

## THOUGHTS CONCERNING URBAN HAZARDS, ELEMENTS OF PERTURBATION FOR TOURISM (I)

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**ABSTRACT.** *Thoughts concerning urban, natural and atrophic hazards, elements of perturbation for tourism.* Tourism has become an important component of human lives. Due to the increase of the everyday living stress, especially in the urbanized areas, the touristic vacations became an item of consumption to which larger and larger segments of population gain access, being spoken even of a “democratization” of tourism. A living antenna of the economic, social and political life, tourism, in general, and international tourism especially, is still vulnerable regarding a series of factors. The urban system, of which tourism is a component part, is vulnerable to exogenous risks that are connected to natural and endogenous factors – of the internal component elements, respectively population and its societal environment ( social + political). Therefore, natural (geo-climatic, geomorphologic and complex), societal, technological and other hazards of different nature, exercise a direct influence upon tourism that is emphasized for each type separately. Also, from the experience of managing hazards, we present a series of measures of protection and prevention.

**Key-words:** urban hazards, clean environment, balance, dysfunction, prevention, control

### 1. General conditions

It is unanimously acknowledged the fact that each human settlement represents a dynamic system, and any damage caused to one of its three great components – the territory or the homeland, the population and the activities, including tourism, affects its balance, it modifies its evolution.

*The territory* as a support of the natural and atrophic touristic objectives, of the transportation and accommodation infrastructure, the *population* which is both a consumer of products of touristic services, and producer of touristic services, as well as the *economy* of the settlement, they interact and are in balance. When one of these three great components suffers alterations, for example after a seismic movement that affects the territory and the population, a strong phenomenon of storms, an economical crisis followed by inflation outbreaks, social protesting movements etc., and the internal balance of the system is being modified. The imbalance that was created can result into a gradual evolution, from a simple

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temporary dysfunction, to more profound imbalances, even to the changing of the hierarchy (of the position) within that specific system that affects the unity of the system and, the last phase, each having a proper dynamics, similar to the “Brownian motion”. Therefore, the urban system of which it belongs and the touristic activity, is a system that is vulnerable to the *exogenous hazards* – of the natural factors and *endogenous* – of the internal component elements, mainly the population and its societal (social and political) environment.

Natural, societal and technological hazards are omnipresent on all meridians, in all the cities, including the ones with a striking touristic function, where we would be tempted to believe that this practice, sometimes for a long term, has ensured them a more careful development within the context of a favorable climate of prosperity, largely due to the inflow of tourists.

*The social urban hazard* was always a societal one, namely in close connection, in a symbiosis even, with politics. The current phase of capitalism, the effects of becoming more flexible and the globalization of the economies, has destructive consequences upon the structures of the society, that are even greater so as the social body is more fragile, the role of coagulant social role of the state is diminished within the context of the liberalization of exchanges induces by the multinational companies. Frequent relocations within the rush after maximum profit, much greater in the cities, induce feelings of insecurity, uncertainty and of social injustice (Ribulon, Frank Chignier, op. cit., p.468). According to Jacques Bonnet (2003, op. cit., p.421) “urban and societal hazards represent the vulnerability of the great cities” where “the concentration of population, even if only temporary, during the touristic season, and of the activities as well “amplify the urban hazards which can be aggravated by the domino effect”.

*Technological hazards* represent a series of accidents (some catastrophic!) and their consequences that seriously disturb the lives and activities of the people, including tourism, of a very different nature, only with a higher incidence of those from transportation and from the industrial activities. As a result of these, a veritable “multidisciplinary culture” has been formed, of approach of the technological hazards, in which the geographers bring their contribution through the evaluation of the potential dangerous industries, an expertise in locating the industrial units, the mapping of the surrounding adjacent area (Bonnet, Jacques, 2003, op. cit., pp.428-429). “An ecological engineering” was born, continues the author, destined for the management of the companies in the surrounding environment, and “the environmental aspect has become a fundamental argument of sale”, a concept that was implemented in practice for the first time in the U.S.A.

