

# A GEOGRAPHIC STUDY ON THE EFFECTS OF COASTAL TOURISM ON SUSTAINABLE DEVELOPMENT: COASTAL TOURISM IN CIDE

## ABSTRACT

Cide is a district of Kastamonu in Black Sea Region located in the northwest of Turkey. Cide district, 140 kilometres from Kastamonu, has many values regarding existing tourism potential in terms of sustainable development. The characteristics of Cide should be assessed well. The improvements of infrastructure service and investments will carry Cide to more important place. This situation will make important contributions both Cide and Turkish economy. The natural and cultural beauties of Cide are important both for Turkey and the world. In this study case the characteristics of Cide was explained, than the historical of Cide settlement was mentioned and the coastal tourism potential of Cide district that combines green and blue, hidden between Black Sea green was discussed. All of the geographic details were researched and were reflected to the findings part. In conclusion it was discussed what to do for Cide.

**Key Words:** Sustainability, Coastal Tourism, Cide, Turkey

## 1. INTRODUCTION

To improve tourism and to increase tourism income has been a most important policy for every country. The Turkish government has carried out policies to boost tourism and to attract many more tourists. Turkey is a tourism paradise with three seas around it, a diversity of flora, different micro climates, historical and cultural values. Tourism is a collection of activities, services and industries that deliver a travel experience through transportation, accommodation, eating and drinking establishments, retail shops, entertainment businesses and other hospitality services provided for individuals or groups travelling away from home (Tecer, 2003).

"Tourism is travel for recreational, leisure or business purposes. The World Tourism Organization defines tourists as people "traveling to and staying in places outside their usual environment for not more than one consecutive year for leisure, business and other purposes" (Agaoglu, 1991).

Factors affecting tourism are geographic location, climate and flora. A place that has an attractive location and a suitable climate is necessary for meeting different types of demands and adjusting the balance of supply and demand. The sectors most affected by climatic changes are agriculture and tourism; climate is the primary determinant of supply conditions of both sectors. The importance of forecasting is becoming important day by day because of global warming that affects daily life. This is why the most significant followers of it are also tourism and agriculture. These forecasts provide the main master data for both sectors; geographic attractiveness and climate are the main stimulators of the tourism sector. Here, the touristic attractiveness of a country or a region is taken to mean that which is related to geographic beauty and climate. The influences of climate changes on every tourism type will be different. In general, the tourism sector should take necessary measures against global warming and climate change in the long term and improve the adherence to this process. It is a necessity for the future of the world and Turkish tourism (Yıldız, 2009).

Because of rapid technological development and human population growth, people often live in environments that do not meet their physiological and psychological needs. Instead, they use rural or natural areas outside of cities to meet these needs (Kurdoglu et al, 2009). Cide is one of these natural areas where tourists can meet their physiological and psychological needs. Cide is in the Black Sea region and the biggest advantage of Cide in terms of sustainable development is that it will be affected from the adverse effects of global warming at a minimum level.

Cide has also great potential for adventure tourism. Kent et al (2009) states that 'the promotion of adventure tourism could provide economic benefits in particular at the village level; this is especially relevant if such activities are planned with sustainability at the forefront of tourism development objectives'. Turkish Sea tourism has been developed on the south and west coasts, but it has not been developed in the Black Sea region yet. Even if the coastal structure is not suitable, the numbers of sunny days are insufficient and the average temperature is low in the Black Sea region, this region can benefit from coastal tourism and especially from other tourism types. The Black Sea region has the most plant species and flora in Turkey. If alternative tourism activities are considered besides coastal tourism, the Black Sea region will have the tourism potential that it has been waiting for. To add to the statistics from General Directorate of State Meteorology, Cide City Hall and Cide District

Governorship to determine how to use the tourism potential of Cide in the best ways, the district was walked through and also information was taken about the region by interview. In the view of such information, the effects on coastal tourism of the aspects such as heat, rain, the number of cloudy days, the temperature of sea water, the structure of the coast were analysed, the transportation and infrastructure possibilities were defined. Thus coastal tourism potential was identified to try and offer a solution to the problems of the region.

