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**ΟΔΗΓΙΕΣ ΣΥΓΓΡΑΦΗΣ ΤΩΝ ΕΠΙΣΤΗΜΟΝΙΚΩΝ ΕΡΓΑΣΙΩΝ ΠΡΟΣ
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Οι υποσημειώσεις παρατίθενται στο κάτω μέρος της σελίδας στην οποία αφορούν και η βιβλιογραφία καταχωρείται στο τέλος της εργασίας. Οι φωτογραφίες και τα διαγράμματα πρέπει να εμφανίζονται σε αποχρώσεις του γκρι.

Κάθε εργασία κρίνεται από τριμελή επιστημονική επιτροπή τα μέλη της οποίας καλύπτουν συναφές γνωστικό πεδίο με το αντικείμενο της εργασίας. Οι εγκρινόμενες εργασίες δημοσιεύονται κατά χρονική σειρά προτεραιότητας.

ΤΟΥΡΙΣΤΙΚΑ ΘΕΜΑΤΑ

ΠΕΡΙΟΔΙΚΗ ΕΠΙΘΕΩΡΗΣΗ ΤΩΝ ΕΠΙΣΤΗΜΩΝ ΤΟΥ ΤΟΥΡΙΣΜΟΥ

ΠΕΡΙΕΧΟΜΕΝΑ

| | | |
|---|--|-----|
| Ανδρεόπουλος Ζ.Σ., Θεοχαρόπουλος Δ.Γ., Παπασταύρου Κ.Α. | Το διαδίκτυο στην τουριστική ανάδειξη ορεινών περιοχών | 6 |
| Φραιδάκη Μαρία | <i>Οικονομικές Επιπτώσεις του Οικοτουρισμού</i> | 19 |
| Dimitris N. Kanellopoulos | eTourism services and technologies: Current issues and trends | 28 |
| Karagiannis Stefanos | Tourism and Ecological Problems - The case of Crete | 43 |
| Λαλούμης Δημήτρης | Κίνητρα αποδοτικότητας της εργασίας στις τουριστικές επιχειρήσεις | 61 |
| Πρινανάκη Ελευθερία & Λούπα Πάττυ | Κοινωνική αποτελεσματικότητα τριτοβάθμιας τουριστικής εκπαίδευσης και ολική ποιότητα | 84 |
| Ρίγγας Χρήστος | Alternativer Tourismus | 119 |
| Σωπασή Ειρήνη | Βιώσιμη Τουριστική Ανάπτυξη Στην Περιφέρεια Κρήτης | 132 |
| Stergiou D. & Benetatos Th. | “Sustainable What?” Sustainable Tourism Development in Greek Tertiary Curricula | 143 |

TOURISM AND ECOLOGICAL PROBLEMS - THE CASE OF CRETE

Karagiannis Stefanos¹²

Abstract

Tourism development in Crete is affected by a number of environmental parameters, among which is the global overheating. We focus on the effects of the climatic changes on the tourism dynamics, while we stress out the relation between the environment and tourism. Our research is targeted on the island of Crete, as it constitutes one of the most dynamic tourist destinations in the Mediterranean Sea.

1. Introduction

When referring to environmental changes, then it is more than obvious that it is not just an internal affair for a country but a global issue. Climate changes have been a worrying subject for the scientific community on a global scale, but have not been widely considered by common people. Greece, as part of this world that faces serious stability problems, also has to confront the results of these environmental changes. Greece depicts a coastline of 15000km¹³, inevitably leading to developing a “marine-oriented” tourism. Nowadays, both sea and mountains attract a great number of tourists. The tourist Crete is a part of Greece that both due to morphology and due to geographical location in the Mediterranean area has developed financial, commercial and cultural activities. However, this was not done at the expense of destroying its natural wealth, where at least the one is caused from the human interference to nature.

Keywords: planet overheating, climatic changes, environmental quality, ecology

2. Planet overheating

One of the most important parameters that affect the temperature of the planet is the rising tendency in the accumulation of carbon dioxide (CO₂)¹⁴. The relation between changes in the accumulation of CO₂ and the changes in the temperature, keeping in mind that humidity and CO₂ are the most important absorbers of the ground emissions, resulted in many research centers to share the same opinions.

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¹³ [Sax-Mak, 1998] H. Sahsamanoğly – T. Makrogiannis, Professors Aristotle University of Thessaloniki: “General Meteorology, pp. 18-27, 1998

¹⁴ [Sax – Mpl 98] H. Sahsamanoğly-A. Mploytos, Professors Aristotle University of Thessaloniki: “Climatology”, pp. 217-242, 1998

