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1 Contents

2 Abstract

The main aim of this report is the illustration of the regional socio-economic dynamics in the coastal zone of Oraioklini in Cyprus, aiming to indicate the importance and values of coastal zone for the economic prosperity and the demographic changes in the area. Through this analysis the report aims to expose the influence beach erosion and climate change might have on the population dynamics of the coastal area. Coastal erosion is directly linked to economic losses due to coastal retreat and loss of land of significant economic value (sand beaches), ecological damage (especially of valuable coastal habitats) and societal problems. Especially, coastlines and beaches represent valuable buffer zones, protecting backshore from marine flooding while shaping the socio-economic environment.The coastal zone of Oraioklini region has been experiencing significant changes in recent decades. The area is located in the South region of Cyprus.The report collects and presents socio-economic data (demographic, urban-rural, land uses, protected natural sites, etc.) in order to estimate the social coastal vulnerability index (SocCVI) for deliverable D3.3.5. The aim is to indicate the importance of coastal infrastructure and the significance of coastal zone for the touristic and the overall economic activities of the Cyprus Case study area.Data used was from various open sources like open data Cyprus, Copernicus, etc.

3 Developing a Database

The first step towardsdeveloping a database is understanding the types of data to be used and how they relate to each other. There are three types of data that are used in the database of HERMES. Raw data, which are data from field measurements, bibliographical data, geographical data. Analytical data that were produced by analysing the previous categories and interpretive data. Field data is data collected at the site, such as sea level, beach profiling or sedimentological data derived by lab analysis of sediment samples. The location where the samples are gathered and the surrounding physical features are the site's geographic data. The final type of data are the interpretive data or data that are created by analysing other types of data. These types' data can be represented individually but are most effective when combined by the relationships that exist between the various data types. Numerous challenges arise when developing a database, including incomplete, inconsistent and inaccurate data.

3.1 Definition of standard terms and concepts

The large number of data variables within this data base may cause confusion. To help alleviate this problem, the standard definitions, presented in table 1,have been adopted.

Table 1: Standard definition of the database components

Data variable	A single, discrete, data item within a data group or set (e.g., data set=elevation, data variable=mean elevation).
System variable	A variable that references or identifies data variables with respect to their geographic location or the physical dimensions of the grid cells or points they represent.
Data group	A collection of data variables that have been derived from a single data source, such as the significant wave height.
Data set	A collection of data variables that have been placed into a single ARC/INFO TM export file and a comparable flat ASCII file.
Data base	All data sets

3.2 Database design and organization

The database is organized in four levels. In the first level the gathering of data is been made. The database comprises rough data typically derived from four sources: (a) maps and orthophoto maps; (b)

field observations; (c) laboratory analyses and (d) social and economic features (non-spatial attributes). In the second level the organization of the data is been made. The data are organized into two categories based on the scale of observation. The first (larger) scale is used to calculate the vulnerability in the case of the total length of the Cyprusshoreline, with the use of the CVI method of Thieler and Hammar-Klose (1999). The smaller scale of observation focus on highly vulnerable beach zones with high touristic, historical, natural, aesthetic and economic value. In level 3, once the information is organized, new thematic data can be generated for further utilization. That is allowed by combining data from different sources for mapping purposes, as well as by multi-temporal analysis of spatial and non-spatial data conceptual model of the environmental and socio-economic database. In the last level (level 4) the risk assessment is been made by utilizing the information that was produced in the previous levels. The coordinate system that was used in the database is the WGS 1984.