## **2. METHODOLOGY**

After being shown the location of the study area in Turkey, general geographical features were shown and the tourism potential of the area was revealed. Climatic data like heat, rain, wind, insolation, cloudiness and humidity were taken from General Directorate of State Meteorology to determine the state of climatic comfort and analysing those, the climatic characteristics of the region were clarified by table and graphics. THI, SSI and TCI indices were used to identify the state of climatic comfort that affects the coastal tourism of Cide. The most suitable months for the coastal tourism in Cide were discovered by using those indices. Some of the major studies on the state of climatic comfort in the world are Mieczkowski, (1985), Hamilton and Lau, (2004), Matzarakis, (2007) and Tzenkova vd.,(2007). The studies on climatic comfort and coastal tourism in Turkey and also including this study region can be found. The most important of these is the study on the whole West Black Sea region coastal strip (Güçlü, 2009). On the other hand, other important studies have been completed by Güngör and Cengiz, (2006), Akıncı, (2007), Matzarakis and Karagülle, (2007) and Güçlü, (2008). After the state of climatic comfort of Cide had been established, the transportation and accommodation opportunities were determined in order to offer a solution to the problems.

### **2.1 The Geographic Characteristics of Cide**

Cide is a district of Kastamonu located in the north west of Turkey in the Black Sea Region. It is located between the Black Sea and other districts of Kastamonu like, Doğanyurt, Şenpazar, Azdavay and Pınarbaşı. Kurucaşile is the district of Bartın which is located in the west of Cide (Figure.1).

The lowland areas of Cide are too limited. Its soil is divided by a lot of creeks and streams. The extent of Kure Mountains is located in the south and southwest of the district Kestane Mountains is located in the north near the coast. The tops of these mountains are covered with a rich forest cover (Cide, 2011). Zeytinlik Hill (1.282 m), Kaleburnu Hill (1.078 m), Halla Hill (1.231 m), Karakaya Hill (1.443 m), Kemerlik Hill (1.220 m) is the main elevations of the district. The most important stream is Devrekani Creek that flows through northwest-southeast direction. This creek passes the borders of Cide and pours into the Black Sea. The other streams of the district are Aydos Creek, Soğuksu Creek, and Fakaz Creek. The square measure of the county that is 148 km far from Kastamonu is 939 km<sup>2</sup> and total population included all villages is 20.253 in 2009 and the population of the county centre is 5.608.

The observations by Cide Meteorology Station were used to put forth the climate characteristics of Cide. According to the results of this research in the study case, winters is warm and humid, summers hot and rainy. The average annual temperature of the region is 13°C, the highest average temperature was measured as 22.2 °C in August, the lowest average temperature was measured as 5,3 °C in February. The annual rainfall of the region is 1154 mm, maximum rainfall was as 170,2 mm in October, minimum rainfall was as 45,80 mm in April. Looking at the distribution of the rate of the drop rainfall according to the season; 15% of them in springs (172,20 mm), 28% of them in winters (319,40 mm), 18% of them in summers (211,80 mm) and 39% of them were in Autumn (450,80) (Figure. 2). Considering the dispersal of rainfall, it can be seen on the table that maximum rainfall drops in autumn season. The lowest rainfall is in spring season. Especially for coastal or sea tourism, much rainfall in summer season has bad effects on tourists that want to swim. According to Cide meteorological station, when the rates of relative humidity and cloud rate of Cide are evaluated, it can be seen that relative humidity is 73.75% per annum. The rate of humidity is the highest in the months of September and October (76,0). The rate of humidity is the lowest in the month of December. It has been seen that the rate of humidity is high each month. On the other hand the rate of cloud is approximately 5,35 days in a year.

The rate of cloudiness is the highest in the month of January with 7.2 days and the lowest in the month of August with 3.1 days. The rate of cloudiness is low in summer months, which is a positive situation