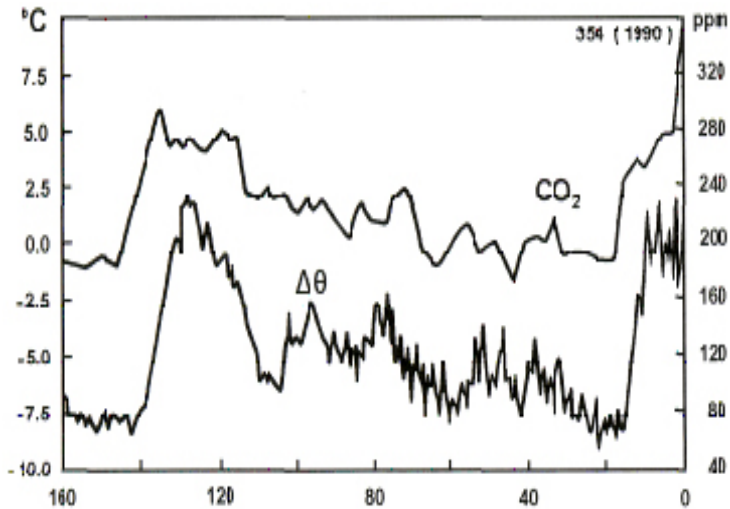


FIGURE 1

The increase in the concentration of carbon dioxide results in the rise in atmosphere temperature and thus the fall in the quantity of earth's transmission that is lost in space (on an absorption margin between 13 μm and 17 μm). On the same spectral margin, the influence of humidity is equally important, despite the fact that its quantity is inversely proportional to the height¹⁵. A characteristic experiment clearly depicting this indirect connection is Plass's experiment. On a technically controlled atmospherical space, with conditions that resemble the ones on the lower layers of troposphere, doubling the concentration of carbon dioxide, causes, due to greater absorption of solar radiation, an increase of 2.5 °C. When CO₂ concentration was decreased to half, the temperature was decreased by 2.7 °C. Figure 5 depicts the tendency in the annual concentration of CO₂ in the atmosphere as well as the divergence in the according temperature as opposed to the current one for a time period of 160,000 years. A concurrent study presented in Science magazine states that the sea level is raising on a double rate as opposed to the one depicted on the previous centuries. From the 1999 that the Epica program is under way, a drilling of 3,270 m was done in the area of Dome C that can be considered as a travel back to time of 900,000 years. Air that was trapped there during the ice age, offers very important details regarding the atmosphere at the time. "We found that CO₂ concentration is 30% higher today, while CH₄ concentration is 130% higher. Also the increase rates are impressive: for CO₂ it is 200 times greater than the ones of the last 650,000 years¹⁶. A raise in the quantity of glacier is possible only when the atmosphere is cold enough. During such conditions, the oceans loose substantial quantity of water that forms sea glaciers. The concentration of carbon salts in the sea water raises, and the balance between oceans and atmosphere, with regards to CO₂ concentration is overruled. As hundreds or thousands of years pass, the surplus

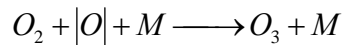
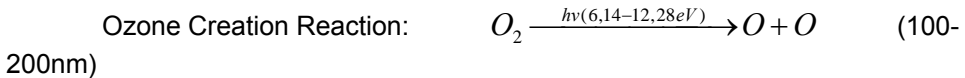
¹⁵ [BlaR 05 A] Black Richard (BBC): "The water vapours causing the heat in Europe", Magazine Anemologia-The European Wind Energy Association, t. 34 pp12, 2005

¹⁶ [BlaR 05 B] Black Richard (BBC): "The concentration CO₂ higher last 650000 years", Magazine Anemologia-The European Wind Energy Association, t. 34 pp 35, 2005

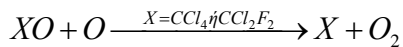
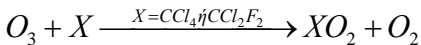
quantity of carbon salts is expelled, and is finally decomposed to produce CO₂, resulting in a new balance.



As it is obvious, a raise in the concentration of carbon dioxide, results in a raise in the atmosphere's temperature, with a further decrease in the quantity of earth glacier due to melt, and as a result an increase in the quantity of water in the oceans. This constitutes a problem for cities that are built along coastlines, as e.g. all capital cities in Crete. The balance of CO₂ transfer between the oceans and the atmosphere is overruled thus leading to a new glacier "rise and fall" cycle. The interesting point stressed out is that if all the estimated underground fuel is consumed (oil- hydrocarbons), in the next half a century, then the concentration of CO₂ in the atmosphere will raise about 10 times the current one, leading to an increase of 7-12 °C. The results of such a phenomenon are known. The ice on the poles would melt, coastline cities or towns would be flooded, and a number of species around the equatorial area would be extinct. However, other phenomena of greater importance would be caused. The layer of maximum ozone (O₃) would lower about 20 km, resulting again in a raise in the overall temperature of the lower layers of troposphere at about 2 °C. Consequently, due to the raise in temperature, the humidity levels would raise, with all the known consequences for earth.



Ozone Destruction reactions:



In such phenomena solar activity is very important, resulting in a number of researchers studying it, since it is directly related to phenomena as annual rainfall rates, electromagnetic storms, atmosphere temperature and water evaporation rates, and consequently the annual quantity of humidity in the atmosphere. An older research introduced by Dundee University (Scotland), under the supervision of Prof. Apostolos Karteris, and the Aristotle University of Thessaloniki, under the supervision of Prof. Andreas Katsampas, proved that the constant decrease of the ozone layer results in a double increase in the quantity of ultraviolet radiation that reaches the ground. The publication of the sensitivity maps, of different ecosystems should be carefully considered, as it depicts Crete (Southern Greece's district) as one of the areas with the higher risk ratio¹⁷. The measurements of ultra-violet radiation UV-B showed that it is getting higher on southern districts.

¹⁷ [GeorT 05] Georgiopolou Tania: "Dry spell...in the management of water", newspaper Kathimerini, pp.3, 4-11-05

| | Athens | Herakleion | Rhodes | Thessaloniki |
|-----|--------|------------|--------|--------------|
| Jan | 4.12' | 3.48' | 4.24' | 3.06' |
| Feb | 4.48' | 4.18' | 5.12' | 3.30' |
| Mar | 5.54' | 5.42' | 6.36' | 4.48' |
| Apr | 7.42' | 7.36' | 8.00' | 6.48' |
| May | 9.24' | 9.42' | 10.00' | 8.06' |
| Jun | 11.12' | 11.42' | 11.42' | 9.54' |
| Jul | 11.42' | 12.00' | 12.06' | 10.30' |
| Aug | 11.00' | 11.12' | 11.30' | 9.30' |
| Sep | 9.12' | 9.24' | 10.06' | 7.42' |
| Oct | 6.42' | 6.24' | 7.48' | 5.18' |
| Nov | 5.06' | 5.00' | 5.54' | 3.54' |
| Dec | 3.54' | 3.54' | 4.30' | 3.18' |

Sunshine – Average sunshine per day (in hours) – Table 1¹⁸

The observations resulting from table 1 are very important, as it is shown that Crete depicts higher average sunshine rates (along with Rhodes) in Greece. Skin cancer, early ageing and serious scalds are just some of the most direct consequences human have to face, regardless of being tourists or natives. According to a report issued by the World Wide Fund For Nature (WWF), it is predicted that on a time horizon of 80-100 years, the rise in the planet's temperature would exceed 4 °C and can affect more cities with higher sunshine rates as Crete.

| | Sunshine In hours h | T (average) Air °C | Ta max °C | Snowy days | Misty days | Stormy days |
|-------------------|------------------------|-----------------------|-----------|---------------|---------------|----------------|
| HERAKLEION | | | | | | |
| Month | | | | | | |
| 1 | 108,8 | 12,2 | 24,8 | 0,4 | 0 | 3,4 |
| 2 | 128,4 | 12,5 | 29,2 | 0,5 | 0 | 2,7 |
| 3 | 170,3 | 13,8 | 34,8 | 0 | 0,2 | 2,9 |
| 4 | 234,5 | 16,8 | 36 | 0 | 0,2 | 2 |
| 5 | 314,3 | 20,8 | 39 | 0 | 0,1 | 1,5 |
| 6 | 353,3 | 24,4 | 45,7 | 0 | 0,1 | 0,8 |
| 7 | 384,7 | 26,4 | 41 | 0 | 0 | 0,2 |

¹⁸ [KeKK 98] Keki K.: "Defenseless the tourist the summertime", newspaper Kathimerini, pp.18, 19-07-98.