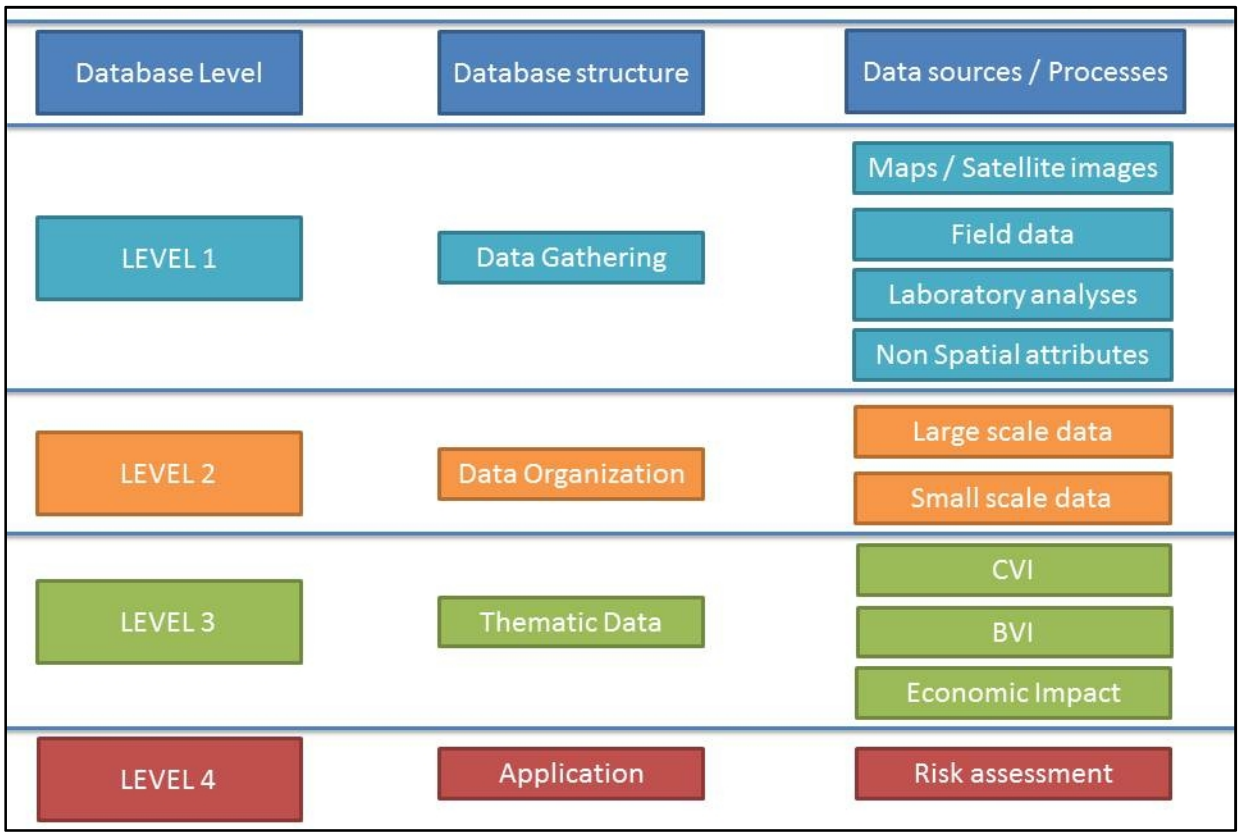

Figure 1: Conceptual model of the database

3.3 Large Scale data set

In HERMES project, the coastal shoreline has been produced in accordance with the Terms Of Reference, with the following characteristics as; seamless representation of the limit between land and sea; scale of 1:100, with an estimated average accuracy of 5 meters. This means that the position of the actual shoreline lies within a 5 meter radius of the representation of the shoreline. The coordinate system is based on the WGS 1984 horizontal reference system.

3.3.1 Geographical coverage

The Cyprus_Shore layer covers the whole area of the Cyprus shoreline and the area offshore which is included in the grid with coordinates. The large scale dataset contains information on elevation (relief), bedrock geology, geomorphology (coastal landforms), sea-level trends, evolutionary trend which describes the horizontal shoreline displacement (erosion or accretion), tide range, wave height and geomorphologic landforms. These data variables were selected for inclusion in this data base accounting of the role they play in determining the vulnerability of coastal areas to variations in sea level and long-term erosion. Besides, for the needs of the present investigation, the Cypruscoast has been divided into sub-regions, according to the regional wind regime.

3.3.2 Coding

The data sets that make up this data base include the following: elevation, geology, geomorphology, sea level trends, shoreline displacement, tide ranges, and wave heights. These data sets were obtained in a variety of scales and formats (e.g., as point, line, or polygon data). Therefore, the methods used to enter the data into the 10x10m grid cell vary betweendata sets. The variable descriptions used in this data base were derived from various sources. The following subsections provide a brief description of the data sources and the units/classification methods used in compiling each data set. The six variables controlling the CVI are determined and assessed on the basis of existing information (e.g. EUROSION, CORINNE programs), which are combined and interrelated spatially.

i. Geomorphology

The geomorphological ranking was made is based upon the identification of the coastal type by analysing satellite images from “Google Earth” according to which the following seven coastal types have

been recognized along the Cypruscoast (figure 3). The ranking include: HR: Rocky coasts and/or cliffs made of hard rocks (low level of erosion), sometimes with a rock platform. SR: Cliffs consisting of conglomerates and/or soft-rock (e.g. chalk), which are subject to low level of erosion, with pocket beaches (<200 m long), not localized on the segment. B1: Beach zones including small beaches (200 to 1000 m long) separated usually by rocky capes (<200 m long), B2: extensive beaches (>1 km long), often with strands of coarse sediment (gravel or pebbles), B3: extensive beaches (>1 km long) with strands of fine to coarse sand, M: Muddy coasts, represented by strands of muddy sediments, associated with deltaic deposits, HM: Man-made structures (ports harbours, marinas).