for Cide coastal tourism (Figure 3). The other important data from the Cide meteorology station is the number of clear and cloudy days. According to the data, Cide has approximately 91 clear days in a year. and has 151 some cloudy days and 108 cloudy days (General Directorate of Meteorology, 2011). The number of cloudy days in Cide is 151 (41%) which decreases in summers (Figure, 3). At the end of summer, warm air masses are drowned to the south and these warm air masses are replaced by cold and rainy air masses. Therefore, the number of cloudy days is 2.7 days between July and August, in winters it is 14,9 days in January. In terms of the natural, human and economic life in a region, the dispersion of the days that are clear, cloudy and mostly cloudy in a year is very important. Because these days effect the characteristics of physical geography like natural flora, soil and hydrography. By this way it also shapes economic activities, particularly agriculture and human relations. However, decreasing of cloudiness in summer season provides a larger part of sun rays that reach Earth, this situation will show a positive impact on coastal tourism. The natural result of climate is vegetation. Vegetation is an important factor for the survival of living stock in the area and the most important source of income for the people of the region. Cide is covered by the forest cover starting from the coast. Sea and forest are nested. Cide is in the border of the Kure Mountains National Park. The National Park has a characteristic of carstic. There are 675 flora taxon in the district, 109 of them are endemic, and 49 of them are rare species. There are 47 taxon in endangered species of which 2 are global, 33 are European and 12 are national. 58 taxon are under lower danger of which 3 are required the protection precaution, 3 can be in endangered and 52 are the least threatening. There are 2 Bern species and a forest with mixed leafed and coniferous trees as floristic. Primary tree species are Fagus, Carpinus, Pinus, Oak and Fir. On the other hand it has a rich wild life potential. Besides there are animal species like Roedeer, Grizzly Bear, Wild Boar, Lutra lutra and Wolves etc., also bird species like Hawk, Sparrow Hawk etc. (Red List, 2010). Cide should bring the Kure Mountains National Park into tourism as alternative tourism activities besides coastal tourism.

## ***2.2. The Historical Development of Cide Settlement***

It has not been known yet when Cide was built and who built it. The name of Cide is written in the Iliad written by Homer. There are ancient cities named Kytoron and Aigialos in Cide. Kytoron is a closed harbour city where no remains exist except for the medieval castle, the ancient city of Aigialos has no remains today.

In the historical resources it is known that Paphlagonia was a region where a branch of Phrygians had lived in 1100-700BC. Paphlagonians gave their names to the regions. As no excavations have been done in Cide yet, no monument from this period has been found. Homer indicated that a clan known as Heneti lived in Cide and Cyturus (Gideros), which is 10km from Cide. Remains of a palace were found on the Cide coast known as Ceviz Dibi that supports this claim. Romans and Byzantians lived there also. Callade Cide, J. Domma and Caracalla named on the coins and the castle remains belonging to Romans prove this claim, too. Çoban Castle between Güble and Gilivri was built in the Roman era but was repaired in the Ottoman era.

Danishments, Çobans and Candars had control over the region, after Byzantians. Ağı was under the control of the Byzantians. After that it was captured by Ottoman, in that term a yard was built in Cide. That harbour was on the Silk Route which maintained its importance throughout history. Known as Karaağaç Harbour, it provided trade connections between Russia and Anatolia. Some of the historical artefacts that survive up to now are the remains of a castle from the Roman and Byzantine era and one example of Turkish civil architecture is the house of Rıfat Ilgaz who was one of the most important writer of Turkey, who lived between 1911 and 1993 (Tuik, 2012).

## ***2.3 The Coastal Tourism in Cide***

The primary tourism potential of Cide is domestic tourists but this has not developed yet. The tourists that come from Istanbul and Ankara are the people who immigrated from Cide before. To improve tourism, it is necessary to ensure that there are not any accommodation, transportation or infrastructure problems; besides, it has ecological, historical and cultural beauties (Zengin, 2006). The most important thing is to evaluate all these tourism elements by the tourism sectors (Yarcan, 1988). We can unit all the elements under these topics which are attractions, accommodation, transportation, infrastructure and supplementary services (Özgüç, 1993). While we research the coastal tourism of

Cide, we try to achieve results with the topics. Because of the location of Cide, it has many historical, cultural, and natural beauties; the attractions of Cide can be seen in Table 1.

As shown in the Table 1 which studies the amenities and features, the number of beaches makes up the highest portion of attractions in Cide. If we think of the bad effects of climate changes returned to positive in the region, sunshine duration will increase. That's why coastal tourism will be much more important for Cide. A strategic plan is needed for coastal tourism according to the climatic comfort situation. From this point of view, it will be researched based on sun-sea bathing and the climatic comfort which Cide has. One of the main needs of tourism is transportation. All types of transportation should be considered for developing tourism. Transport services start with when the tourists go out from the house, then go on through the trip and finish with coming back to the house (Zengin, 2006).

