

Climate and Urban Design of Maritime Public Spaces in Mediterranean Arab Cities

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ABSTRACT: *The traditional urban fabrics in Arab cities along the Mediterranean coast offer an exceptional 'urban lab' to study climatic design, urban patterns and forms applied in public realms. Nonetheless, due to the rapid modernisation and expansion of these cities, most of their old urban tissues are in a process of severe dereliction and abandonment. As part of the current asymmetric urban expansion, the new urbanisations and infrastructures within the old cities are applying generic and fashionable spatial schemes detached from climatic and morphologic urban considerations, which are generating discontinuous and dysfunctional townscapes. The key questions raised by this phenomenon are twofold: How do existing maritime urban settlements effectively respond and adapt to the coastal Mediterranean climates? How can intuitive climatic design influences contemporary urbanism and landscape? This study proposes a synoptic and comparative analysis of appropriate public spaces in the Mediterranean cities of Tangier, Beirut and Malaga. It also reflects on the notion of 'placeness' and landscape recovery of traditional urban tissues through a wide range of urban design strategies in paradigmatic public spaces. Nonetheless are these chosen cases sharing similar urban patterns regardless their geo-climatic contexts? What makes Mediterranean urban voids resilient or not?*

The aim is to articulate the principles of ecologic urbanism; climatic design and landscape design by taking into account urban voids and solar orientation; natural ventilation and greenery; and surface materials and colours in unique urban spaces such as the old port and Medina in Tangier; the AUB Campus in Beirut; and the Guadalmedina creek in Malaga.

Keywords: Ecological voids, Climatic Design, Landscape Design, Mediterranean Arab Settlements

INTRODUCTION

The traditional urban fabrics in Arab cities along the Mediterranean coast offer an exceptional 'urban lab' to study the effects of ecological voids [1] on climatic design and urban patterns and forms applied in critical public realms. The origin and development of these vernacular urban settlements has been produced by the symbiosis between natural environments and sustainable human practices throughout a timeline. These traditional fabrics constitute 'passive' climatic urban systems that provide a set of precedents that should be studied, reinterpreted and implanted according to nowadays requirements. According to the American landscape architect Alan Berger [2], as the city expands, it leaves—especially in the historical centres—vacant lots, derelict land and building stock no longer used for their original purposes. This is the territory of urban voids where informality unfolds. These uninhibited territories are not only anomalous fragments within the urban tissue but they also create disconnections between historic and contemporary urban regions.

The negative territorial effects caused by Neo-liberal urban pressures in the past ten years have seriously deteriorated many of the Mediterranean coastal ecosystems that are essential for the continuity of biological corridors and therefore human development. This *out-of-control* urban dynamic has produced profound alterations within the historic urban fabric and in its local communities.

The current construction market has inappropriately transformed both the formalised and informalised urban development in an accumulation of disconnected and

fragmented buildings, mere objects detached from any urban continuity, which underpin the notion of the city as an embedded organism rather than a dislocated one.

The Mediterranean region is facing a massive change, which only should be reverted throughout the restitution of symbiotic processes along the littoral in order to recover its original landscape and environmental capacities.

Its current macro-economical scenario brings new opportunities to interplay and exchange intensely in creative strategies of landscape recovery within port cities of Arab origin, from an inventive reinterpretation of their initial urban forms and ecologies. The main consequence has been the progressive loss of 'urbanity' and the lack of knowledge on how 'ecological voids' could affect positively the urban climate in formalised and also informal urban systems.

The comparative study on the relationship between Mediterranean Arab settlements and public spaces in waterscapes such as the waterfront promenades could offer a set of strategies that should be incorporated to the innovative interventions of urban recuperation that will resolve current discontinuities within each city.

In the last century, the Arab historic centres of European Mediterranean cities such as Alicante (Spain) or Palermo (Italy) have suffered a systematic process of deterioration of their historical urban tissues mainly due to uncompleted housing and urban interventions that have randomly pitted the city, leaving the imprints of this abandonment like an archipelago of residual voids.

In North African Mediterranean cities, the urban deterioration of the medinas and old ports are a

continuous dynamic generally produced by an inefficient planning coordination and the lack of specific urban heritage and environmental agendas that both protect and invigorate their landscape attributes. Mostly the connection between the old city and its maritime frontage is poorly attained.

Then the key questions raised by this phenomenon are twofold: How do existing maritime urban settlements effectively respond and adapt to the coastal Mediterranean climates? How can intuitive landscape design enhance the urban climatic comfort of port cities in the Mediterranean region?

