

CULTURAL LANDSCAPE PALIMPSEST AREA MODELLING: THE CASE OF MEDITERRANEAN BASIN

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ABSTRACT

The Mediterranean basin is rather isolated area with unique richness of cultural heritage sites. All of them reflect long – term cultural and land use changes associated with different regional civilization. In our research the combination of data about historical heritage sites and civilization areas was made via GIS-mapping and modelling. The analysis of World Heritage Database permits classify 190 sites of Mediterranean Basin into eight cultural landscape categories – rock paintings, remains of ancient settlements, architecture monuments, monasteries and castles, temples and necropolis, historical city centers, nature use systems, cultural landscapes. Eight civilization époque were defined – prehistorically, ancient, antique, early medieval, late medieval, modern age, recent time.

Each type of civilization change corresponds to the territory where cultural landscapes of various eras are superimposed and forms an area of landscape palimpsest. The areas of two- and three-layer palimpsests are formed under the relevant type of civilization change, i.e. two or three civilizations. The resulting map and data also represent a significant tool for future comparative studies focusing on unraveling the relationship between the formation lengths of historical records and the “civilization” time-scale in which past cultural landscapes were framed.

Keywords: *landscape palimpsest, civilization, world heritage, mapping*

INTRODUCTION

In physical geography and, in particular, in geomorphology the palimpsest is understood as set of uneven-age landforms on one area. Part of these landforms has been created millions years ago at other geological and climatic conditions and now represents relicts; other part continues to be formed also in the present moment [4]. The term a palimpsest is used also in cultural geography; where it reflects existence in a landscape of the certain signs and non-material symbols which have remained since the previous cultural periods [12]. In the course of anthropogenic impact man introduced in it various influence of culture which affected in transformation of landscape structure and a configuration of landscape patterns, development of traditional land management, creation of the linear and polygonal elements in a rural landscape making part of material and non-material cultural heritage. Elements of landscape structure and land use of different historical periods make an essential contribution to ecological stability and historical identity of a cultural landscape [8]. Cultural Landscape palimpsest is formed as a result of consecutive change within the same territory of different civilizations therefore can contain several layers [13].

From the point of view of GIS-modeling the spatial representation of the cultural and landscape palimpsest is the system consisting of natural and historical subsystems. The overlay and combination among themselves of their separate components allows defining independent areas of the spatially distributed phenomena. The difficulties arising in the process of mapping are connected as with the mixed nature of the most considered object — a cultural landscape, and with different temporary and spatial scales of the processes leading to its forming [5]. The cultural landscape as object of mapping represents set of the interconnected elements of three types: points, areas and tracks. As the main characteristic of point elements serves their localization connected with features of location. Polygon elements differ in a size, a configuration of borders and a form. Tracks (lines) bear in themselves property of the direction and have the extent (length) [14]. Such algorithm of mapping is useful at the local level to GIS-modeling of spatial structure of landscapes of high cultural and nature protection value.

Nevertheless, traditional cultural landscapes due to features of historical and social and economic development do not form a continuous area of distribution none region of the planet. As a rule at the regional level, three situations of their localization are typical. Historical and cultural monuments with the status of protected cultural landscapes are points in the background of the territory transformed during later industrial development. Ancient roads, trade ways, hydraulic engineering constructions, channels etc. inherited in modern farming systems are lines often combined with small areas of traditional forms of environmental management (can also be objects of protection). The third case is the areas of historically developed agricultural development, with housekeeping elements, characteristic of them – polyculture, terraces, water-mills, etc. the farms which have remained in modern system thanks to a special environment and the long history of civilization development which has already checked them for sustainability.

In this article we will consider the possibilities of allocation of cultural and landscape palimpsests on the basis of the analysis of areas of distribution of civilizations and objects of cultural heritage of the recognized world importance. In case of the long and unidirectional development areas of distribution of civilizations are imposed at each other and form zones of a palimpsest of traditional cultural landscapes of different historical eras.