ΤΟΥΡΙΣΤΙΚΑ ΘΕΜΑΤΑ

| | | | | | | |
|-----------|-------|------|------|-----|-----|-----|
| 8 | 356,7 | 26,3 | 40,7 | 0 | 0 | 0,1 |
| 9 | 285,2 | 23,7 | 38,5 | 0 | 0 | 1 |
| 10 | 197,2 | 20,3 | 36,2 | 0 | 0 | 3,7 |
| 11 | 161,5 | 17,1 | 31,9 | 0 | 0 | 3,4 |
| 12 | 121,1 | 13,9 | 26,7 | 0,1 | 0 | 4,1 |
| RETHYMNON | | | | | | |
| Month | | | | | | |
| 1 | 110,8 | 24,9 | 0,8 | 0 | 0 | 2,3 |
| 2 | 132,2 | 25,4 | 2 | 0 | 0 | 1,5 |
| 3 | 157 | 28,5 | 3 | 0 | 0 | 1,4 |
| 4 | 218 | 33,2 | 5,4 | 0 | 0 | 1 |
| 5 | 309 | 37 | 9,6 | 0 | 0 | 0,4 |
| 6 | 335 | 37,5 | 13,6 | 0 | 0 | 0,4 |
| 7 | 373,1 | 41,4 | 15 | 0 | 0 | 0,1 |
| 8 | 350,2 | 39,3 | 16,4 | 0 | 0 | 0 |
| 9 | 263,7 | 38 | 13,6 | 0 | 0 | 0,7 |
| 10 | 166,1 | 35 | 8,8 | 0 | 0 | 3 |
| 11 | 165,8 | 30,5 | 6,9 | 0 | 0 | 1,6 |
| 12 | 112,9 | 28 | 2,4 | 0 | 0 | 2,4 |
| CHANIA | | | | | | |
| month | | | | | | |
| 1 | 111,7 | 11,6 | 25,6 | 0,2 | 0 | 2,5 |
| 2 | 128,9 | 11,8 | 29,4 | 0,2 | 0 | 1,9 |
| 3 | 174,4 | 13,2 | 34 | 0,2 | 0,2 | 1,9 |
| 4 | 228,5 | 16,3 | 35,8 | 0 | 0,3 | 0,4 |
| 5 | 314,2 | 20,1 | 38,6 | 0 | 0,2 | 1 |
| 6 | 357,8 | 24,5 | 40 | 0 | 0 | 0,3 |
| 7 | 391,7 | 26,5 | 42,5 | 0 | 0 | 0,1 |
| 8 | 368,4 | 26,1 | 41,2 | 0 | 0 | 0,1 |
| 9 | 276,3 | 23,3 | 39,6 | 0 | 0 | 0,6 |
| 10 | 183,8 | 19,4 | 35,6 | 0 | 0,1 | 2,5 |
| 11 | 157,7 | 16,1 | 35 | 0 | 0,1 | 2,1 |
| 12 | 115,4 | 13,1 | 28,8 | 0 | 0 | 2,3 |

| SITEIA | | | | | | |
|--------|-------|------|------|-----|-----|-----|
| month | | | | | | |
| 1 | 112,6 | 12,2 | 23,8 | 0,4 | 0 | 2,7 |
| 2 | 129,2 | 12,3 | 26,6 | 0,3 | 0 | 2,6 |
| 3 | 182,5 | 13,6 | 27,6 | 0,1 | 0,2 | 2,1 |
| 4 | 229,2 | 16,6 | 36 | 0 | 0,1 | 1,1 |
| 5 | 309,3 | 20,3 | 35,8 | 0 | 0,1 | 0,8 |
| 6 | 348,8 | 24,3 | 39,2 | 0 | 0 | 0,7 |
| 7 | 378,3 | 25,9 | 40,6 | 0 | 0 | 0,1 |
| 8 | 348,4 | 25,7 | 39,6 | 0 | 0 | 0,1 |
| 9 | 282,6 | 23,5 | 36,4 | 0 | 0 | 0,5 |
| 10 | 200,3 | 20,2 | 36 | 0 | 0 | 3,1 |
| 11 | 166,1 | 16,7 | 32,2 | 0 | 0 | 2,7 |
| 12 | 118,7 | 13,8 | 27,1 | 0,1 | 0 | 3,3 |

Table of basic meteorological data (HNMS/2005)-Table 2

This implies that on the Crete level, the areas of the northern axis, in which the tourist infrastructure is built just meters from the coast, would result in being flooded in the years to come. A further study of table 2 (Hellenic National Meteorological Service) and the calculation of average numbers forms a very clarified “image” for Crete, even though the statistical faults may be high (due to the fact that the results came from a limited number of terrestrial meteorological stations).

It is very characteristic for the area that the annual averages for snow, mist and storm are minimal or zero, constituting the area as one of the sunniest ones in Aegean Sea. This intensifies the study of Dundee University for the danger imposed by the extended exposure to sun.

The first consequences of the rising tendency of the annual temperature rate measured lately will initially become visible to the coastline tourist infrastructure. A lot of areas will sink under the level of the sea or will become susceptible to floods, and this is something that should be carefully considered, as the perspective of tourist growth in Crete is high. The studies for the creation of a commercial port in the southern part of Crete, which undoubtedly would promote the local society and assist in the tourist publicity of the island, should also consider these facts, so as to avoid building a port that is highly dependent on weather-climatic changes of the future.

| Average Numbers for Crete | | | | | | |
|---------------------------|-----------------------------|--------------------------|-------------------|---------------|---------------|----------------|
| | Sunshine in hours (h) | T air (average) °C | Tair max °C | Snowy days | Misty days | Stormy days |
| Month | | | | | | |
| 1 | 111,0 | 15,2 | 18,8 | 0,3 | 0,0 | 2,7 |
| 2 | 129,7 | 15,5 | 21,8 | 0,3 | 0,0 | 2,2 |
| 3 | 171,1 | 17,3 | 24,9 | 0,1 | 0,2 | 2,1 |
| 4 | 227,6 | 20,7 | 28,3 | 0,0 | 0,2 | 1,1 |
| 5 | 311,7 | 24,6 | 30,8 | 0,0 | 0,1 | 0,9 |
| 6 | 348,7 | 27,7 | 34,6 | 0,0 | 0,0 | 0,6 |
| 7 | 382,0 | 30,1 | 34,8 | 0,0 | 0,0 | 0,1 |
| 8 | 355,9 | 29,4 | 34,5 | 0,0 | 0,0 | 0,1 |
| 9 | 277,0 | 27,1 | 32,0 | 0,0 | 0,0 | 0,7 |
| 10 | 186,9 | 23,7 | 29,2 | 0,0 | 0,0 | 3,1 |
| 11 | 162,8 | 20,1 | 26,5 | 0,0 | 0,0 | 2,5 |
| 12 | 117,0 | 17,2 | 21,3 | 0,1 | 0,0 | 3,0 |