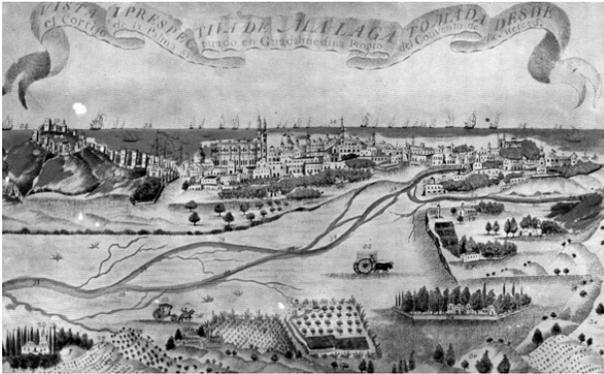


Figure 1: Pre-industrial urban panorama of old Malaga taken from the outskirts of the Guadalmedina valley towards the Mediterranean Sea. It is noticeable how the delta was initially treated as an agrarian system that fed the port town. Source: Andalusian Historical Archive.

SCOPES AND METHODS

As part of a 2-years European Union FP-7 funded Marie Curie urban research project called *EMUVE (Euro Mediterranean Urban Voids Ecology)* [3] and the site-specific research collaboration in the AA visiting programme *Mittelmeerland* [4] were the authors are highly involved; this study proposes a synoptic and comparative analysis of relevant urban schemes of public spaces in three Mediterranean cities with Arab urban patterns: Tangier, Beirut and Malaga.

This study is articulating both landscape and environmental design strategies found in original Arab medinas and waterfronts, which have gradually been replaced by *'tabula rasa'* zoning policies; poor urban governance and informal or illicit built forms and regulations in each case study.

These in-between conditions can learn from vernacular and intuitive techniques of landscape interventions on ecological voids.

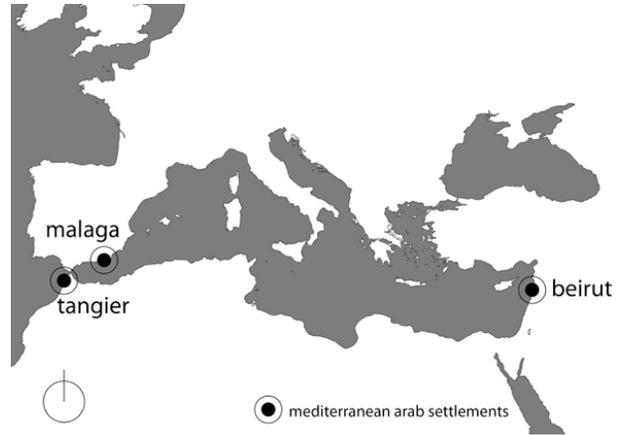


Figure 2: Location map of the three chosen Arab port cities of Tangier, Beirut and Malaga. Source: Suau archives, 2013.

It articulates the notions of ecologic urbanism; climatic design and landscape by taking into account the unbuilt spaces of cities so-called 'urban voids' and how they respond towards solar orientation; natural ventilation and greenery; and surface materials and colours. We have selected strategic urban spaces such as the old port and Medina in the old town of Tangier, Morocco; the AUB Campus between the *Corniche* and Hamra Street in Beirut, Lebanon; and the linear void of Guadalmedina creek and riversides in Malaga, Spain. Although these cases studies belong to the Arab maritime cultural tradition, each of them provides specific social, spatial and environmental features.

In the case of Tangier, its geographic condition of strategic port at the gate of the Gibraltar Strait has historically defined its urban form and its port infrastructural landscape in the old city and its new relocation. Beirut reveals a fractured urban landscape where the marks of the recent war conflicts are not healing yet. Malaga has a well-defined Arab urban structure, disconnected from the reclaimed land's port infrastructure and split by the Guadalmedina creek, originally a fertile river delta now asphalted and without vegetation.

The analytic climatic study will compare the design strategies and the data obtained in the three selected cases, in order to establish common conclusions for the development of innovative tools for urban and environmental recovery.

In doing so this study has utilised various digital simulations and graphic-based computer programmes such as CAD, 3D Max, ECOTECT and Climate Consultant 5.4 [5]; all are simple-to-use tools that understand the local climate and 3D modeling applied to the chosen case and its landscape proposal.