## 2. Natural hazards

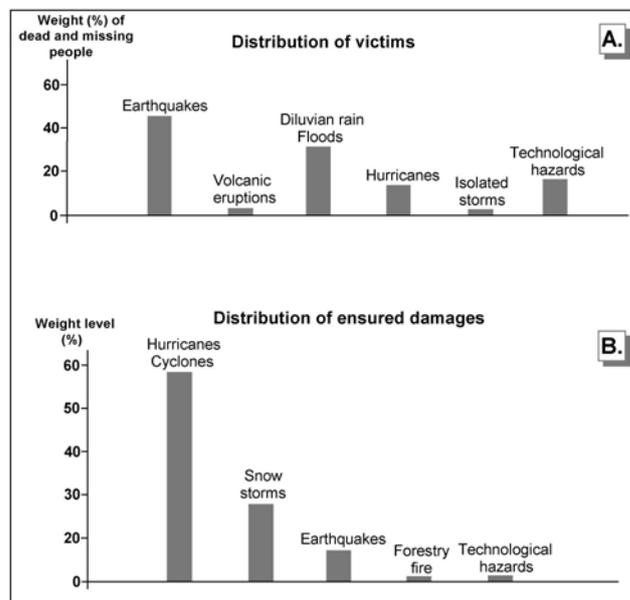
Each human settlement – urban, rural, touristic resort, is located within a natural environment whose resources they exploit and with whom, in general, are in

a relationship of contingency, under the constant “sword of Damocles” of the potential dangers of the elements which compose the natural environment, from the moment “they manifest themselves with an unusual intensity” (Jocelyne Dubois – Maury, Claude Chaline, 2004, *op. cit.*, p.35). The history of humanity records numerous events, such as the unexpected eruption of the Vesuvius volcano and the covering with volcanic ash of the Pompey and Herculaneum settlements in the year of 79, the earthquake and the fire that destroyed Lisbon in the year of 1755, the catastrophic floods which devastated the city of New Orleans, due to the effects of Hurricane Katrina from August 29, 2005, and so on. If the settlements are subject to natural hazards, then the urban areas, some with touristic function as well, affected by major natural catastrophes, are not rare, the most destructive effects being generated by earthquakes, flooding, hurricanes and thunderstorms both in terms of loss of human lives, and of the insurance costs (Figure 1).

The hazards induced by geological phenomena are devastating through the intensity they may appear, the great areas they can affect and the multiple effects they can cause as a chain reaction (a domino system).

*Active volcanism* represents major hazards generated by the over 1000 active volcanoes, but few of them are located within touristic areas or, better said, too few settlements with touristic function are found in their proximity.

Over time, the memory of the people retains the most catastrophic events: of the Vesuvius in the year of 79, of the Etna from the year of 1669 which devastated Catania, of Montagne Pelée from the year of 1902 from Martinique, of Merapi from Indonesia, Hekla from Island from the year of 2010 which turned the air transport from the entire northern hemisphere upside down, of Pinatubo from the year of 1992 from the Philippines, etc.



**Figure 1.** Weight of victims (A) and of the value of the ensured damages (B) in disasters of different type related to natural hazards. (Source: Dubois-Maury, Jocelyne, Chaline, Claude, 2004, *op. cit.*, p. 15.)

The important touristic cities such as Mexico City located at the foot of Popocatepetl Volcano, Catania, Acireale and an entire network of resorts located on the “Riviera dei Limoni” at the foot of Etna Volcano, the settlements and the small touristic resorts from the Aeolian Islands from around Stromboli Volcano and so on, are constantly subject to volcano activity. At the same time, the volcanic relief is one of the most appreciated forms of relief by the tourists, such as Fiji Mountain and Hondo region from Honshu Island in Japan, the volcanic mountain of Kilimanjaro from Kenya, the Central French Massif, with its lofty cones rising above the lava plateaus, the immense caldera of the Călimani Volcanoes from Romania, and so on.