MATERIALS AND METHODS

The main feature of the Mediterranean region is at least, two-thousand-year age of cultural landscapes of the region. For inventory of cultural landscapes the global database of the UNESCO World Natural and Cultural heritage (whc.unesco.org), given digital atlases for certain regions (DARMC — Andalusia) was used. In the GIS database each object was characterized by name of object and its type; country of stay; geographical coordinates; absolute height; emergence time; belonging to an ethnos/civilization; existence of overlapping of civilizations; type of a landscape (at an opportunity); object of protection; existence of problems of management. All allocated objects then were reclassified depending on type (points, lines, and polygons), a functional purpose and a typicalness in relation to the main type of development (table 1).

Table 1. Types of World Heritage Sites in Mediterranean Basin

Functional purpose	Type	Typicalness in relation to the main type of development
Rock paintings	Points	Medium
Ancient settlements	Points, rarely polygons	High
Buildings	Points	Low
Castles and convents	Points, rarely polygons	Medium
Necropolis and temple complexes	Points	Medium
Historical town centers	Polygons	High
Nature management systems	Polygons	High
Cultural landscapes*	Polygons	High

* also those objects which are entered in the List of the UNESCO World heritage under such nomination.

The specified categories of objects represent various value from the point of view of a typicalness of cultural and landscape complexes of the region, but all can be used as sources of verified and comparable data about properties and time of development [6, 3, 9].

Data on the reclassified objects were used for creation of schematic cultural landscape profiles of the Mediterranean regions in the Excel program.

The received database also was the basis for the thematic geographic information system "Civilizations and cultural and landscape complexes of the Mediterranean" made in a software package of ArcMap 10.0. The areas of distribution of 16 main civilizations of the Mediterranean were digitized (to a stage of Modern times and formation of the Western European civilization) by different historical atlases. By distribution of various civilizations and World Heritage sites different type of a landscape palimpsest were allocated. Depending on quantity of layers were allocated two - and three-layer cultural and landscape palimpsests.

At the last stage of work on the basis of multicriteria approach zoning of the region on degree of expressiveness of lines of the Mediterranean cultural landscape was carried out.

RESULTS AND DISCUSSION

According to idea that each Mediterranean civilization represents a certain chronotope — "spatio-temporal intercommunication" [10] it is possible to present the Mediterranean as set of "multilayered" regions of lower hierarchical level. The types of civilization changes defining character of a cultural and landscape palimpsest are the basis for allocation of such areas. On the basis of historical data [1, 2] was made the map of hypothetical areas of palimpsests of various civilizations for the period before fall of the Roman Empire (fig.1).

During regionalization of the Mediterranean Basin 9 historical and geocological regions of the first order differing in uniformity of landscape structure are allocated. Depending on stages of historical development the different number of regions of the second order is defined: before fall of the Roman Empire – 15, for the Postroman period – 7.

The history of civilization development of the Mediterranean contains about 8 thousand years (time of origin of a civilization of ancient Shumer; [7]) from which the most part fell on the period of the most ancient and ancient stage of development of human society. The analysis of historical and archaeological data allowed to localize rather reliably areas of distribution of civilizations of the Mediterranean at different stages of development of human society. At the same time a certain complexity was made by allocation of various types of civilizations during the period after approach of our era. In the periods of the early and late Middle Ages we found it possible to allocate a Christian civilization of the medieval West (in borders of Pyrenean and Apennine peninsulas), the Byzantine civilization (The Balkan Peninsula and Asia Minor), the Arab civilization and an Ottoman civilization.

Classification of civilizations and their "collision" in a new and latest historical stage, considerably, is defined by cultural and religious factors. On the other hand, this period already corresponds to an industrial stage of development of society, and others including technogenic factors become the main in differentiation of space.

Comparison of the course of distribution of civilizations and landscape features of the Mediterranean testifies to two major regularities that developed in the region by the time of blossoming of the empire of Ancient Rome. The earliest civilizations arose in the southeast of the region in river valleys in a zone of subtropical desert and steppe landscapes [11]. Gradually semi-arid landscapes were involved in development; the last developed the western areas with northern semi-humid landscapes. Thus, in the distribution change of local civilizations repeated change of a gradient of moistening — from drier to more h.