MEDITERRANEAN CASE STUDIES

1. Tangier: Green buffer between medina and port

Tangier port –location 35°46'N 5°48'W- has a Mediterranean climate (Köppen, Csa) with heavier rainfall than most parts of North Africa owing to its exposed location. The summers are hot and sunny and the winters are sporadically wet but very mild.

Existing situation: The old Medina of Tangier is located on the top of a hill over the obsolete port infrastructure facing the maritime panorama of the Gibraltar Strait.



Figure 3: Photographic sequence of the medina cliff as background and the peripheral void of the abandoned cargo zone of the old port of Tangier, Morocco. Source: Suau archives, 2013

This topographical accident produces a disconnection between the urban cliff of historical city center, the old port and the Modernistic waterfront of the city. This colonial promenade is poorly connected with the historical medina being interrupted with the docklands, nowadays an asphalted truck cargo parking situated between the medina and docks.

Landscape proposal: In order to reduce the heat released by the asphalted cargo band, an urban park of olive trees is established instead.

This parkland performs as ‘climatic buffer’ that cools the cliff border of the medina and provides shade for dwellers. In addition to this, a boulevard of palm trees is allotted along the main maritime road.

Similar precedent of maritime green strips can be found in the Sicilian town of Syracuse and its waterfront-boulevard Foro Vittorio Emmanuelle II.

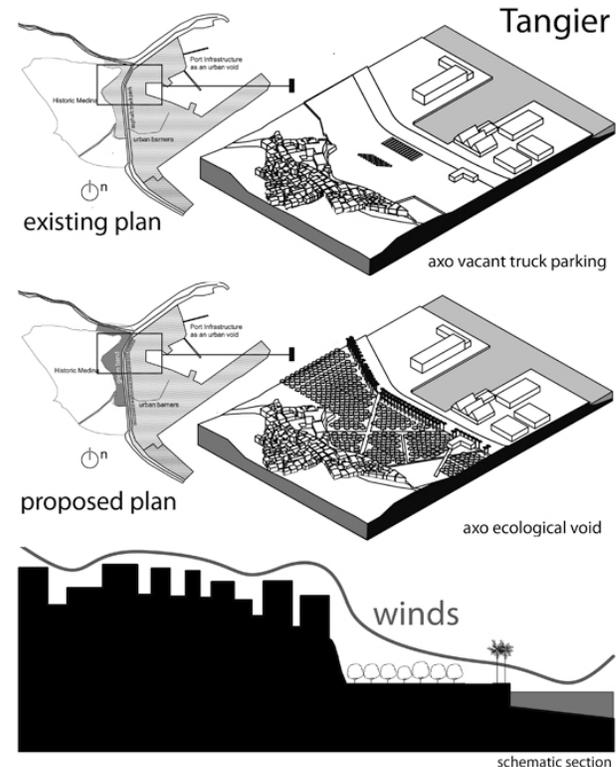


Figure 4: Existing and proposed plan: Analysis and landscape recovery design of the maritime freight band between the medina and old port of Tangier, Morocco. Source: Suau archives, 2013

2. Beirut: Expanding green connectors

Beirut –location 33°53'13"N 35°30'47"E- has also a Mediterranean climate characterised by warm days and nights. Summertime can be almost rainless. Autumn and spring are cool with rainy winters.

The prevailing wind during the afternoon and evening comes from the West (onshore, blowing in from the Mediterranean); at night it reverses to offshore, blowing from the inland out to sea.

Much of the autumn and spring rain falls in heavy rainstorms on a limited number of days, but in winter it is spread more evenly over a large number of days.



Figure 5: Aerial view of Ras Beirut with the green AUB Campus on the slope and the Corniche motorway surrounding the coastline. Source: <http://almashriq.hiof.no/lebanon>, accessed in 04/07/2013

Existing situation: The chosen area of Ras Beirut is characterised by three well-defined landmarks:

- The *Corniche* coast motorway, which is opened to the sea and predominantly oriented to motorised vehicles.