The high level of *seismicity* generates hazards caused by the tectonics of the plates and the phenomena induced by waves such as tsunami and fires. The most important “basin of vacation” – of the Mediterranean Sea, is the most exposed to this type of hazard: the peninsular Italy has known several devastating earthquakes in the regions of Abruzzi, Messina (1908), the Balkan Peninsula with frequent earthquakes in Macedonia, Epirus, Euboea, Asia Minor Peninsula, respectively Turkey, with an active fault in the north, parallel to the coast of the Black Sea that has generated telluric movements since the year of 1999 with epicenters in Izmit, Düzce, with serious effects upon local tourism, or the one from the year of 1992 from Cairo that has produced damages to its historical center and several hundred victims.

In the South-American space, in the Andean area, the very high seismicity is determined by the subduction of the Nazca Plate located under the American Plate, to which the exposure of the coasts to the tsunami waves is added, having their origin in the open of the Pacific Ocean that constitutes a real risk for the coastal resorts of Huauchaco, Mancora (Peru), or Viña del Mar (Chile). In the year of 1896 the Chilean coast was erased by a giant tsunami wave which left 26.000 victims, and in the year of 1960 an earthquake produced by Chile triggered, 24 hours later, a huge tsunami wave on the coasts of Japan (*ibidem*, p.43).

Seismicity is maintained at a high level in Central America and in the western part of Northern America as well, with active fault lines, such as the fault of San Andreas located in California.

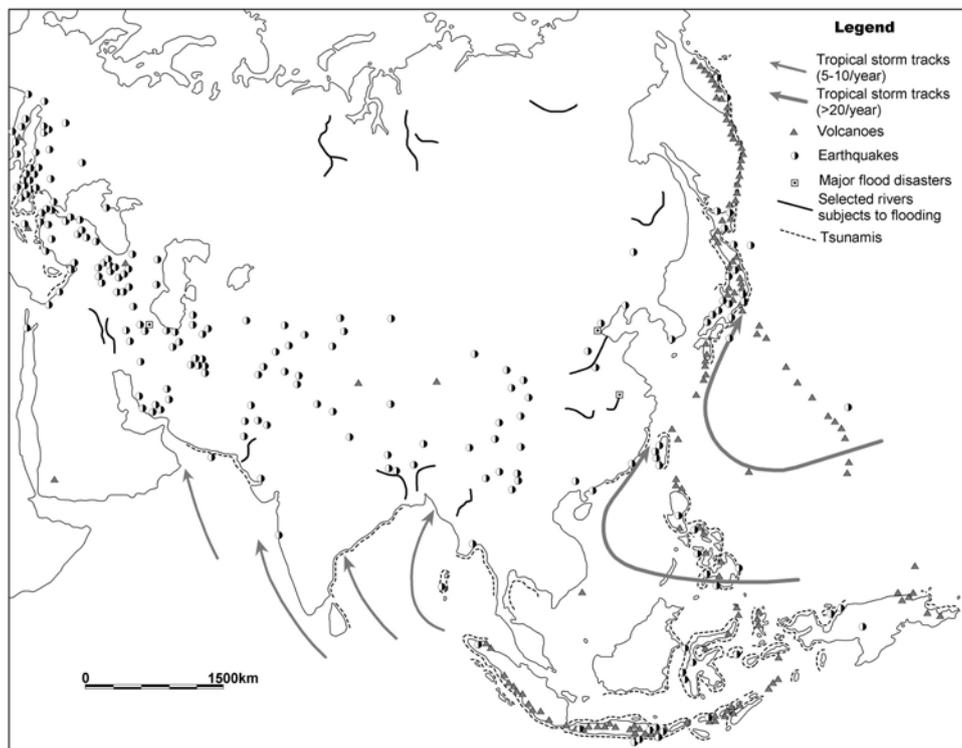
*Fires* represent the result of strong seismic movements, measuring over 6.5 degrees Richter. The most devastating fires of the past century occurred in San Francisco in the year of 1906 when 80% of the city was burned, at Valparaiso in the year of 1932, in Tokyo in the year of 1923 when 2/3 of the city was burned, including the architectural patrimony of Edo (*ibidem*, pp. 45-46).