Besides Cide having natural and cultural attractions, insufficient transport services affect the tourism of Cide in a negative way. Unfortunately, the only way to arrive at Cide is by the highway. Although Cide has an airport, it has not been active yet. The nearest airports to Cide are in Ankara and Samsun. Opening the airport will develop the tourism in Kastamonu. Highway transportation through Kastamonu and Bartın to Cide is hampered by sharp bends; because of the location of Cide, it is not a district on the busiest road. Therefore the number of tourists coming via the tours is quite low. In particular, Cide-Bartın, Cide-Sinop and Cide- Kastamonu highways should be improved. It is really important for both Cide's and the Black Sea region's tourism.

In spite of the fact that the transportation from Cide to Ankara, Istanbul or the other cities is difficult, it is possible to find a bus. There are regular bus and minibus services from Cide to important centres. The distance of Cide to Ankara is 376 km (by indirect bus services from Bartın or Kastamonu). Cide to Istanbul is 467 km (by daily bus services) and to Amasra 71 km (by daily minibus services).

The best option to attract the tourists is "mass tourism". The most important problem is accommodation because of the mass tourism. The components of accommodation are hotels, hostels, apartments, pensions, bungalows, holiday resorts etc. The vital element of these components is hygiene. Every tourist choice is different, but in general everyone needs cleanness, silent and friendliness. That's why these aspects are as important as the number of rooms. Accommodation responses to tourism demand are especially bed capacities (Coles, 2003). Hotel and pension prices are cheap (about €20) in Cide. The most important problem in Cide hotels is food, except for a few hotels there is no dinner service in hotels. They have just breakfast services. Tourists want to find everything in hotels. The capacity of beds in Cide is;

- 6 hotels – 105 standard rooms, 15 suites – 235 bed capacity
- 2 guest houses – 35 standard rooms – 77 bed capacity
- 7 pensions – 39 standard rooms – 80 bed capacity

Total bed capacity of Cide is 398 (Cide City Hall, 2011)

The information about the number of tourists is shown below in Table 2. This information was taken from Cide City Hall.

The information above is just related to the hotels; the number of tourists who stayed in pensions is not certain. As the town has just started to develop, statistics are not reliable but those given above are certain ones. The restaurants are vital for Cide. As it is mentioned before, most of hotels do not have lunch or dinner service so restaurants become important. In Cide there are 33 restaurants, 6 patisseries, 20 cafes, 7 souvenir shops and 39 supermarkets.

### **3. FINDINGS ABOUT INSOLATION AND SEA WATER CONDITIONS**

If we analyse weather temperatures and sea water temperatures for Cide, one of the most important factors of temperature distribution is angle of incidence of sunlight. It can be seen on Table 3. When we look sunbathing duration, the lowest sunbathing duration is 1 hour 42 minutes in December, the longest sunbathing duration is 10 hours 34 minutes in July (Table 3). Sunlight duration lasts between 7 hours 06 minute and 10 hours 34 minutes between May and September, the longest time is in July.

#### ***3.1 The State of Climatic Comfort of Cide***

The state of climatic comfort of the West of the Black Sea region coastal strip which Cide is located in was explained in general terms by research undertaken by Güçlü in 2009. In this study, it is necessary to give information about the state of climatic comfort for the region in order to evaluate the state of

tourism activities of Cide and their future. THI, SSI and TCI indices are used for demonstrating the state of climatic comfort that affects coastal tourism in Cide.

When the state of climatic comfort of the West Black Sea region coastal strip are evaluated according to the Thermo Hygrometric Index-Thom Index (THI), it is understood that the strip undergoes cold, cool, comfortable and hot thermal terms. The coastal strip of Cide passes 2 cool terms, 2 comfortable terms and 1 hot term in a year (Table 4). Cold thermal conditions are prevalent in Cide over approximately a 190-day term between 26 October and 3 May. It is observed that the comfortable term is the second term that provides lots of tourism activities in suitable conditions. The first term is on average 42 days between 19 May and 30 June, the second term is 44 days between 31 August and 13 October. Hot thermal conditions prevail between 1 July and 30 August, that is high heat and relative humidity in Cide according to the THI index. This period which lasts 60 days is not suitable for children, old people and people taking a sporting exercise.