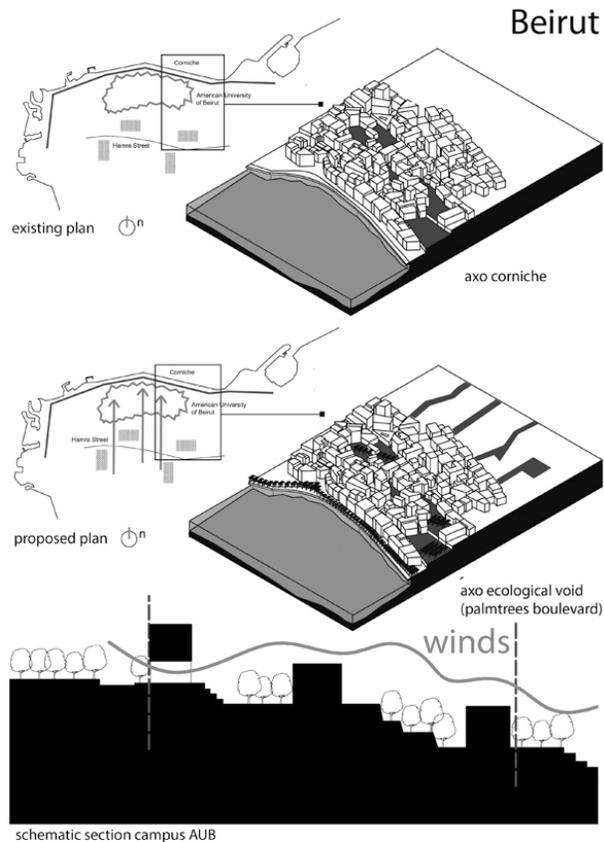


Figure 6: Existing and proposed plan: Analysis and landscape recovery design in Ras Beirut of the parkland campus between the Hamra area and the Corniche of Beirut, Lebanon. Source: Suau archives, 2013.

There is a privation of accessibility and public spaces from the downhill to the sea and the available facilities are mostly privatised and restricted. This issue is also evident in the new urban developments such as Saint Georges' Yatch Club situated in the new reclaimed lands.

- The *Hamra* district, an E-W oriented pedestrian boutique street within the historic urban fabric, is situated uphill and parallel to the *Corniche*.
- The campus of the American University of Beirut (AUB) [6] is located between Hamra zone and the sea road. Being a well-kept and green space, it is a fenced-off space controlled by several checkpoints, a fortified urban void that divides the across connectivity between the retail zone of Hamra and the tall residential frontage of the *Corniche*.

Landscape proposal: The increasing in the urban porosity and green ramifications from the parkland void towards the immediate urban fabric could offer new transversal pedestrian connections and additional greenery lanes between the Hamra area and the impermeable residential crust along the coastline by enhancing the urban landscape and environmental conditions of a wider area.

Apart from this, the *Corniche* has to reinforce its landscape action through the implementation of a boulevard of palm trees and a grand promenade for rambling.

3. Malaga: Recovering water capillarity of creek

The climate of Malaga is Mediterranean with very mild winters and hot summers. Malaga enjoys plenty of sunshine throughout the year, with an average of about 300 days of sunshine and only about 50 days with precipitation annually.

Its maritime location, 36° 40' 0" N, 4° 29' 0" W, with winds blowing from the Mediterranean Sea, makes the heat manageable during the summer.



Figure 7: Informal outdoor occupancy of the Guadalmedina creek's embankment in Malaga (1928). Source: Andalusian Historical Archive.

Malaga experiences the warmest winters of any European city with a population of half million inhabitants. The average temperature during the day in the period December through February is 17–18 °C. During wintertime, the Malaga Mounts (Montes de Málaga) block out the cold weather from the north.

Existing situation: The Arab historical town of Malaga has been recently opened to the sea by a new waterfront that has connected the port and the city centre such as Barcelona did in the early 90's. However, there is another urban limit that still divides the old and new town. The degraded and waterless Guadalmedina creek, a rundown linear void- acts as a socio-urban fissure within the city and the coastline. The past Arab urban history provides the key elements for the landscape recovery of this obstructed water artery, which is intermittently navigable until Puente de la Esperanza.

Landscape proposal: Through 'cardiovascular' interventions in the Guadalmedina basin, both the main artery and lateral ramifications can be again repaired by combining both soil and water management systems that generates terraces and bands for recreational greenery and collective micro-agriculture –allotments or orchards- to recover the disused spaces of the Guadalmedina river bed.