The collective memory registered catastrophic fires that had no connection to earthquakes, and which have almost completely destroyed historical cities, such as the ones that took place in London (1666), Rennes (1720), Moscow (1812, self-immolation), Chicago (1871) or Salonika (1917).

Under the imminence of the activation of negative natural phenomena such as volcanism and high seismicity, and of their secondary effects – giant tsunami

waves, there are the touristic areas situated “on the Pacific Ring of Fire”, important touristic cities such as Tokyo, San Francisco, Santiago de Chile, Christchurch, suffered great destruction over time, caused by earthquakes, not to mention the powerful tsunami wave which in the year of 2004 swept the coastal areas of South-East Asia causing great destruction including tourism in Thailand, India, Sri Lanka (Figure 2).

In terms of natural disasters neither Europe is found in a better situation, its impact upon tourism is greater, given the fact that is the most “touristified” continent, during the year of 2009 concentrating 46,7% of the total volume of international touristic arrivals.



**Figure 2.** Map of natural hazards from Asia  
 (Source: processed after Espenshade, B. Edward, jr. edit., 1993, *op. cit.*, p. 167.)

Floods, such as the ones occurred in Florence on the Arno in the year of 1966, the one from Prague on the Vltava in the year of 1996, from Dresden on the Elba in the year of 2002, or Warsaw on the Vistula in the year of 2010, as well as

the earthquakes and the high seismicity in the Italian Peninsula, from the Balkans and from Asia Minor (Turkey) brought great damage to tourism, especially since these active seismic areas superpose highly frequented touristic areas.

In the centre and in the northern part of the North-American continent there are violent storms accompanied by massive snowfalls that severely perturb transportation; neither Europe is under shelter, during the last decades the incidence of tornadoes has increased as a result of the global warming, they being more frequent in the Atlantic Europe.

In the tropical regions the major hazard is represented by the high frequency of cyclones (Table 1).

**Table 1.** Ten most disastrous tropical hurricanes generated between the years of 1970-2003

Event	Country	Date	Damages Materials (bilion USD)	Casualties
Hurricane Andrew	USA	23.08.1992	20,185	38
Hurricane Mireille	Japan	27.09.1991	7,338	61
Storm Daria	Western Europe	25.01.1990	6,221	95
Strom Lothan	Western Europe	25.12.1999	6,164	80
Hurricane Hugo	USA	15.09.1989	5,990	61
Storm Vivian	Western Europe	25.02.1990	4,323	64
Hurricane Bard	Japan	22.09.1999	4,293	26
Hurricane Georges	USA	20.09.1998	3,833	6000
Storm Allison	USA	05.06.2001	3,150	33
Hurricane Floyd	USA	10.09.1999	2,508	70

Source: Dubois-Maury, Jocelyne, Chaline, Claude, 2004, *op. cit.*, p. 19-20.

In the U.S.A., the most important touristic area – Florida Peninsula – is subject to 5-10 tropical cyclones / year, whose trajectory delimits it both towards east and towards west (Figure 3).

A higher incidence, of more than 20 tropical cyclones/ year is found in South-East and Eastern Asia, where, given the large extent of the “holiday basin”, the effects upon the touristic areas are somewhat diminished.

When the effects of two natural phenomena are associated, storms with strong winds, with diluvian rains and floods, the destructive effects are amplified, as in the year of 1998 when Cyclone Mitch devastated the capital of Honduras, Tegucigalpa, or the floods accompanied by storms in Western Europe (1999), in Eastern Europe (2002) or in Southern France (2009).

As part of the climatic hazards, large quantities of liquid precipitation can be added as well – torrential rains and/or under solid form- massive snowfalls, floods, thunderstorms.