HNMS/2005

Studies for the development of winter tourism, with the creation of a skiing centre on Mount Psiloreitis, should also consider the climatic changes currently ongoing on the planet, as well as phenomena analogous to that of the Alps that faces serious problems resulting from the rise in global temperature. On the 18th August 2003, the closing of Mont Blanc was announced, for the first time after 1786 when the humans first conquered its top. The overheating transmuted the highest top of Europe, in a dangerous place for mountaineering. The conditions were so extreme, according to ice and climatic changes specialists, and the subsidence of ice so intense that its former form – and with it the billions of the tourist industry- would never recover to its ordinary state. “The extreme weather conditions for the area (it has not snowed from the beginning of February) result in the following danger: the pylons of the ski elevators are now very dangerous for human life, if they are to be used next year”¹⁹.

Dr. Jonathan Baber, lecturer of the University of Bristol on ice subjects, holds the opinion that the destruction of the Alpine environment may be irreversible. “People are not prepared to consider seriously planet overheating, and only start worrying and pressing when their lifestyle and home is threatened. What happened in Alps this year was the result of a series of very warm years and acts as a notice for according phenomena elsewhere. This is an alert and a

¹⁹ [EdwD 03] DAVID EDWARDS “PLANET OVERHEATING” Z MAGAZINE 23/9/2003

potential normal winter would not get things back to proper.” Last year, the National Science Academy of USA warned for disastrous and sudden climatic changes in the following 10 years. The Prime Minister of Great Britain at the time, after studying this report wrote: “We do not have either time or alternative solutions. If we don’t take measures soon in order to minimize the consequences, we are under the danger of converting this planet, our home, to an uninhabitable place”.²⁰

While the media are referring to these disasters in this way, some serious efforts are made to identify the motivation behind those opposing environmental actions. The refusal for reaction on the environmental changes is presented as a normal human posture or is ascribed fatalistically in “America” or “China”. However, those obstructing environmental measures are easily identified.

In the middle of the 19th century, along with commercial industry development and the technology in general, another phenomenon occurred: the greenhouse effect. At the time, the phenomenon was present only in the areas around the poles. This, however, is not the case today. Ozone layer hole, during the summer, is present even in areas near the Equator, while the greenhouse effect is the daily subject on the United Nations and the large ecological organizations.

3. Volcanic – Seismic activity in Greece-Crete

It would be an omission, if we did not refer and relate climatic changes to the volcanic-seismic activity in Greece. We do not try to equal, however, Greece with the Southeast Asia or the western parts of the Central and North America.

Even if the causes of an earthquake are not known today, seismology, geophysics and geotectonic science can provide information that may be helpful to predict an earthquake. Climatic conditions in an area are one of these factors and it is considered as very hard to study and analyze, as it depicts a number of side parameters.

Greece is a seismic country and we have to take the responsibility of securing both the native population and the thousands of tourists that visit us every year. The consequences of an earthquake, apart from any damages caused to infrastructure, may have social, economical and political side effects.

The most important neotectonic characteristics of the Aegean Sea are depicted on figure 6, as the major active breaches, the borders of the Eurasian and African plates as well as the volcanic bow of the Aegean Sea. As it is obvious the Greek subsoil is not very stable.

The earthquake of Kythira – Chania (8-1-06) is a recent example that worried both the scientific community and the Greek population in general. Crete again became the area of interest and the phenomenon became known worldwide. In a few months the summer tourist season will begin and such events obstruct the raise of tourist flow percentages, since security and human integrity is the major subject of all the tourist areas. It is, therefore, imperative to create a department of Geology in the University of Crete, as well as to extend

²⁰ [GU 02] Statement of Minister of Environment of England (newspaper Guardian, 16-5-02)



FIGURE 6²¹

the Seismologic Laboratory of the Technological Educational Institute of Crete. Due to the fact that this notion is shared by a number of members of the scientific community, the Ministry of Education should seriously consider these voices and proceed with the institution of a Geology Department (Seismology-oriented) and a corresponding laboratory in the University of Crete, as well as the further development of the Laboratory of Geophysics and Seismology of the Natural Resources and Environment Department of TEI Crete, with the ultimate goal of including the latter to the national network of laboratories, in order to assist and fulfill the needs stemming from such events.

4. The orientation of Crete in the tourist map of Greece

It is beyond doubt in the scientific community of geologists that climatic conditions constitute one of the two major factors in the configuration of the earth bas-relief. Outer processes, as they are called, as rock-weathering (decomposition of rocks in their current location) is the most important reason for that. The geophysical and geodynamical location of Crete is such that all the factors affecting the bas-relief of a landscape as climate, atmospherical processes and water flow contribute equally. The branch of Climatic Geomorphology, that is rapidly evolving nowadays, has studied and reached important research results for morphologies analogous to Crete's. Unfortunately, these conclusions are common to the ones produced by research of other scientific studies. Human intervention to nature, regardless of its actual effects, has diminished the environment and accelerated the deformation process of the environment's natural beauty.

²¹ [PapazB 97] Papazachos B. Professor Aristotle University of Thessaloniki: "Introduction in the Seismology, pp. 189-194,1997

Crete's location in the global scientific map is strategic. The universities, technological and scientific centers located there constitute it as very important from a scientific aspect. This scientific development on the island over a period of 10 years, should become an attraction pole, both for the scientific tourism (scientific conferences) and for the highly-regarded qualitative tourism.