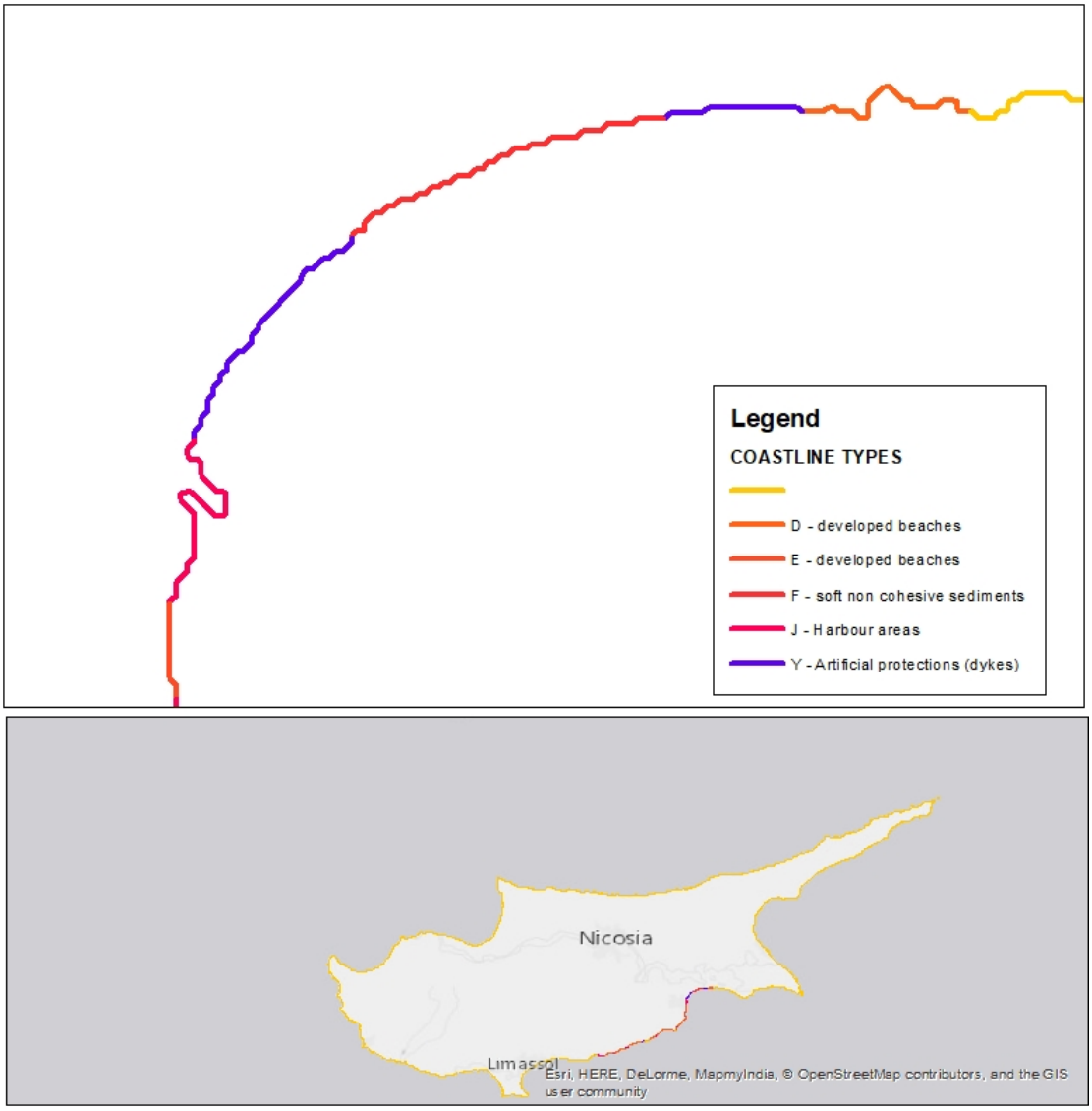

Figure 2: Coastline classification based on the geomorphology of the coastline.

ii. Evolutionary trends (Erosion or Accretion)

The stability of the coastline position of coastal areas with elevation less than 5 m above mean sea level has been assessed during the EUROSION project (2001). The ranking of coastline based on the erosion-accretion has four categories: S: Generally stable E: under erosion, A: Accretion, S: Stable (man-made coastline). In figure 4 is presented schematically the ranking of the Cyprus coastline based on the Erosion-Accretion trends derived by Eurosion 2001.

