Brown Forest Soil
XRF Analyze	CaO	0.222	Colour		7.5 YR 5/4
	MgO	1.82	Texture		Tın
	SiO2	50.2	Organic Matter (%)		3.55
	Other	43.771	Lime (%)		1.98
	Ig (Ignition loss)	3.99	P (kg/da)		26.62
Mineralogical-Petrographic Analyze	colour	Middle Light Gray- Very light Gray	pH (1:2.5)		6.28
	Tissue	Porfiroblastik	EC (mikromhos/cm)		50.70
	Grain Size	Micro-macro crystalline	KDK		24.98
	Main Components	Feldspat, kuvars, biyotit, muskovit	**changeable cations (me/100)**	Ca	16.44
	Porosity (%)	-		K	3.44
	Crack Width (µm)	-		Mg	2.65
				Na	0.53
			Micro Elements (mg/kg)	B	0.11
				Cd	0.033
				Cu	6.57
				Fe	5.67
				Mn	4.98
				Ni	0.06
				Pn	0.31
				Zn	4.49

As a result, in the area where the gneisses are widespread in the research area, soils have generally loamy, silty clayey and clayey loam structure. According to this, soils are considered to be in the middle heavy-heavy soils group in terms of penetrability. The color of the soils is dark grayish, brown- dull brown, depending on the characteristics of the bedrock and the condition of washing. The amount of organic matter in these soils developed under dense forest cover is generally high. The soils show mild acid reaction in PH. In addition, the soils have very little calcareous and low calcareous properties. Besides, the developed soils on these rocks have played a role in the formation of humid environments due to the high water holding capacity. Hence, in these sections, moist species are observed frequently.

4. RESULT

The strong tectonic activities of the research area in the near geological past made the main area of gneiss basin important. In addition, these rocks have developed together with soluble rocks such as crystallized limestones and dolomitic limestones. Even the contact areas of the gneisses and the soluble rocks in the field were frequently encountered. Therefore, it was often not possible to separate these rocks with certain boundaries.

Although the site is located in the Mediterranean climate zone, the role of the bedrock on the developed gneisses has come to the forefront. Gneisses are rocks that are resistant to wear and dissolution because they are metamorphic rocks. In addition, soils due to the amount of silica due to the difficulty in the separation of soil shows a generally shallow feature. Due to the slow and difficult dissolution of the bedrock, soil development is not very deep even on sloped surfaces (average 30-40 cm, very rarely around 60 cm). The role of the bedrock in the formation of loamy, silty loamy and clayey loam of the texture of the soil was decisive.

In general, on the gneisses, dark forest lands were observed. These soils named by Katrancı are acidic. Due to the high silica content in these main rocks, pH is below 7. In fact, the results of analysis of soil samples taken on gneisses prove this situation. The soils of the soil are generally high and the density of the bedrock and the bedrock is the main determinant of this situation. Lime rate of these soils with high amount of silica is quite low. Therefore, the developed soils on the gneisses in the field clearly reflect the characteristics of the bedrock. As a matter of fact, these rocks cover a large area in the field and play a dominant role in soil development.

As a result, the role of the climate factor, one of the ecosystem elements in the field, is generally dominant on other ecosystem elements in the field (plant, hydrology, land use, etc.). However, the role of the bedrock has been dominated in the physical and chemical properties of the soils developing on the gneissic bedrock.

REFERENCES

Atalay, İ. (2004). Türkiye'nin Ekolojik Bölgeleri, Meta Basım, İzmir.

Atalay, İ. & Mortan, K (2007). Türkiye Bölgeler Coğrafyası, İnkılap Kitapevi, İstanbul.

Atalay, İ. (2011). Toprak Coğrafyası, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. (2008). Ekosistem Ekolojisi ve Coğrafyası, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. & Efe, R. (2008). Ecoregions of the Mediterranean Area and the Lakes Region of Turkey, In: Efe, Cravins, Ozturk, Atalay (Eds), In: Environment and Culture in the Mediterranean Region, Inkilap Publ, Istanbul.

Atalay, İ.; Efe, R. & Soykan, A. (2008). Mediterranean Ecosystems of Turkey: Ecology of Taurus Mountains. In: Efe, Cravins, Ozturk, Atalay (Eds). Environment and Culture in the Mediterranean Region. Part I, Chapter One p. 3-37, Cambridge Scholars Publishing, Newcastle.

Atalay, İ. (2010). Uygulamalı Klimatoloji, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. (2011). Türkiye Coğrafyası ve Jeopolitiği, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. (2011). Toprak Oluşumu, Sınıflandırılması ve Coğrafyası, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. (2011). Türkiye İklim Atlası, İnkılap Kitabevi Baskı Tesisleri, İstanbul.

Atalay, İ. (2014). Türkiye'nin Ekolojik Bölgeleri /Ecoregions of Turkey, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. & Gökçe Gündüzoğlu, A. (2015). Türkiye'nin Ekolojik Koşullarına Göre Arazi Kabiliyet Sınıflandırılması, Meta Basım Matbaacılık Hizmetleri, İzmir.

Atalay, İ. (2017). Türkiye Jeomorfolojisi, Meta Basım Matbaacılık Hizmetleri, İzmir.

Bedi, Y. & Öztürk, E. M. (2001). Alanya Köprülü (Antalya) Dolayının Jeolojisi (Alanya O28 c1, d1, d2 ve d3) Paftaları, MTA, Derleme No: 10488, Maden ve Tetkik Arama Genel Müdürlüğü, Ankara.

Erinç, S. (2001). Jeomorfoloji II (Güncelleştirilmiş 3. Basım), Der Yayınları: 294, İstanbul.

Erten, N. (1996). "Alanya Dolayının Jeolojisi ve Tektonik Özellikleri", Yüksek Lisans Tezi, Süleyman Demirel Üniversitesi Fen Bilimleri Enstitüsü, Isparta.

Koçman, A. (1993). Türkiye İklimi, Ege Ünv. Edebiyat Fak. Yayınları No:72, İzmir.

Mater, B. (2004). Toprak Coğrafyası, Çantay Kitabevi, İstanbul.

Özgül, N. (1983). Alanya Bölgesinin Jeolojisi, Doktora Tezi, İstanbul Üniversitesi Fen Bilimleri Enstitüsü, İstanbul.

Özgül, N. (1976). "Torosların Bazı Temel Özellikleri", Türkiye Jeoloji Kurumu Bülteni, 19 (1): 65-78, Ankara.

Sabancı, S. (2012). Alanya ve Manavgat'ın İklim Özellikleri, Yüksek Lisans Tezi, İstanbul Üniversitesi Sosyal Bilimler Enstitüsü, İstanbul.

Seydioğulları, S. (1991). Alanya, Hat Baskı Sanatları Sanayi ve Tic. Ltd. Şti, İstanbul.

Sür, A. (1977). Alanya'nın İklimi, Ankara Ünv. Dil ve Tarih-Coğrafya Fak. Yayınları No: 270, Ankara.

Şengün, M. (1986). Alanya Masifinin Jeolojisi, MTA Derleme Rap. No: 8000, Ankara (Yayınlanmamıştır).

Şişli, M.N. (1980). Ekoloji, Hacettepe Üniversitesi Yayınları A 31, Ankara.

Topraksu Genel Müdürlüğü. (1970). Antalya Havzası Toprakları, Topraksu Genel Müdürlüğü Yayınları: 235, Köyişleri Bakanlığı Yayınları: 145, Ankara.