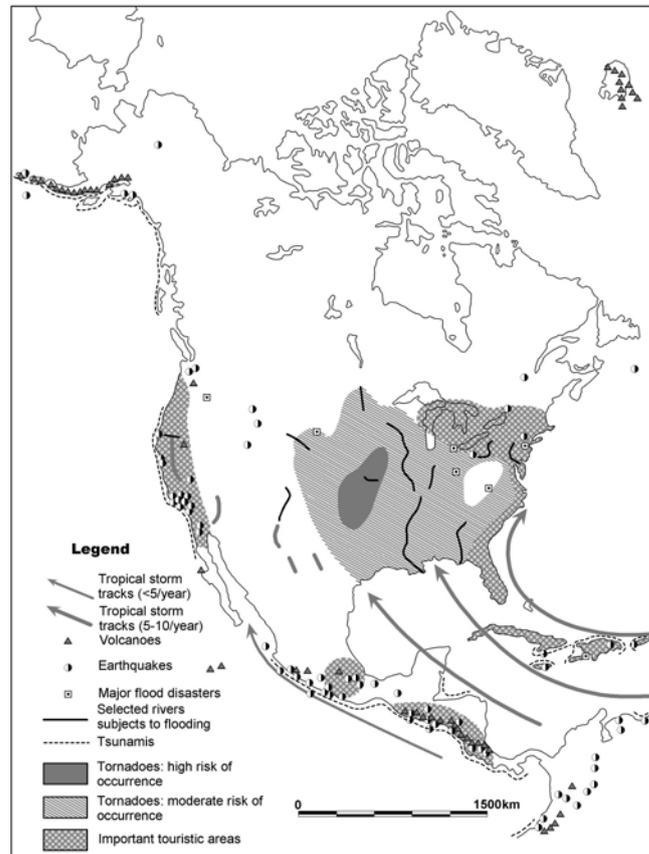
High amounts of precipitations- heavy rains or torrential rains, which fall in a short time, affect tourism, especially in the Mediterranean space, where the phenomenon is frequently met.

The greatest damages are caused along the rivers, in the basins with deforested slopes from where the water sets large masses of solid alluvial deposits into motion that increases the destructive power of the high flood wave. Jocelyne Dubois-Maury and Claude Chaline (2004, *op. cit.*, p.37) observe the high frequency of the torrential rains on the rivers situated in the South of France, the second largest touristic area of the country according to the volume of overnight stays, respectively in the basins of the Aude, Hérault, Orbieu, Têt, Tech and Var rivers. The most frequented were the Montpellier settlements which knew ten great

floods and Nimes in the year of 1988, from the department of Languedoc – Roussillon. Var and Paillon rivers frequently affect Nisa from the department of Alps-Côte-d’Azur and its beaches. Large human losses were recorded in July 1987 at Grand-Bornand where a sudden torrential rain on the torrent of Bourne caused the death of 23 people from a champing situated on the trail of the high flood, and in September 1992 at Vaison-la-Romaine in Vaucluse, when 40 victims were recorded.

Torrential rains are more frequent in Italy, Switzerland, Spain, but the gravest event occurred in November 2001 at Algiers, where 500 casualties were recorded.

*Floods* affect riverside settlements, following diluvial rains, with large amounts of precipitation, that fall in a longer period of time, usually 4-15 days.



**Figure 3.** Map of natural hazards from North America  
 Source: processed after Espenshade, B. Edward, jr, edit., 1993,  
*op. cit.*, p. 57.

Floods are frequent in Monsoonal Asia where, during the rainy season the touristic activity is practically interrupted, in countries such as India, Thailand, Cambodia, Vietnam, Sri Lanka, but these floods are predictable and hardly affect the tourists.

Floods with a greater impact upon tourism are taking place in the temperate climate region; such were the ones that happened in the year of 1993 in the basin of the Missouri and Mississippi rivers in the U.S.A., on Oder, Czech Morava and Vistula in the year of 1997 during full touristic season, as well as in France in the basins of Meuse and Loire. In Europe, the most destructive floods occurred in the year of 2002 on Elba, Vltava and the Danube rivers, the more affected cities being Prague and Dresden, with damages that amounted to 20 billion Euro's; these floods were resumed at a smaller scale in the year of 2003 on the Rhône River in Switzerland and on the Gard, Hérault and Ardèche rivers in France.