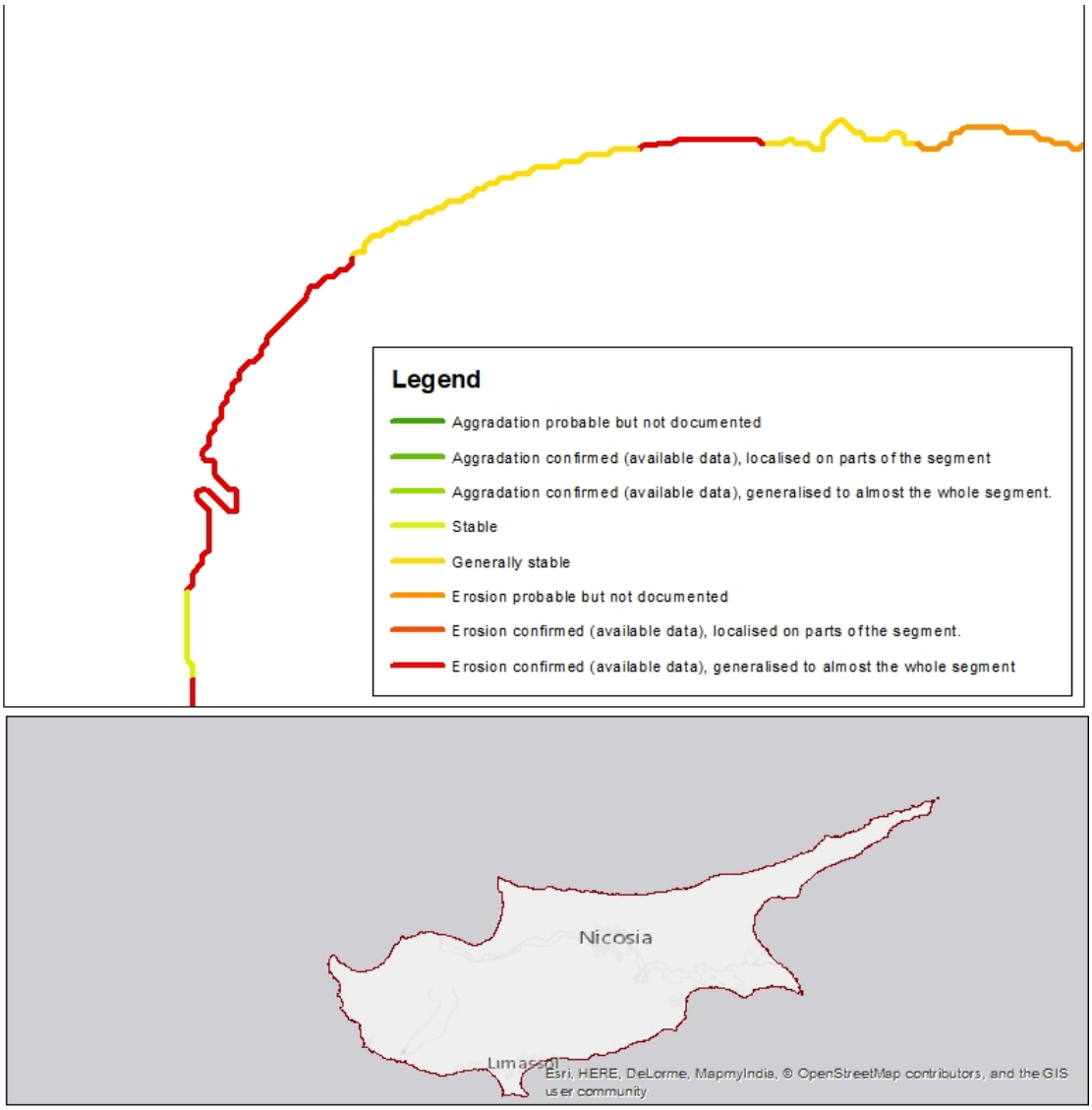

Figure 3: Coastline classification based on the evolutionary trends of the coastline.

iii. Coastal Slope

The coastal slope was estimated by the distance between the 5m isobaths and 5m elevation contour lines (Figure 5). For the ranking of the coastal slope was used four categories: L: low slope (<6%), M: Medium slope (6-9%), H: High slope (9-12%) and C: Cliff coasts (>12%).