The SSI index is named as summer index. This index is put issued by the American Heating and Cooling Engineers Association with searching literature produced over the last 75 years, and is confirmed by Kansas State University in the results of tests and analyses. According to the Cide SSI index, the thermal comfort conditions between 4 June and 19 September are suitable for tourism and recreational activities in general. The most comfortable term is 2; between 23 June and 24 July and 17-30 August in Cide has first, second and third strip thermal comfort degrees. TCI values of Cide are determined as the lowest being 44% (in October borderline) and the highest is 72% (July very good). Annual average TCI value of Cide that changes between 57% (acceptable) and 72% (Very good) in May-September is in "good" category with 65%. High extreme heat, relative humidity and summer rains decreases TCI value in summer term (Güçlü, 2009).

### ***3.2 Findings of The Seabathing Season***

The best temperature for sea bathing is 25-28°C and the most suitable seawater temperature is 22-25°C. These do not exceed 25°C per day for weather temperature. On the other hand this ideal situation does not last a long time or in the most important tourism centres. For example, even between Marmaris and Alanya that are the most important tourism centres it lasts from 13-25 June, that is nearly 2 weeks. As appropriate weather temperature values are 20-30°C and seawater temperature values of 18-28°C were discussed together, appropriate months are July, August and the beginning of September in terms of sea bathing. It is 12 May-25 July, 3 September-19 October between Marmaris and Alanya which is the most important region of tourism for Turkey (Güçlü, 2009). In parallel with global warming, weather and seawater temperature is increasing day by day in a negative way in the Mediterranean region. This is an alternative to the west of the Black Sea region of the Mediterranean region. If the appropriate temperature of weather and sea water is for less than 90 days, this condition does not attract tourism investors. Because of the increasing temperature depending on global warming it will make the Black Sea region more hot than cold (Akıncı, 2007).

Besides weather and seawater temperature, beaches and the type of sand at Cide are really important. The 11 km long city centre beach, Gideros, Aydos, Denizkonak, Uğurlu, Çayyaka, Akbayır and İlyasbey are suitable for swimming. The city centre beach has mixed white fine sand and gravel; yellow sand is on a very small part of the coast.

## **4. CONCLUSION AND SUGGESTIONS**

In spite of the potential, Cide has not exploited from coastal tourism yet it has suitable climate and sea bathing conditions in general. The sunshine duration of Cide is lower than the Mediterranean coast. Summer rains and the rate of cloud are high and that decreases sunshine comfort. Today, rapid climate changing is happening and global warming is demanding attention. It is certain that rapid climate changing has dangerous effects on people. As the wars cause disasters, on the other hand they contribute to technological improvements. Climate changes punish some regions like the wars; on the other hand it will reward other regions like the Black Sea region. After all, the output process of innovation, coincide with periods of crises. Tourist effects posed by climate changes emerge as an opportunity to assess in some areas (Yıldız, 2009). In this respect, Turkey's tourism sector will respond to the global warming causing the possible positive effects of climate change which can be listed as follows:

\*Increasing temperatures due to global warming, the sunshine duration of Black Sea Coast and additionally sea, sand and the sun will increase the number of benefit days and this may indicate that Black Sea coasts will be like Mediterranean coasts (Kesim, 2007).

\*Tourist activities for plateaus and national parks will increase and as a result of the fact that increasing temperatures will decrease the interest in coastal tourism

In the research done by Kurdoglu et al (2009), it is understood that the tourists came to the areas because of its “natural beauty” (39.9%) mostly that they did not experience in their hometowns. Cide has a great potential for tourists in terms of natural beauty.

\* Climate changes caused by global warming will lead to warmer winter months and in this case, tourism will spread to 12 months in Turkey.

\* In the light of these results, the tourism potential of Cide will increase. One of the most important points is that shower cabins can be found by the sea. It is necessary for the tourists. The capacity of the accommodation places in Cide is 398.