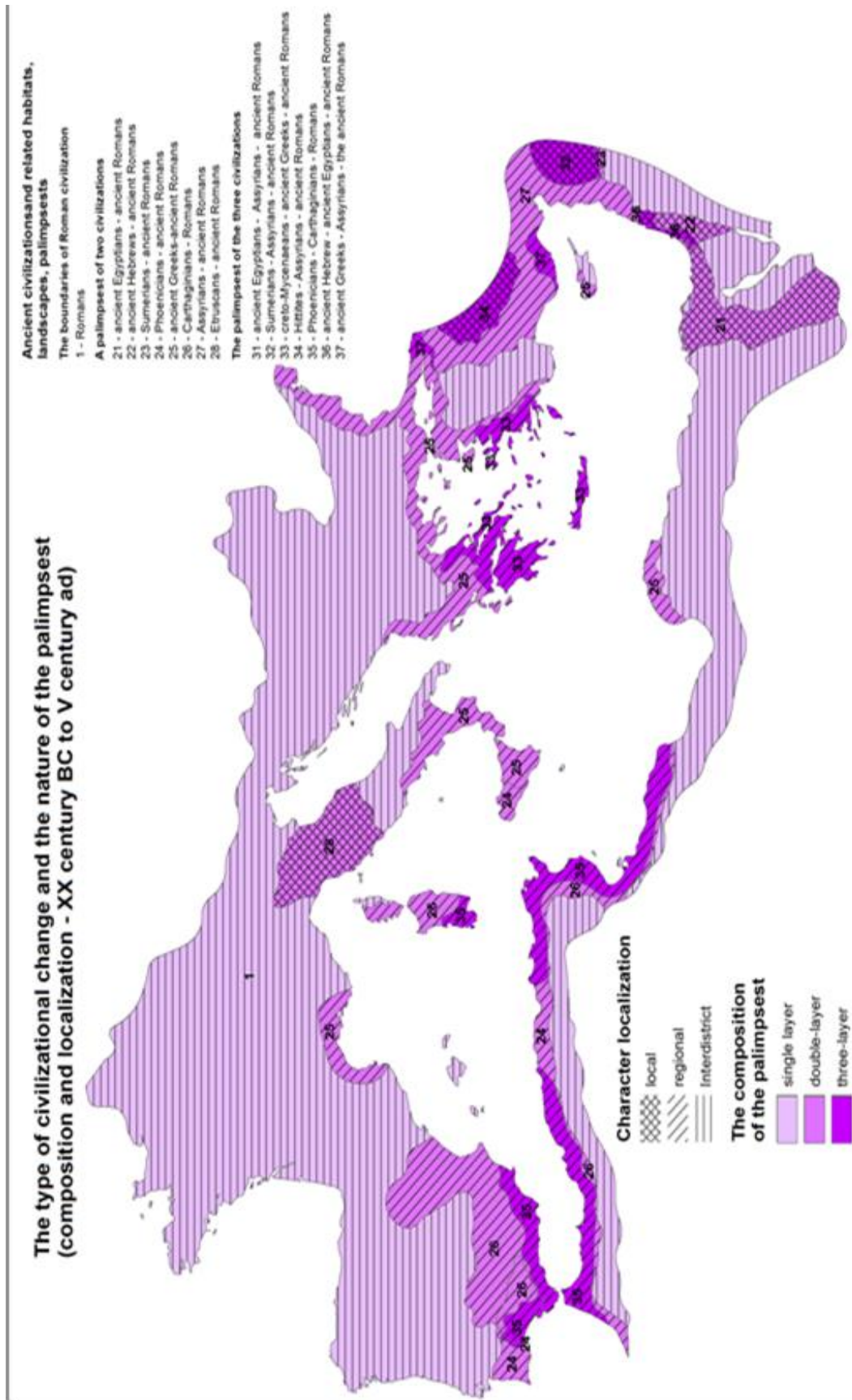


Fig. 1. Cultural landscape palimpsest in Mediterranean Basin (before the fall of the Roman Empire)

This direction was connected with change of nature of environmental management of civilizations — from the irrigated agriculture to forestry and mining developments. Along with this direction also expansion in preference of landscape levels is traced. After landscapes of river valleys of Mesopotamia and the delta of Nile islands in the Aegean Sea, coastal plains of the peninsula Asia Minor and the Balkan Peninsula, and then denudational plateaus and folded structures of the Apennine and Iberian Peninsula were involved in development.