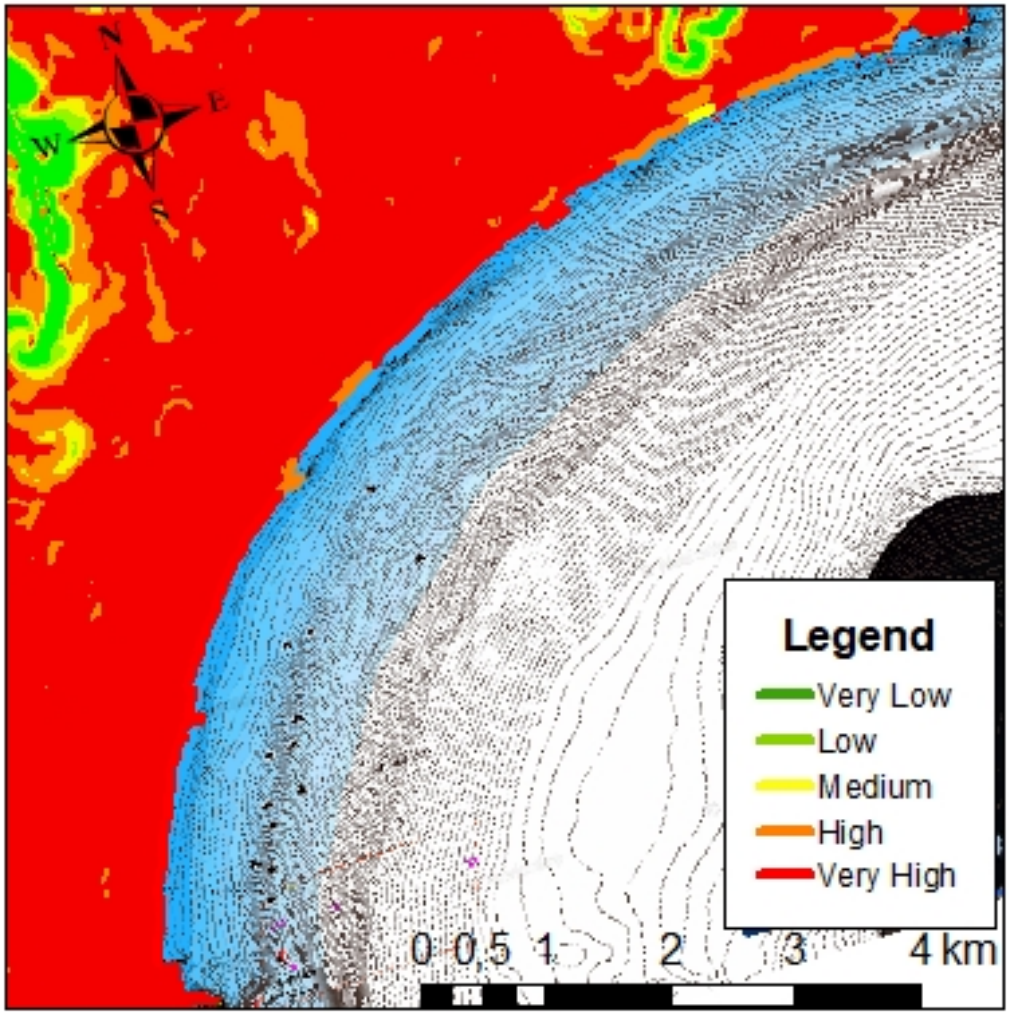

Figure 4: Coastline classification based on the coastal slope.

iv. Relative Sea Level Change

It is anticipated that climate change will lead to a rise in global mean sea level, primarily because of thermal expansion of ocean water and land glacier melt. Coastal areas could face a significant risk of increased flooding, inundation and erosion as a result of sea level rise. The extent of the rise and local variability in the rate of rise are important issues in planning how to respond. By the "worst case" scenario, global mean sea-level is expected to rise 95 cm by the year 2100, with large local differences

due to tides, wind and atmospheric pressure patterns, changes in ocean circulation, vertical movements of continents etc.; the most likely value is in the range from 38 to 55 cm (Warrick et al, 1996). The IPCC has modelled scenarios in which a rise between 9 and 88 cm between 1990 and 2100 is projected. The projected sea level rise will impact mainly on low lying areas such as marshes, tidal flats and deltas. Sea level rise leads through an increased tidal range to increased coastal erosion. Whilst climate change is unlikely to change significantly the total area at risk of flooding, it will increase the risk to which these areas are exposed. Therefore, it is also interesting to indicate which agricultural land, urban centres and areas of internationally-designated environment sites are potentially subject to sea level rise. Unfortunately the existing information base does not provide suitable data for such an assessment. Main requirement for the definition of flooded areas due to sea level rise is a DEM with a vertical resolution in the deci- or even centimeter range to accommodate the different ASLR scenarios. The northern coastline of the island of Cyprusexperiences sea level variations at least 38cm by 2100 based on the conservative model of the IPCC 2007. For the use of the project there will be examined scenarios with Sea Level Rise of 0.4m, 1m and 2m

v. Offshore Wave Climate

A complete operational oceanographic forecasting and observing system has been developed in Cyprus, covering the coastal and open deep sea areas around Cyprus and the Levantine Basin, and has been operational since early 2002. The system is called CYCOFOS-Cyprus Coastal Ocean Forecasting and Observing System and integrates the main features, which are required in GOOS, EuroGOOS and MONGOOS design. CYCOFOS is a result of several years of oceanographic research activities carried out in the framework of EU projects such as the MFSPP, MAMA and MedGLOSS. The CYCOFOS at present consists of several modules that provide regular NRT oceanographic information, both to local and sub-regional end users in the Levantine Basin. The oceanographic data bases related to coastal and open deep sea monitoring and forecasting activities in Cyprus consists of:

1) the *CYBO* (Cyprus Basin Oceanography) cruises, a long-term monitoring at coastal and deep sea areas of Cyprus and SE Levantine basins between 1995-2010. The CYBO project contributed to the updating of the Eastern Mediterranean Levantine database, in the frame of Medatlas oceanographic database and later on of the SeaDataNet and EMODNET.
2) the *Cyprus MedGLOSS* coastal stations provided long term monitoring of the ea level and water temperature, as part of the MedGLOSS and ESEAS networks, between 2001-2010

3) the CYCOFOS *HRPT* ground receiving station, provided between 1998-2015 remote sensing SST at any part of the Eastern Mediterranean Sea,

4) the *CYCOM & CYWAM* high resolution flow and offshore wave forecast models in the Levantine

within the framework of the above EU research projects promoting operational oceanography, the CYCOFOS, an operational Cyprus Coastal Ocean Forecasting and Observing System, has been developed for the sea areas around Cyprus and the Levantine Basin, Eastern Mediterranean. The CYCOFOS at present provides NRT (near real time) operational forecasts of sea currents, water temperature, salinity, sea level, significant wave height and direction. In addition, the CYCOFOS provides to the system's end users the SKIRON offshore wind fields in the Levantine Basin.

The first module of the CYCOFOS system has been providing operationally in-situ data since September 2001, while operational ocean forecasts have been provided on the system web page since March 2002. In the frame of the HERMES project in-situ data will be provided on-line by the HERMES buoy will be deployed in the Larnaca bay at the depth of 40 m.