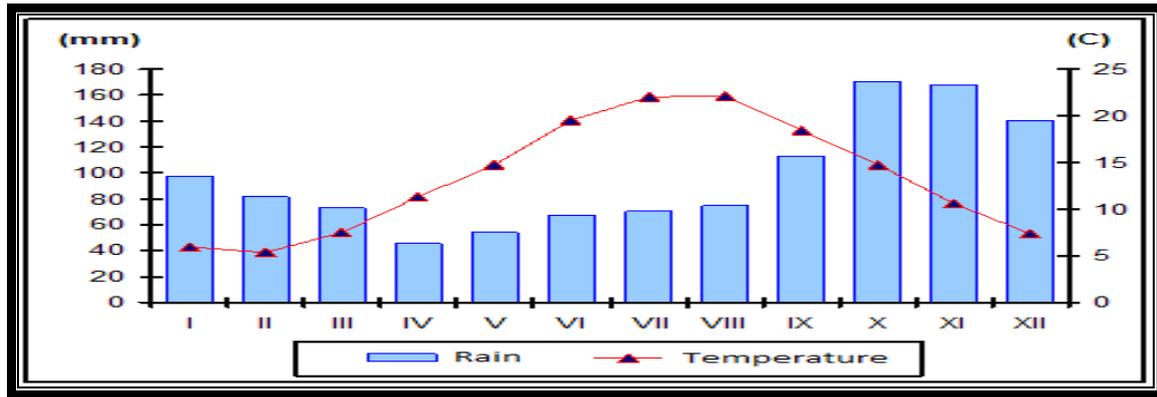
There is no starred hotel in Cide. If the package tours are made real, accommodation capacity is not enough to stay in Cide. Hotels should solve this problem together. The most important fact to develop the region is transportation. Because the Black Sea region is mountainous and rough, it makes it difficult for transportation and also it makes difficult for tourism, thus the improvement of the road between Bartın and Sinop is important for Cide. The effect of rapid climate changes should be minimized the least. Therefore, it is necessary to serve an alternative tourism activities to the tourists come to the region. When the tourists do not swim because of climate, it is very important to know if the tourists come to the region for just a week “what they will do except for swimming “. This is why the advertising of Cide should be made not only about coastal tourism but also other, alternative tourism activities. Cide has a harbour that is not very busy, with only 5-6 yacht coming to the harbour. When the harbour returns to being active, it helps the tourists come to the region by sea transportation. The most important problem for Cide coastal tourism is advertising. Cide could introduce itself not only in Turkey but also in Kastamonu. There are lots of people who live in Kastamonu who do not know anything about Cide. If the advertising of Cide can be undertaken effectively, it can attract lots of domestic or foreign tourists with its natural beauty. District Governorship and Cide City Hall should work together for the advertising campaign both at national and international levels.

The sunshine duration of Cide is lower than southern regions because of being in the south region and for the same reason cloud rate is higher. To emphasize natural, cultural and historical importance of Cide is really important for the advertisement besides coastal tourism. A booklet about Cide should be published not only with pictures but also other details like what to do, where to go, where to eat.

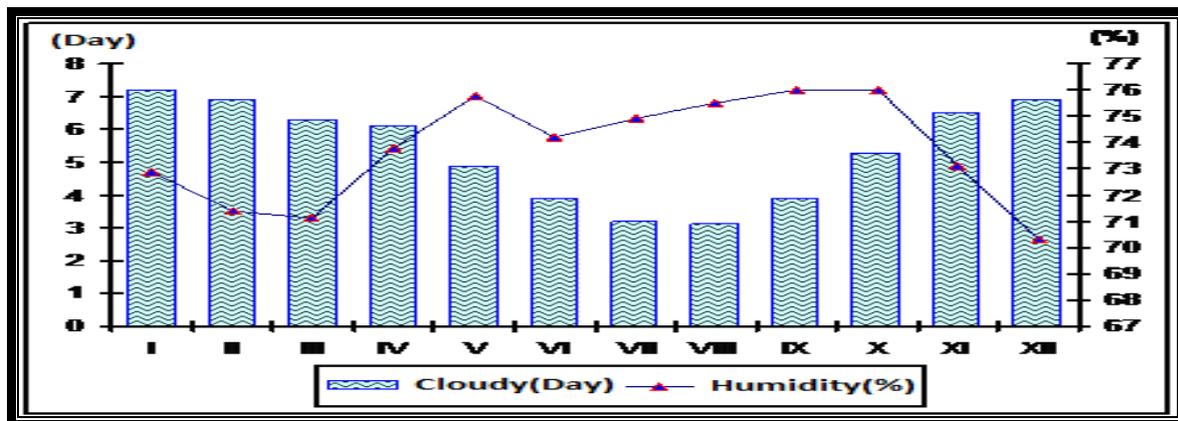
A strategic plan has to be prepared for Cide by City Hall and District Governorship. According to this strategic plan the bed capacities, the quality of service, the number of incoming tourists etc. should be defined, controlled and supported with statistics. Tourism is a sector that the most affected by political bickering between the countries. This is why tourism advertisement should be done different countries in the world not only one point. This can help that tourism effects political bickering less. The Tourist Information Office opened last year; it helps tourists walking around to be more aware and also helps to advertise Cide.