5. Modern tourism and Crete

Tourism is a phenomenon of the post-war societies. It represents the need of the modern human to rest and revive his psychological and body strength, to entertain, to change location and to escape routine in search for new and different things. Tourism as a modern financial and social phenomenon depicts nowadays a massive character. The factors that have contributed in its rapid development were the rise in income and spare time on the developed countries, the development in transportation, and the organization of mass – and therefore- cheap tourism. It stands for one of the basic financial activities, nowadays, for Greece, with great evolutionary perspectives²². For many years, European countries, and more specifically the Mediterranean ones, were the centre of the global tourism. The percentages are representative in this case: tourist activities stand for 12% of the GNP and 6% of the jobs. These percentages are about to change if we consider the entrance of new Members in the EU. However, tourism figures do not only rise, but also transmute.

| Arrival of foreign tourists July 2005 | | | |
|---------------------------------------|-----------|-----------|------------|
| Airport | 2004 | 2005 | % 05/04 |
| Athens* (1) | 463.197 | 528.045 | 14 |
| Zakynthos | 101.568 | 102.278 | 0,7 |
| Herakleion | 342.275 | 389.044 | 13,7 |
| Thessaloniki* | 175.482 | 179.838 | 2,5 |
| Corfu | 181.678 | 191.743 | 5,5 |
| Kefalonia | 30.603 | 29.618 | -3,2 |
| Cos | 132.019 | 131.747 | -0,2 |
| Mytilini | 16.250 | 14.624 | -10 |
| Rhodes | 223.493 | 253.375 | 13,4 |
| Chania | 108.042 | 112.788 | 4,4 |
| Chios | 3.244 | 2.607 | -19,6 |
| Total | 1.777.851 | 1.935.707 | 8,9 |

* Total abroad flights.

(1) For Athens, an assumption that the rise for July would be around 14% was made.

Table 4

²² [ITRF 05 C] "Greek Economy and Tourism", (announcement) Institute of tourist researches and forecasts (I.T.R.F.), n.19-May05, 19-5-05

Despite the fact that mass tourism remains the major tourism form, regardless of being domestic or abroad, other forms arise to intensify the aspect of the relation of tourism to the environment. Nowadays, 60% of all the tourist activities relate to the environment, while 40% relate to the urban and cultural characteristics of each destination. With the exception of Athens we present the arrival tables for months January-July and just July for 2005²³, where we can see that the major destinations are the ones depicting extensive natural wealth.

| Arrival of foreign tourist for months January-July 2005 | | | |
|---|-----------|-----------|---------|
| Airport | 2004 | 2005 | % 05/04 |
| Athens* (1) | 2.372.914 | 2.681.747 | 13 |
| Zakynthos | 263.773 | 247.000 | -6,4 |
| Herakleion | 966.149 | 993.563 | 2,8 |
| Thessaloniki* | 619.129 | 628.268 | 1,5 |
| Corfu | 452.460 | 457.112 | 1 |
| Kefalonia | 85.388 | 79.806 | -6,5 |
| Cos | 329.981 | 318.624 | -3,4 |
| Mytilini | 41.039 | 39.031 | -4,9 |
| Rhodes | 615.568 | 629.231 | 2,2 |
| Chania | 293.781 | 306.951 | 4,5 |
| Chios | 9.341 | 7.909 | -15,3 |
| Total | 6.049.523 | 6.389.242 | 5,6 |

* Total abroad flights.

(1) For Athens, an assumption that the rise for July would be around 14% was made.

Table 5

5.1 Qualitative Tourism

Tourist products today are extensively affected by environmental quality. The opposite as a result is faced daily, that is tourist destinations that were the first choices of tourists, are nowadays facing survival difficulties due to problems in the environment and their consequences on the climate. Self-destruction problems are intense both in Greece and consequently in Crete as well as in other Mediterranean countries.

During these last years a gradual diversion of the tourist preferences to more specific and independent forms is observed – and consequently to the tourist offer, adapted mainly to the special interests of each tourist for the landscape, sightseeing, cultural activities, intense action, alternative lifestyles

²³ [ITRF0-05 B] “Recent tendencies and estimates”, (announcement) Bulletin board Institute of tourist researches and forecasts (I.T.R.F.), 26-9-05.

etc. Holidays are therefore not considered just visiting the beach. These changes are also observed in the frequency and duration of holidays, which are directly connected to the psychological needs and motivation of modern people. The new tendencies and special requirements on the tourist needs, define the level of quality in the offered tourist product. Part of this quality is the environment. Tourism is gradually re-oriented to quality²⁴, and the natural and cultural inheritance of the area and on this Crete should be fortified. Tourist and the environment according to the modern perceptions are directly and closely connected and it is of vital importance to assure the compatibility between them. This compatibility should be based to a great extent on the law of "fruitfulness". Thus, Crete, in order to remain competitive and to sustain satisfactory development rates, should protect fully its variety and quality of natural resources. The confrontation of environmental problems related to tourism, should be based on the consciousness that the protection of the quality of the environment is conditional to the development and continuation of tourist activity, through a more extensive framework of viable tourist development. Without implying the environmental problems caused by tourism were the main reason, Crete became the centre of conversation in the EU, but also the reason for a fine of million Euros imposed on Greece, for illegal rubbish dump in the area of Kouroypitos, Chania and other sources of pollution spread across in the island²⁵. Tourism and the environment are the most important link in the chain of the financial life of Crete. If the aforementioned in relation to the fact that the tourist's requirements and the tourist product evolve, in relation to the fact that there is consideration about the socio-economic and environmental consequences of mass tourism, and the search for the golden mean between the requirements of economy, society and the environment, has new alternative forms of tourism: Naturalist²⁶, Mountain, Cultural, Adventure, Agricultural, Health and Natural Life, Sport, Curative, Educational, Scientific and others. Crete in most of these forms can react successfully as it depicts the required "natural infrastructure". It would, therefore, be an omission from our side, if we did not mention a small are of Greece and more specifically Crete that satisfies all these conditions for the development of all the tourist forms we have mentioned. It is the area of Mount Psiloreitis is the borders of Herakleion and Rethymnon prefectures (figure 7). In the figure, five points are depicted (A, B, C, D and E) that mark out an area of 1000m – 2453m.

In the areas B and C the infrastructure is on a very primitive stage, with the exception of Krousona and Anogia. We have, however, to point out that all the involved conveyors related to concessions should be careful, so as to avoid possible environmental damage in the area. The visitor expects to find peace and relaxation in the forest and in general a complete satisfaction from the landscape. In order to accomplish that, a number of great intervention techniques of irregular building are made, while a lot of chemical means are used. The organizations of environmental protection are opposing the use of

²⁴ [UnivA 05] Eduard Interwies, Ecologic, 'Ground and water', University Athens (Agronomics)-wwf gr, Athens 3-11-05

²⁵ [BoutM 04C] Voutirakis M., Physics Ecologist, Chairman of Association of <Promotion of Renewable Energy Sources (R.E.S). in Crete: "Red card in Crete for the management of litter", newspaper Mesogios, 5-5-05

²⁶ [NikR 02] Nikki Rose: 'Environmental Tourism in Crete', Magazine Stigmes, t.62 March-April 2002

hazardous chemical substances. The tourists' desire for parking space, resting places, and food locations affect negatively the environment. Apart from that, a possible impact of interests may occur when the land or the mountain landscape are connected to tourism. On the first hand, there is purity conservation, peace, and landscape neutrality, while on the other hand, the tourists demand every possible building infrastructure, lodging capacities, an interesting programme for their free time and winter infrastructure. As a result, the tourist industry cares for fulfilling the tourists' demands, in order to have a positive income flow, while neglects the preservation of the environment.