At present the CYCOFOS forecasting system consists of the following modules:

- data acquisition from the CMEMS system and pre-processing of the initial and boundary data for the flow and wave models,
- the CYCOM model (an adaptation of the Princeton Ocean Model) used for high resolution hindcasts and forecasts of the flow in the Levantine and the Eastern Mediterranean sea,
- the CYWAM model (an adaptation of the WAM) used for coarse- and fine-grid wave forecasts. In the Mediterranean and
- the VIOD interfaces for the visualisation of the model's products.

The CYCOM-Cyprus Coastal Ocean Model (Zodiatis et al., 2002) is a version of the POM (Princeton Ocean Model, Blumberg and Mellor, 1987), that has been used in the MFSPP project for climatological and operational coastal and regional flow simulations. The CYCOM model is a high resolution flow model and has been upgraded to operational status since early March 2002. The main characteristics of the CYCOM model are: nonlinear equation of momentum, sigma co-ordinate system, time splitting with external-barotropic model following the CFL stability conditions and internal-baroclinic mode with longer time step, Cartesian co-ordinates, an Arakawa C-grid for the flow and Arakawa A-grid for the scalar fields, Smagorinsky horizontal eddy viscosity and a Mellor-Yamada vertical eddy viscosity using a 2nd order

turbulence closure sub-model. The CYCOFOS flow model provides on a daily base 5 days days forecasts of currents, sea temperature, salinity and sea level. Within the frame of the CMEMS the CYCOFOS flow forecasting system was upgraded and its resolution is 600 meter for the Levantine domain ans 2 km for the Aegean Levantine domain (Eastern Mediterranean), providing detailed informationof particular value near to the coast.

The CYCOFOS use a WAM model (WAMDI group, 1988) for offshore wave forecasts in the Mediterranean and the Levantine Basin. The CYCOFOS WAM model was upgraded to operational status in August 2014. The fine resolution Levantine WAM model is nested entirely in a coarse Mediterranean WAM model. The Levantine WAM model provides high resolution forecasts of the significant wave height and direction. The CYCOFOS WAM models use the hourly SKIRON wind forecasts.

The WAM wave model is a 4rd generation wave model, which solves the wave transport equation explicitly without any presumptions on the shape of the wave spectrum. The equation describes the variation of the wave spectrum in space and time due to the advection of energy and local interactions. The wave spectrum is locally modified by the input of energy from the wind, the redistribution of energy due to non-linear interactions and energy dissipation due to wave breaking and bottom friction. The adjective term is integrated with a first order upwind scheme. The source function is integrated with an implicit scheme, that allows an integration time step greater than the dynamic adjustment time of the highest frequencies in the model prognostic range.

vi. Tidal Data

Sea level variation over the past decades is due to the combined effects of astronomical and meteorological tides. The astronomical tide, in the case of Hellenic waters, is generally less than 10 cm, having as principal constituents the M2 and S2 (1-2cm) with phase angle of propagation between 0° - 330°. However, the overall fluctuation of sea level exceeds 0.5m due to meteorological forcing (differences in barometric pressure, wind and wave setup). The mean sea level fluctuations (the sum of meteorological and astronomical tide). These values are based on sea-level measurements conducted in major ports. While in figure 8 the tidal variation in the region of Cyprus is presented based on the work of Tsimplis 1994.

3.4 Data format and structure

The database is developed in coverage and shapefile formats. The structure of Cyprus_Shore is described in table 2.

Table 2:Cyprus_shore structure

Attribute	Type	Description
FID	OID	Unique object identifier (ArcGISattribute).
Shape	Geometry	Polyline (ArcGIS attribute).
Section	String	ReGion Code (1-6)
Orient	String	Orientation of the beach zone
Length	Float	Length of the segment in metres.
Beach_Width	Float	Width of the segment in metres.
Coast_Clas	String	Coastal Erosion Morpho-sedimentological code
Shore_Trent	String	Coastal Erosion Evolutionary trend
Hs	Float	Significant wave height value of the segment in meters
Tide	Float	Tidal value of the segment in cm
Sea_level	Float	Sea level value of the segment in mm
Coastal_sl	Float	Slope percentage of the segment in
CoastGeo	String	Geomorphological land forms

After the calculation of the mentioned variables the data set has been developed, with the use of ArcGIS. In the dataset the Cypruscoastline is been divided in smaller section based on the geomorphology. In the other columns are placed the corresponding numerical values of the other variables (e.g. tidal range, coastal slope, etc). Additionally, other information about the coastal sections are placed in the data base like coastal orientation, geomorphological landforms etc.

3.4.1 Rules for generalization

A segment should be at least 50 m long, but no maximum length is defined. If a segment has a different value for one of its attributes, then it should be split into two different segments, provided that each has the minimum length of 50 m. Some segments in the dataset may be smaller than 50 m. In such case, they are kept in to ensure consistency and to avoid losing accuracy. For new segments, the 50 m rule is applied.