**Figure 1:** The Location of Cide



**Figure 2:** Approximately the Dispersion of Annual Temperature and Rain to the Months Between (1975-2010). (General Directorate of Meteorology, 2011).



**Figure 3:** The Dispersion of the Number of Cloudy Days and Humidity Rate of Cide to the Months between 1984-2010 (General Directorate of Meteorology, 2011).

**Table 1:** The Attractions of Cide (Cide Cityhall, 2011)

| Cave     | Beach              | Canyon | National Parks | Waterfall | Castle  | Plateau       | Lighthouse |
|----------|--------------------|--------|----------------|-----------|---------|---------------|------------|
| Gideros  | Kapısı, Gideros    | Kısıık | Kure Mountains | Efken     | Gökçe   | Armut çayıırı | Kerempe    |
| Ilgarini | Gökçekale          | Malyas |                | Gömeren   | Gideros |               |            |
| Kılııılı | Değırmenağzı       | Valla  |                |           | Okçular |               |            |
| Haıılı   | Denizkonak         | Aydos  |                |           | Hıdır   |               |            |
| Okular   | Merkez, Fakaz      |        |                |           | Gazallı |               |            |
| Kulyuc   | Köselialtı         |        |                |           | Çoban   |               |            |
|          | Gazallıaltı        |        |                |           | Asarcık |               |            |
|          | İnciraltı, Gilivri |        |                |           | Akca    |               |            |
|          | Cosnaraltı         |        |                |           |         |               |            |
|          | Aydos, Guble       |        |                |           |         |               |            |
|          | Camaltı, Time      |        |                |           |         |               |            |

**Table 2:** The Number of Incoming Tourists for Cide between 2006-2011

| 2006 | 2007 | 2008 | 2009 | 2010 | 2011  |
|------|------|------|------|------|-------|
| 2959 | 7330 | 6343 | 6670 | 8720 | 10681 |

**Table 3:** The Sunlight Duration, Angle of Sunrise's Fall and Seawater Temperature of Cide to the Months Between 1984-2010 (General Directorate of Meteorology, 2011).

| MONTHS                                  | I     | II    | III   | IV    | V     | VI    | VII   | VIII  | IX    | X     | XI    | XII   |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| <b>Approx. Temperature</b>              | 5.9   | 5.3   | 7.5   | 11.3  | 14.8  | 19.5  | 22.0  | 22.2  | 18.5  | 14.8  | 10.6  | 7.4   |
| <b>Sea Water Approx. Temperature</b>    | 8,3   | 7,2   | 7,7   | 9,5   | 13    | 17,4  | 20,1  | 20,8  | 18,9  | 16,8  | 13,1  | 10,4  |
| <b>Sunlight Duration (Hour, Minute)</b> | 2.59  | 3.22  | 4.33  | 6.59  | 7.49  | 9.49  | 10.34 | 9.43  | 7.06  | 5.28  | 3.19  | 1.42  |
| <b>Angle of sunrise's fall</b>          | 31,30 | 39,14 | 46,58 | 54,37 | 62,31 | 70,10 | 65,28 | 57,44 | 50,15 | 42,11 | 34,17 | 26,07 |

**Table 4:** Comfort Condition according to THI index in Cide 1984-2010 (Calculated to data from General Directorate of State Meteorology)

| Freezing Cold | Freezing | Gelidity | Very Cold | Cold             | Cool         |                       | Comfortable    |                      | Hot              | Very Hot | Baking Hot |
|---------------|----------|----------|-----------|------------------|--------------|-----------------------|----------------|----------------------|------------------|----------|------------|
|               |          |          |           |                  | 1.Term       | 2.Term                | 1.Term         | 2.Term               | 1.Term           |          |            |
| -             | -        | -        | -         | 26 October-3 May | 4 May-18 May | 14 October-25 October | 19 May-30 June | 31 August-13 October | 1 July-30 August | -        | -          |

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