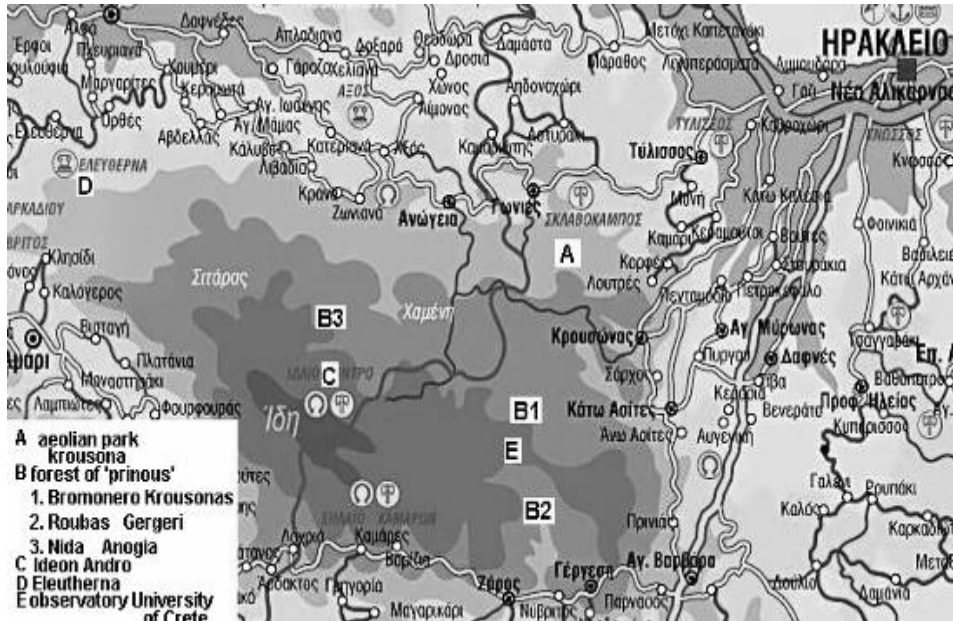


FIGURE 7

It has been proven that, especially winter tourism is harmful for the environment, as in extreme cases it can lead to disastrous consequences, as the destruction of a forest or landslides. In order for future generations to survive, the forest, as the only oxygen supplier, to be protected so as to continue to exist. If it is destroyed, after our actions, we should at least try to replace it with the implantation of a new one, which is a very difficult task²⁷.

The restoration of the balance between the deranged relations of tourism and the environment, can be achieved through a productive development²⁸, whose principles have been defined and specialized with an action plan manuscript, titled as "Agenda 21 for the travel and tourist industry – Towards an environmental viable development", that was formed and co-signed in 1996 by the World Tourism Organization (WTO) and the Earth Council (EC).

²⁷ [KarS] Dr. KARAYANNIS STEFANOS

²⁸ [LogM 01 A] Logothetis Mlt (Director of Institute Tourist and hotel Researches): 'land-planningtourism', 13st Congress of pan- Hellenic Network of Ecological Organisations, Rhodes, Oct-2001.

This important manuscript is targeted on the travel and tourist enterprises, governments, national tourism organizations and in the travel and tourist public, to state the message that the travel and tourist industry has an utmost interest in the protection of the natural and cultural resources, as they constitute the background of their enterprises, and to propose the appropriate measures on that direction²⁹.

5.2 Crete in danger

The northern axis of Crete has undoubtedly presented intense problems, resulting from the over-population of human activities in the coastline areas and over-population. This intense urbanization of the cities and the intensity of activities in major urban areas, has resulted in an increase in the energy requirements in all sectors, as industry, transportation and house-commerce or tertiary sectors³⁰. As a result an over-consumption of natural resources, environmental degradation, a decrease in the eco-variety, a loss in the available living space, and coastline deterioration has been observed. It is therefore vital to analyze terms as "Burden" and "Resistance". The results of an international seminar held in Vienna on 1984 with the subject of: "Burden and Resistance of tourist areas" act as a catalyst. Every unpleasant outcome of human interaction with the environment is defined as "Burden", regardless if "Resistance" is the standard according to which a change in the environmental conditions is possible. "Resistance", synonym for dexterity, as the conception of acceptance capability, etc, is every time period in which the "Burdens" are tolerable³¹.

Prof. Bernecker (Professor in the Institute of Tourist Research of the Vienna University) presented a comprehensive report to the understanding of "Resistance" (he used term "Capacity") of the tourist and the relaxation areas. The total capacity, namely the mountain are capacity, is constituted of 5 parts: natural capacity, reception capacity, ecologic capacity, socio-psychological capacity, and environmental or effective capacity³².

Natural capacity is defined as the offered earth and aquatic world. It sets the limits, in which tourism is developed and its appropriation as relaxation sector.

Reception capacity is defined as the frequency of visitors' movement that affects the economic production very little.

The socio-psychological capacity represents the resistance of an area, with regards to the relations of the native population with the tourists³³.

The so-called environmental or effective capacity includes all these parameters that cause a decrease in use.

Ecological capacity is formed by all these capacity elements, of every size, whose limits extend beyond the other forms of capacity, and cause a special problem in identification. This size is according to Prof. Bernecker every

²⁹ [LogM 01 B] Logothetis Mlt. (Director of Institute Tourist and hotel Researches) 'Right of tourist Industry-section Tourism and natural environment', ed. Sakoula, Athens 2001

³⁰ [BoutM 04 B] Voutirakis M., Physics Ecologist, Chairman of Association of Promotion of Renewable Energy Sources (R.E.S). in Crete: "The Anarchy growth and the overexploitation of natural resources threatens with destruction the environment and the person", newspaper Mesogios, 4-9-04.