In case segments need to be generalized to fit the minimum length requirement, the following rules should be observed:

1. Morpho-sedimentology criteria are offirst priority,

2. Evolutionary trend criteria are of second priority,

3. Different geology criteria are of third priority,

4. The presence of coastal defensesis of last priority.

Figure 5 gives an example of this kind of situation. Here, within an initial single segment, the characteristics of the three attributes change at different points. The first split will therefore be at the point of change in Geomorphological classification (result A), and the second split at the point of change in the Evolutionary trend (result B). Since the new median segment already has the minimum length of 50 m, it cannot be further divided at the point of change in Coastline geology.

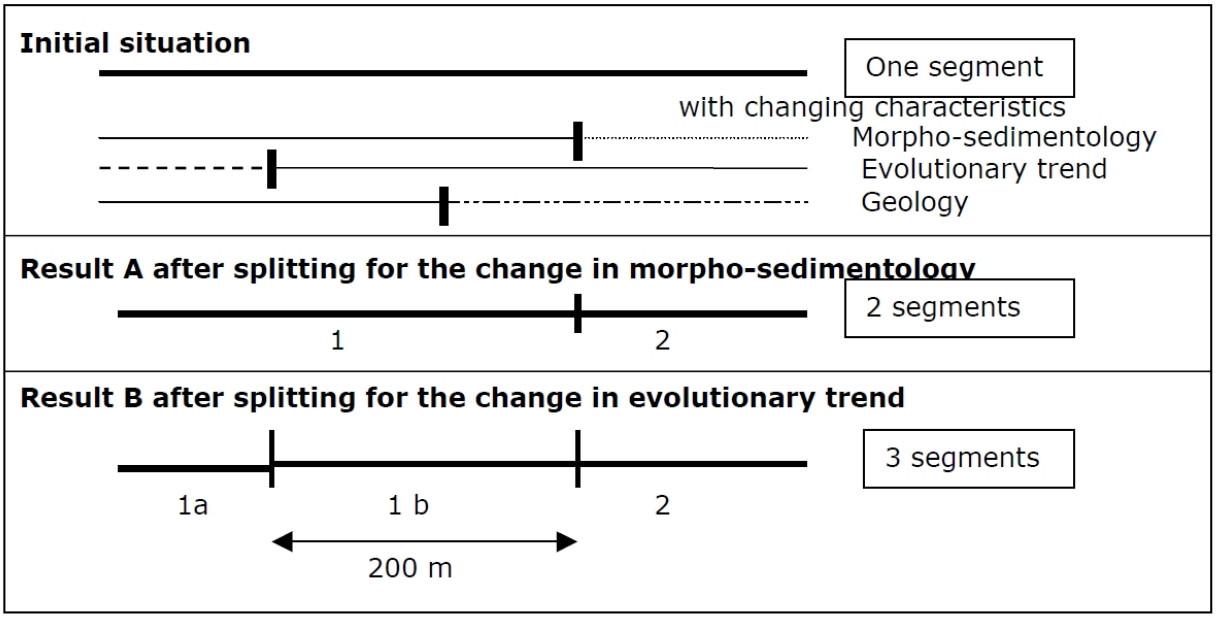

Figure 5: Hierarchy of segments classification in the Cyprus _shore layer.

4 Limitations and Restrictions of the Data

The data variables in this data base contain no known calculation or data entry errors. Because of the spatial extent of this data base the period of record, sampling frequency, and scale of the source documents varied. The use of averages and the choice of the grid cell size as the spatial scale for these data has minimized the error that might have been introduced into this data base, when these data sources were integrated into a single data base with uniform formats and scales. Of the data variables contained in this data base, only the sea-level-trend variables, derived from long-term tide-gauge records, may have significant error. The tide-gauge records used for calculating the sea level trends on the East Mediterranean were obtained from Cazanave et al., 2007 . These records have been examined and contain no evident errors, are of very high quality, and have been used in several sea-level-rise studies. The sparse station network, however, has made it necessary to calculate the sea level trend variables for intervening grid cells by calculating a slope line between the two closest adjacent stations. The confidence in the accuracy of the local subsidence variable and the relative and corrected sea-level-trend variables, estimated with this method, decreases as the distance from grid cells who are missing data and adjacent tide-gauge stations increases. If the distance, from a grid cell with no-data to the nearest two long-term gauge stations (i.e., the North and South of the no data grid cell), exceeds 100 km, then the sea-level-trend variable derived for the no-data grid cell may be erroneous.

5 Socioeconomic data for Larnaca area

Cyprus, excluding the occupied part, has a total population of 689,500, of this 474,500 urban (69%) and 215,000 rural (31%). Between 1982-2001, the total population grew by 35%; the urban population grew by 45% and the rural population by 15%. Cyprus has an open free-market economy, driven mainly by the tourist and service sectors as reflected in the contribution to the Gross National Product (GDP). GDP in constant 1995 prices has reached in 2001 just over 5 billion Cyprus Pounds. The broad Service Sector accounts for 75% of GDP. Cyprus' main trading partner is the European Union accounting for about 55% of imports and 40% of exports. The main characteristics of the Cyprus economy include a continuous economic growth, strong private sector, a large tourism sector and an openness to international trade Cyprus is the 25th out of the 48 countries included in the "high human development" group with a HDI of 0.877, following Hong Kong with an index of 0.880 and preceedingSingapore with an index of 0.876.