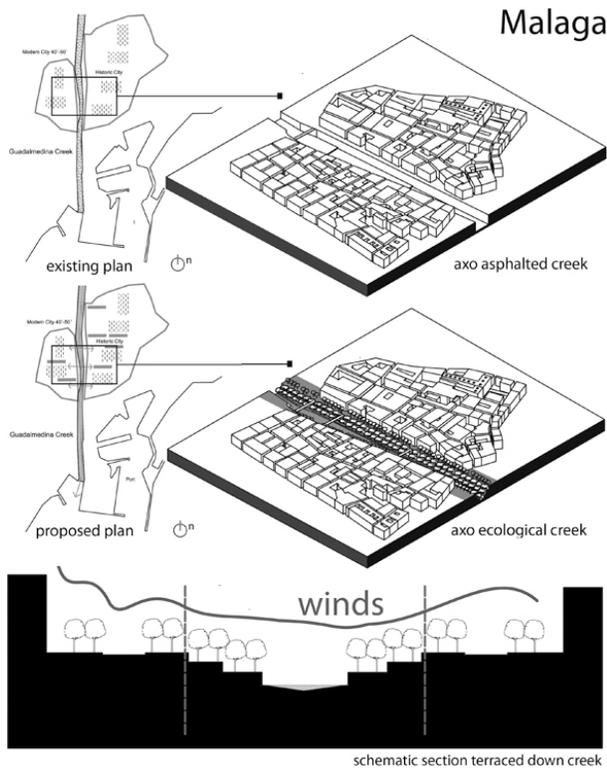


Figure 8: Existing and proposed plan: Analysis and landscape recovery design along the Guadalmedina creek in Malaga, Spain. The aim is to create recreational and agrarian terraces that allow collective greenery. Source: Suau archives, 2013.

Therefore the terraced-down section of the creek offers an optimal support to establish local greenery and natural cooling in this longitudinal urban void.

DESIGN CONCLUSION

This study has mainly addressed the cultural dimension of landscape related to sustainability at city and regional scales throughout the revitalisation from neglected into ecologic urban voids. The role of these open spaces in Mediterranean Arab settlements is climatically twofold: a. provide natural cooling in the public space and the immediate surrounding and b. offer a sensorial human comfort through aromatic, tactile and visual attributes of local greenery.

Both climatic and landscape design factors can be combined to contribute in optimal urban schemes without building new forms but recovering unseen opportunities of vacant or hedged public spaces.

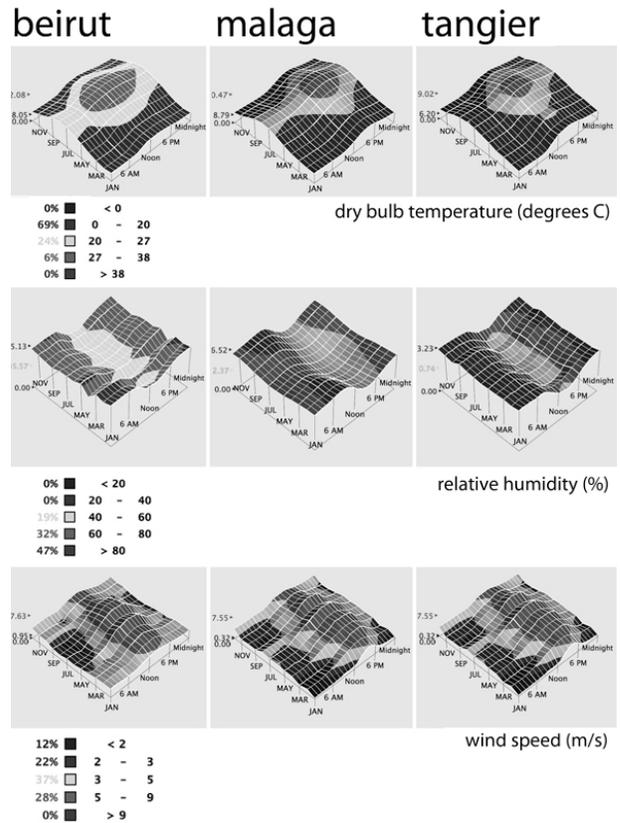


Figure 9: Comparative 3D climatic charts of Beirut, Malaga and Tangier. Source: Suau archives, 2013.

The proposed design of each case study has taken into account the following factors: a. urban voids and solar orientation; b. natural ventilation and greenery; and c. surface materials and colours. The chosen urban voids have been part of previous sustainable landscapes with high ecologic value, which has been altered and disrupted from the original meaning. Thus the landscape

design follows the sun path and the geographic capacities of the terrain.

Regarding passive cooling, natural ventilation can be achieved by establishing appropriate local flora both in inner urban voids but also around the urban boundaries. This greenery performs as a climatic buffer that lowers outer temperature, shades the ground and visitors and humidifies the immediate surrounding.