In some cities such as London on the river Thames and Rotterdam large hydrotechnical works, mobile dams were built which protect them in case of multiple catastrophic phenomena such as rain + wind + strong (high) tide, that are destructive for the coastal, low regions and inside the estuaries (Bordeaux).

Literature quotes such combined phenomena: in the year of 1953 in Holland, when over 1800 deaths were recorded, 70.000 houses destroyed and 250.000 people evacuated; in the year of 1999 in New Orleans (U.S.A.), in the year of 1966 in Venice; in fact, Venice has frequently witnessed this phenomenon, when the sea water floods the quarters of the lagoon, which I call "acqua alta", damaging tourism. When high precipitations fall under solid form, massive snowfalls are produced, and, if the wind blows, strong snow storms are generated. Among the most spectacular we quote (*ibidem*, pp. 19-20): Storm Daria (January 25, 1990) from Western Europe and North-Western Europe, with 95 deaths and over 6.2 billion USD damage, Storm Lothar (December 25, 1999) with 80 deaths and 6.1 billion USD damages, Storm Vivian (February 25, 1990) with 64 deaths and 4.3 billion USD damages, or Storm Anatol (December 03, 1999) with 20 deaths and 1.6 billion USD damages. In the U.S.A. they fell in March 10, 1993, 246 deaths and 2.1 billion USD damages, and in April 06, 2001 with damages of 1.9 billion USD. As shown, the tribute in human lives of these storms is high, the damages are huge as well, gravely disturbing, especially the traffic.

If massive snowfalls in the mountainous sector are more frequent, this fact accumulates the risk of producing *avalanches*, the more dangerous as these affect the populated settlements and the mountainous touristic resorts. The worst avalanche (*ibidem*, pp. 39, 41) occurred in the year of 1962 in the Peruvian Andes that caused 4000 victims; nor even Europe is missing from the classification, the worst avalanches occurred in the year of 1970 at Val d'Isère with 39 victims, in February 1999 at Chamonix with 30 victims and within the same year at Galtuer (Austria). In Romania, during the winter touristic season few of this type of

accidents occur every year, especially on the ski tracks situated in the mountain massifs from the proximity of Prahova Valley.

*Strong winds* part of the storm phenomenon have a mechanical violent effect, that affect buildings, arborescent vegetation, high voltage power lines. This phenomenon is characteristic to the tropical regions where the hurricanes are being formed, with an annual cyclic character in the Gulf of Mexico and the Caribbean Sea, in South Asia and Southeast Asia. Lately even the temperate regions have known a greater incidence of the thunderstorm phenomenon, such as Hurricanes Lothar (December 25, 1999) and Martin (December 27, 1999) from Western Europe.

In the Caribbean Sea Basin, Hurricane Hugo (September 15, 1989) caused the death of 60 people and damages of over 4,3 billion USD in Guadalupa, Monserrat, Bahamas and Porto Rico, seriously affecting local tourism and implicitly, their economy, or in the year of 1992 Hurricane Andrew which devastated Florida and Louisiana generating immense damage.

Since the economy of the islander countries from the Antilles Ark is largely dependent on tourism, natural disasters of this type have serious effects upon them; such is the case of the islands situated in the south-east of Africa such as Mauritius which receives a yearly average of 700.000 tourists proportional to a population of 1, 2 billion inhabitants or the Island La Reunion, which at a population of nearly 800.000 inhabitants records 400.000 tourists, as well as the Comoros or the Seychelles islands.