³¹ [KarS]

³² [KarS]

³³ [KarS]

resistance of the natural environment and landscape "...that allows a tourist use, without causing damage to the ground, animals or plantations...". This limitation in very few natural landscapes and elements does not suffice for the ecosystem resistance. On the contrary, each parameter that is elemental to the natural environment and its protection should be included in ecological capacity³⁴. Due to numerous causes, it is very difficult at present to verify these limits. However, we can relate capacity to the definition and size provided by Physics. The comparison is remarkable. It seems that there is a direct relation to the capacity in the forms we described and the capacity as it is defined by the laws of Physics for a system of accumulating loads. The system consists of an arrangement of capacitors. The amazing remark is the fact that the law defining the relation between capacity C, the load that we store in the capacitors Q and the dynamics of space ΔV is represented by the following formula:

$$C = \frac{Q}{\Delta V}$$

In a tourist area, undoubtedly, a major role in its development is played by both his population superiority as opposed to other areas, and the potential of this population. By population we refer to the people that deal with the tourist enterprises or deal with tourist activities in general. With a stable (human or not) potential material of a tourist activity, the capacity of an area is analogous to the population's raise. The greater the population that is gathering on an area with stable potential, the greater the spatial capacity is. The most important conclusion is stemming from the fact that the denominator depicts the differential potential and not just the potential. This implies that there should be homogeneity in the potential of a tourist area (minimum ΔV) so as to acquire an analogous raise in its capacity. From the depicted equation we can acquire results for two different areas with regards to their capacity by calculating the difference of potential, and given that these areas preserve equal numbers with regards to their population.

As we can observe from the formula the ratio of load to the potential of an area can be kept stable. It is important to keep a stable capacity as it leads to a smoother intervention to the environment. An increase in the population of a tourist area does not necessarily imply a negative effect on the environment, unless there is an analogous rise in the potential of these people, on all sectors as the environmental sensitivity, so as to keep a stable area capacity.

We will present another example that fortifies this viewpoint for the minimization of the spatial potential, in order to raise the capacity with a simultaneous reference to the transfer manner. According to the Zero Law of Thermodynamics "the transition of an open system from high dynamic energy conditions to low dynamic energy conditions without the consummation of energy is spontaneous". We can observe such examples daily in our lives. Rivers, for example, flow from high energy areas (due to height), to low energy areas (sea level).

It is important to stress out that terms "dynamic energy" W and potential is not the same, but they have a proportional relation (q: stable)

$$W = q * \Delta V$$

³⁴ [KarS]

What should be made clear, however, are the destructive effects caused by a large-scale transition from areas with a high potential difference. It resembles an impetuous river that follows the shortest path when flowing down a mountain; that is the straight line. We, therefore, observe that the flattening of an area that depicts a great difference in its tourist dynamics requires action that should take place in an attempt to result in a balanced development of an area, and also its effects to be in such an extent that nature could absorb them.

6. Tourism and Ecology

When Ecology emerged as new form of science in 1869, nobody would believe it that in 2006 would be considered as one of the most popular alternative scientific forms³⁵, and so relevant to tourism.

The main goal of global ecology is to preserve the nature, to help and to promote the real alternative development through the preservation of natural sources³⁶, tough nowadays tourist industry can not follow this necessity.

The development of this relationship of Human and Nature, would be impossible to occur if human beings through the pass of time effected to nature more and more devastatingly. On the other hand, this developmental and historical course presupposes various ameliorative interventions of the human being in the nature³⁷, and it is necessary to those who are relative to tourism to be more than careful to this sensitive section.

The population should be considered to be included in the natural environment where the components of natural environment and the interactions are appeared³⁸, with the difference that the tourist activity must deal with the environment as to be in the centre of the interest not only in present time but in the future as well

Conclusions

Tourism development, as in any other financial activity is not an end in itself³⁹. The main target is by its development to assist the financial and social evolution of the target area by enhancing both the income and the living conditions of the population (short-term goals), and the general perspectives of spatial evolution.

our interest should not be centered on definite sizes as the arrivals and stays of tourists in an attempt to increase these figures, but on the quantitative and qualitative consequences, positive or negative, that are caused by the increase in the tourist flow and on the appreciation of the final result, not only for the current time period, but for the future to come.

³⁵ [KourSak] Kourouzidis Sakis, Reading Ecology, Ecological Bibliography, Publication «ΟΙΚΟ», Athens 1993, p.p.15

³⁶ [PiMo] Pirosvesti Mirto, Protection of the Nature, Ecology Section, Thessaloniki, 1990-1991, p.p.39

³⁷ [RoDi] Rokos Dimitris Sciences and Environment in the end of century, Problems and prospects, alternative publication/ecological thought 9, 1994, p.p. 5

³⁸ [DIAMI] Diamantopoulos I, Applied Ecology, Ecology Section, Publication Aristoteleio Panepistimio, Thessaloniki, 12-1989, p.p. 68

³⁹ [Spiil 95] Splanis I. (Professor University of the Aegean): "Tourism and environment in the islander regions", Conference: Commercial Chamber Heraklion, 17/19-3-1995

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ΠΡΟΦΙΛ ΤΟΥ ΣΩΜΑΤΕΙΟΥ

Το **ΔΡ.Α.Τ.Τ.Ε.** (Δράση για την Ανάπτυξη του Τουρισμού και της Τουριστικής Εκπαίδευσης) είναι ένα **μη κερδοσκοπικό Σωματείο** με έδρα την Αθήνα. Δημιουργήθηκε από στελέχη τουριστικών επιχειρήσεων και καθηγητές της τριτοβάθμιας τουριστικής εκπαίδευσης με τους παρακάτω αναφερόμενους σκοπούς:

- Ανάλυση δραστηριοτήτων με στόχο τη βελτίωση της τουριστικής και ξενοδοχειακής εκπαίδευσης σε όλα τα επίπεδα στην Ελλάδα.
- Ανάλυση δραστηριοτήτων για την ανάπτυξη του τουρισμού στην Ελλάδα.
- Ανάλυση δραστηριοτήτων για την ανάπτυξη ειδικών μορφών τουρισμού.
- Ανάλυση δραστηριοτήτων με στόχο την εφαρμογή επιστημονικής διοίκησης στις ξενοδοχειακές και τουριστικές επιχειρήσεις.
- Διενέργεια ερευνών, μελετών και δημοσιεύσεων για την επιστημονική προσέγγιση του ξενοδοχειακού και του τουριστικού προϊόντος.
- Έκδοση περιοδικών και βιβλίων που αφορούν την επιστημονική ανάλυση του τουριστικού φαινομένου και των λειτουργιών των τουριστικών επιχειρήσεων.
- Οργάνωση μεταπτυχιακών προγραμμάτων στον τουρισμό σε συνεργασία με ιδρύματα του εσωτερικού και εξωτερικού.
- Γνωμοδότηση επί θεμάτων τουρισμού, επιχειρήσεων τουρισμού, ξενοδοχειακής και τουριστικής εκπαίδευσης.
- Ενίσχυση με υποτροφίες της εκπαίδευσης στις επιστήμες του τουρισμού

ΜΕΛΗ

Το ΔΡΑΤΤΕ σήμερα αριθμεί περί τα 700 μέλη.