Comparison of areas of distribution of civilizations and location of World Heritage Sites demonstrates that the main knots of a cultural and landscape framework were put at the last stage of an ancient Roman civilization. The analysis of history of development of cultural landscapes showed that a third of them treat more than one historical era, i.e. represent a palimpsest. At the same time 60% of such objects have age more than thousand years.

Cultural and landscape complexes were interpreted and as elements of model of structure. Two types of dot elements were allocated (separate architectural objects, monastic and castle complexes; temple complexes and necropolises), and also six types of areal elements (rock paintings; ruins of ancient settlements; historic centers of the cities; systems of environmental management; cultural landscapes, including palace and park ensembles). Linear elements as separate objects did not manage to be allocated, however they often are a part of areas. For example, object Alhambra (Andalusia) represents the palace fortress (locus), consisting of the constructions built from XII to the 15th century. The part of its vicinities is busy with gardens of the Generalife (area), another — castle which were surrounded with gardens and irrigation lands (huerta) earlier. On adjacent slopes — olive plantations and a landscape of a dehesa (a sylvopastoral landscape) transformed already to the Post Arabic time. Linear elements of a cultural landscape — the irrigation canal dewatering from Darro's stream and the road connecting fortress with underlying quarter Albaisin.

Nearly a third part (32%) from all considered objects is presented by historic centers of the cities — most of all them in North Africa, Levant and on the Iberian Peninsula. Systems of environmental management and cultural landscapes (both objects of this category, and park ensembles and some other objects belong to them) make more than one heel (23%) of all considered objects. Another 26% of objects together are the share of other types of areas — ruins of ancient settlements, rock paintings, monastic and castle complexes. The listed types of objects represent, first of all, relicts of a cultural landscape, but the part of them is used and now to still functional purpose.

CONCLUSIONS

The technique of mapping of landscape palimpsests developed on the example of the Mediterranean includes three stages: 1) the inventory of historical and archaeological data on World Heritage Sites and systems of environmental management and allocation of typical cultural landscapes of different civilizations; 2) GIS-mapping of areas of distribution of civilizations; 3) identification of areas of cultural and landscape palimpsests and drawing up historical and geocological portraits of areas.

The analysis of geographical and historical and cultural factors of formation of cultural landscapes of the Mediterranean showed existence in the region of rather extensive transitional strip of which it is characteristic as a number of the "Mediterranean" lines in the nature, culture and economy, and a number of lines of the neighboring regions. Crossing of matrixes of basin, climate zone and vegetation zone allows us to include in the macroregion along with a catchment basin of the Mediterranean Sea as well the territories occupied with landscapes of the western sector of a subtropical belt. They lie in the Central Spain and Portugal, and also the central part of the peninsula Asia Minor. The northern border of the Mediterranean in such understanding is washed very away. It is possible to include both

the submediterranean landscapes of the Central Balkans, and mountain landscapes of Northern Italy in it.

The similar spread of the Mediterranean is accurately marked also by civilization borders. Along with a transitional strip also the kernel of the Mediterranean cultural landscape of which material traces of an antique civilization, the remained agricultural activity (a plantation of traditional Mediterranean cultures of an olive, grapes or wheat), accurately expressed winter maximum of rainfall are characteristic is allocated.

On the basis of historical data it is revealed that by the time of emergence of the Roman Empire within the region there were already 8 types of two-layer and 7 types of three-layer cultural and landscape palimpsests which in certain areas, for example, on the Aegean coast of Asia Minor, in Egypt they are inherited also in modern structure of land use. The role of later civilization shifts consisted or in maintenance of traditional cultural landscapes, for example, in Andalusia, or in their elimination, for example, in the north of Africa. The last, as a rule, took place in peripheral parts of the region and it fell on the period of adverse climatic changes.

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