Light coloured surfaces in hard pavement, roofs and walls are strongly recommended to reduce heat radiation and lower the outdoor temperature of any Mediterranean public space. In traditional urban Arab culture, the use of bio-textures or flora in gardens instead of hard pavement and surface water are essential to maintain an adequate level of climatic comfort without any mechanical supply. An exemplary case of ecological void can be found in the Alhambra, Granada.

Finally we summarise the common passive landscape design guidelines for the recovery of urban voids in the Arab Mediterranean's traditional urban fabric of Beirut, Malaga and Tangier:

1. Increasing high vegetation operates as sunshades (extend in summer and retracted in winter) can reduce heat gain in nearby built forms
2. Use light coloured surface materials and cool pavements and contiguous alleyways (with high emissivity) to minimize conducted heat gain
3. This is one of the most comfortable climates, so shade existing hard ground to prevent overheating and layout trees to sea breezes in summertime
4. Established vertical vegetation (ivy, bushes or trees) especially on the west side of the neighbouring blocks to shade both facades and pavement if summer precipitation supports local flora growth
5. Shaded outdoor areas in adjacent blocks (patios and inner squares) oriented to the prevailing breeze can extend living spaces in summer and humid weathers
6. Trees should not be planted in front of facades facing the Equator but rather 45 degrees from each opening edge.

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I especially give thanks to the collaboration of my colleagues Melina GuirnalDOS and Spyridon Pagkalis. Melina contributed with the initial drafting during the early research phase whilst Spyros developed both the

final drafting of each case study, axonometric views, and schematic cross sections.

REFERENCES

1. The existing voids within the urban fabric could be turned on future environmental, cultural and economic attractor for the reactivation of the degraded areas of the city into productive and ecological landscapes. It should be a key factor to influence the urban development towards more sustainable criteria, in symbiosis with the landscape and its natural resources.
2. Berger, A. (2006) *'Drosscapes: Wasting Land in Urban America'*, New York, Princeton Architectural Press, pp. 26-44. Also refer to: <http://www.waste2place.com>
3. The Euro-Mediterranean Urban Voids Ecology (EMUVE) - *Marie Curie Actions: Intra-European Fellowships (IEF), FP7-PEOPLE-2012-IEF, Proposal nr 331084-* is an EU funded research project focused on the study and recovering of existing voids produced by current shrinking cities at the Euro-Mediterranean coastline. These vacant borderlands or frontiers could be reactivated with radical eco-urban strategies as complex systems of social, environmental, economic, topological and symbolical relationships. EMUVE is developing a comparative research on several case studies along the Euro-Mediterranean littoral. The recycling of these spaces could contribute as future cultural and economic catalysts to the regeneration of degraded lands into socio-productive and ecological landscapes. Full description is available here: http://issuu.com/cristiansuau/docs/emuve_presentation
4. *Mittelmeerland* is an independent research project that investigates the future of the Mediterranean Sea as a territory of water. It consists of two parts:
 1. *Mittelmeerland Atlas*, which envisions and explains invisible relationships such as economic, social, political and cultural transformations of the Mediterranean as a whole, as well as present and future spatial changes of port cities.
 2. *Mittelmeerland Handbook*, a design guide for the future of Mediterranean coastal cities, which connects cities and explores ecology, climate, sustainability, culture and nature. The Handbook is developed in a series of six AA Visiting School Workshops in Dubrovnik, Tangier, Beirut, Algiers, Alexandria and Istanbul from 2011 to 2013. More information: <http://www.mittelmeerland.org>
5. *Climate Consultant 5.4* uses format climate data that is made available at no cost by the Department of Energy for thousands of weather stations around the world. Climate Consultant translates this raw climate data into dozens of meaningful graphic displays. The purpose is not simply to plot climate data, but rather to systematize and represent this information in easy-to-understand ways that show the subtle attributes of climate, and its impact on built form. Each simulation has employed ASHRAE Book of Fundamental Comfort Model – 2005. Refer to: <http://www.energy-design-tools.aud.ucla.edu/>
6. The 250,000m² area of the American University of Beirut Campus is on a green hill overlooking the Mediterranean Sea on one side and bordering Bliss Street on the other. Based in one of Lebanon's few geographic locations, AUB's campus in Ras Beirut occupies an area of nearly 61 acres and consists of 64 buildings, seven dormitories and several libraries. Unfortunately the access to this unique parkland is restricted.