*Forest fires* are the result of long droughty seasons, having natural causes, in smaller measure, but most often they are caused by people. Some vegetation associations such as the chaparral from California, bush in Australia, garriga and macquis in Southern Europe, as well as species such as the eucalyptus that contains flammable resins which favors combustion (burning) are highly flammable and predisposed to fires. They hinder tourism through smoke emissions and destructions caused to accommodation, frequent fires from the region around the city of Los Angeles caused damages, as well as the wildfires from the year of 2002 found in the proximity of Sydney, frequent fires from Portugal with a peak in the year of 2003 when 400 000 ha of forest burned down, the ones from Spain where annually 200 000 ha are destroyed through fire, Italy with 100. 000 ha destroyed, France with 50 000 ha and Greece that registered several episodes of fires in the area of Athens.

In France, the most frequent fires occurred in the outskirts of Marseilles, at Château-Gombert, Septèmes-les-Vallons, as well as at Saint-Maxime, Cavalaire and Hyères.

### 3. Human interventions – hazardous aggravating effects

Although that natural hazards are mostly (excepting fires) of exogenous nature, man's action of anthropization of the environment may aggravate the consequence of the natural hazard, through the induced effects which he introduces involuntarily in the equation of arranging the urbanized space.

Jocelyne Dubois – Maury and Claude Chaline (2004, *op.cit.*, pp. 46-53) identify the following effects induced by the potentiation of the hazard:

- excessive urbanization without an optimal ratio between the built space and the green space, as well as the interventions in the minor river beds of the rivers led to *the waterproofing of the urban lands*. These, in case of heavy rains are not able to absorb, in a natural way, the excess water, and sometimes it gets even to serious floods as the one at Nîmes in the year of 1988, at Florence in the year of 1966. At Nice, the interventions made in the minor river bed of Var, which was reduced from 800-1000 m to 200-300 m, and in the one of Paillon that was completely canalized and covered, since the year of 1886 when it caused serious floods, it creates great damages whenever it rains excessively. All these “hinder” the touristic activity.

The issue is more acute where the sewerage system is oversized and it is not capable to take over the superabundance of the excesses of rains such as Buenos Aires or at Bucharest.

The irrational exploitation of water from the ground-water layer, without taking into consideration the hydric balance, the consequences could be dramatic in the sense of weakening the urban lands through the phenomena of settling that occur and which detracts the architectural patrimony valued through tourism. The most symptomatic cases are Bangkok, where the excessive pumping of ground-water led within a century time period to the general “descent” (settling) of the urban land with 88 cm and Tokyo where the same phenomenon occurred, further exposing the seaside facade of the city to the tsunami waves (*idem*, p. 49), both are touristic cities that register numerous tourists.

In the year of 2006 Tokyo recorded 4, 81 billion foreign tourists and 480 billion national visitors, and Bangkok 3, 8 billion foreign tourists and 83 billion national visitors.

When the topography of the urban site is fragmented, with steep slopes from which the forest vegetation was removed, the effects of the torrential rains and of high seismicity is much higher – this is the situation in which the important Brazilian touristic centre of Rio de Janeiro found itself in the year of 1988.

- The anthropisation of the forest fires, in the sense that these are the result of certain deliberate human acts.

Following several investigations, the University of Nice, reached the conclusion that 40 – 80 % of the forest fires from the Province Alpes-Côte-d'Azur

(PACA) are of human nature; the most numerous cases are recorded in the proximity of the Nice, Grasse, Puget-Théniers, Valberg centers, and the most reduced ones at Cannes-Valbonnes and Menton.

### Conclusions

Natural, societal and technological hazards are present in different proportions, all over the globe, affecting the urban system. As a component part of the urban system, the touristic activity is permanently under the incidence of the exogenous and endogenous natural hazards.

The urban areas with touristic function are vulnerable in front of natural hazards, the level of victims and the value of the assured damages being proof of this statement: active volcanism, high seismicity and its combined effects – tsunami waves and fires, then the floods and massive snowfalls, tropical storms, thunderstorm phenomena are the most destructive natural disasters that affect tourism. The maps reproduce the superposing of the touristic areas over the regions with the greatest natural hazards, therefore the incidence of the natural disasters upon tourism is high, the examples presented, fully prove it.

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