Τα **τακτικά μέλη** του ΔΡ.Α.Τ.Τ.Ε. είναι απόφοιτοι τουριστικών σχολών τριτοβάθμιας εκπαίδευσης και ταυτόχρονα στελέχη της τουριστικής βιομηχανίας ή εκπαιδευτικοί της τουριστικής εκπαίδευσης ή το κύριο επάγγελμά τους συνδέεται άμεσα με τον τουριστικό κλάδο. Ως συνδρομητές εγγράφονται επίσης **τουριστικοί οργανισμοί και τουριστικές επιχειρήσεις.**

Ως **δόκιμα μέλη** εγγράφονται μετα-λυκειακοί σπουδαστές τουριστικής εκπαίδευσης. Τα δόκιμα μέλη καταβάλουν **συμβολική συνδρομή**, δεν έχουν δικαίωμα ψήφου, αλλά έχουν δικαίωμα να ενημερώνονται και να εξυπηρετούνται από τις δράσεις του σωματείου.

ΙΝΣΤΙΤΟΥΤΑ ΤΟΥ ΔΡΑΤΤΕ

Στα πλαίσια του ΔΡΑΤΤΕ λειτουργεί το **Ινστιτούτο Τουριστικών Μελετών και Ερευνών** (Ι.Τ.Μ.Ε.), που ιδρύθηκε με προορισμό να υπηρετήσει τους επιστημονικούς σκοπούς του Σωματείου. Το Ινστιτούτο διενεργεί έρευνες και μελέτες, επιλαμβάνεται δραστηριοτήτων επιμόρφωσης σε θέματα τουρισμού και τουριστικών επιχειρήσεων, τόσο αυτοδύναμα όσο και σε συνεργασία με ιδρύματα, φορείς και επιχειρήσεις του εσωτερικού ή του εξωτερικού, καθώς επίσης επιμελείται την οργάνωση συνεδρίων και ημερίδων. Το Ι.Τ.Μ.Ε. είναι επίσης αρμόδιο για θέματα υποτροφιών σε όλα τα επίπεδα σπουδών. Τα κριτήρια επιλογής των υποτρόφων τίθενται με απόφαση του Διοικητικού Συμβουλίου του ΔΡ.Α.Τ.Τ.Ε.

Στα πλαίσια του Σωματείου λειτουργεί επίσης το **Ινστιτούτο Αξιολόγησης Ποιότητας Τουριστικών Δραστηριοτήτων** (Ι.Α.Π.Τ.Δ.) το οποίο ειδικεύεται σε Συστήματα Διασφάλισης Ποιότητας των επιχειρήσεων του κλάδου. Το Ι.Α.Π.Τ.Δ. έχει διαμορφώσει ένα πρότυπο εφαρμογής του ISO 9001:2000 που εξειδικεύεται στις ξενοδοχειακές επιχειρήσεις και έχει εκπαιδεύσει σε συνεργασία με την TÜV SÜDDEUCLAND είκοσι έμπειρους διευθυντές ξενοδοχείων στην εφαρμογή του προτύπου αυτού.

ΔΡΑΣΤΗΡΙΟΤΗΤΕΣ

Το ΔΡ.Α.Τ.Τ.Ε. αναπτύσσει πλήθος δραστηριοτήτων για την επίτευξη των σκοπών του. Αναλυτικότερα:

- Λειτουργεί **γραφείο διασύνδεσης** εργοδοτών και υπαλλήλων τουρισμού
- Λειτουργεί **βιβλιοθήκη** τουριστικών βιβλίων και περιοδικών, στην έδρα του Σωματείου
- Υλοποιεί προγράμματα **εκπαίδευσης** των μελών του σε θέματα **λογισμικού τουριστικών επιχειρήσεων** και σε θέματα **καριέρας**
- Διαθέτει ειδικευμένους συμβούλους σε θέματα **μεταπτυχιακών τουριστικών σπουδών**
- Καλύπτει την **εκπαίδευση στις θέσεις εργασίας** απασχολούμενων σε ξενοδοχειακές επιχειρήσεις.
- Οργανώνει και υλοποιεί, αποστολές **συμβουλευτικών ομάδων ξενοδοχειακών επιχειρήσεων**, με στόχο την άμεση βελτίωση της ποιότητας του προϊόντος, των μεθόδων λειτουργίας των τμημάτων, τη μείωση του κόστους και τον προσανατολισμό των πωλήσεων.
- Αναλαμβάνει διενέργεια **ερευνών** και **μελετών** αναφορικά με την ανάπτυξη τουριστικών επιχειρήσεων ή τουριστικών περιοχών.
- Στηρίζει τις τουριστικές επιχειρήσεις σε θέματα **σύγχρονης τεχνολογίας**, όπως η **μηχανοργάνωση** και η **προβολή και προώθηση** μέσω διαδικτύου.

- Λειτουργεί **επιστημονικές ομάδες** οι οποίες ερευνούν την ισχύουσα κατάσταση σε σχέση με την τουριστική εκπαίδευση και την τουριστική πολιτική και συντάσσουν προτάσεις προς τους αρμόδιους φορείς.
- **Λειτουργεί καθημερινά γραφείο ενημέρωσης και υποστήριξης** στην Αθήνα, στην οδό Ζωοδόχου Πηγής 2, ώρες 18:00 έως 20:00.

ΕΠΙΚΟΙΝΩΝΙΑ

Μπορεί κανείς να επισκεφτεί το ΔΡ.Α.Τ.Τ.Ε. στην διεύθυνση **Ζωοδόχου Πηγής 2, Αθήνα 10681** ή να τηλεφωνήσει στον αριθμό **210 3806877** από Δευτέρα έως και Παρασκευή, ώρες 18:00 έως 20:00. Επίσης κάποιος μπορεί να επικοινωνήσει με φαξ στο **210 3806302** ή να επισκεφθεί τις ιστοσελίδες μας στη διεύθυνση **www.dratte.gr** και να αποστείλει e-mail στη διεύθυνση **info@dratte.gr**