The spatial development pattern in Cyprus is characterised by two dominant trends, the sub-urbanisation and the coastalisation (Rempis et al 2018). Suburbanisation takes the form of rapid population growth and development sprawl in the suburbs located at the edges of the main urban areas. In this Report, the definition of "urban areas" follows that used in the recent Population Censuses and the Local Plans, under the Town and Country Planning Law (TCPL), referring to the areas including the towns and the surrounding expanding suburbs.

Coastalisation is a consequence of the rapid and sprawling pattern of coastal tourism development, and is equally dominant in Cyprus. As much as 95% of all licensed tourism hotel accommodation capacity is on the coast (the rest is located in Nicosia and the mountain resorts). Of all coastal tourism accommodation capacity, 55% is concentrated in the suburban tourism centres around the towns of Limassol, Larnaca and Paphos and as much as 40% is located in rapidly growing coastal village communities that have grown into tourism centres, notable in the settlements of Ayia Napa and Paralimni in the southern Famagusta District, which, unlike the rest of the rural areas of Cyprus that remained dependent on agriculture, recorded in the period 1982-2001 a population growth of 57%, higher than the growth of the coastal urban areas themselves.

The Coastal Zone in Cyprus there is no single legal or functional (planning) definition of the "coastal zone" or "coastal area". There are three main widely used geographical definitions referring to "coastal zone / area", each one related to the purposes of a different law and institutional context. First the

Foreshore Protection Law defines the “foreshore” as “all lands within 100 yards of the high water mark”. The foreshore area is public property falling under the jurisdiction of this Law. Second the New Tourist Policy of 1990 (under the Tourism Hotel Accommodation Law and the TCPL) designated a “zone” of 3 km. from the coastline for the purposes of control of tourism development. Last The Coastal Protection Study of the Coastal Unit of the Ministry of Communications and Works adopted for the purposes of the survey of coastal erosion problems a definition of the “coastal strip” as the area of 2 km. from the coastline. The small size of Cyprus and the close proximity of all areas to the coast, combined with the dominance of coastal tourism in building development and the economy, create a strong functional overlapping between the coastal area and other areas, blurring the coastal / hinterland distinction.

The coastal zone that extends 2 km inland from the coastline, covers 23 percent of the country’s total area, in which about 50% of the total population lives and works and 95% of the tourist industry is located, generating by far the largest source of household income. The average population density is about 17.5 persons per hectare. The Island has a total of 772 km. of shoreline, of which 404 km. are in the occupied northern area (52%); 72 km. are within the British Military Bases (10%); and 296 km. are within the area under Government control (38%). The shoreline overall is uneven and rocky (54%) with sandy beaches and many small coves (46%). The coastal zone is characterized by rich wildlife, long and small beaches, open areas, cliffs, capes, harbours, sand dunes, accumulations of pebbles, and, in general, marine and shore areas of prime ecological and scientific value.

The coastal zone is not a unified planning area, there is no separate institutional or land use planning framework specifically pertaining to the coastal areas. Coastal land use zones form parts of several Development Plans applying to different local administrative areas. Each section of the coast is covered by land use zones together with those covering the wider inland planning area falling under either a Local Plan (such as Limassol, Larnaca and Paphos) or by the out-of-urban-areas Statement of Policy for the Countryside. The existing Development Plans are demarcated along the urban/rural rather than the coastal/inland dimension. Only a relatively small section of the coastal area development is still controlled under the provisions of the old Streets and Buildings Regulation Law: (a) the area of Paralimni Municipality, including the Protaras tourism area, and (b) the parts of the coast that fall within the British Military Bases of Akrotiri, Episkopi and Dekelia of approximately 72 km. The extent of the land use planning zones in place along the coast is as follows: a) tourist zones cover approximately 103 km b) open areas/protected archaeological zones cover approximately 125 ks. c) agricultural zones cover 36 km d) residential zones cover approximately 17 km, and e) industrial zones cover approximately 9 km. The

greatest extent of coast under some form of protection is the Paphos District (62% of the coast) mainly due to the long stretch of the Akamas Peninsula, most of which is a national forest.

A hierarchy of Protected Areas, designated under the provisions of the Policy Statement for the Countryside, is in place in the coastal zone including the following categories and areas: i) Nature Protection Shores and Areas (ii) Protected Sites (iii) Areas of Outstanding Natural Beauty, and(iv) Archaeological Sites.

The exploration of the demographic characteristics of Larnaka has been based mainly on official data from Eurostat and specifically from the Census of Population of 2011. For comparison purposes data from the 2001 Census and from previous censuses has also been used. Furthermore, data from the other provinces or cities of Cyprus has also been used for comparison purposes, and in some cases reference is made to the overall results for the entire population of Cyprus. Sources for the data are the Department of Statistics, Population Census of 2011 primarily, but also population censuses ofearlier years; theDepartment of Town Planning and Housing; the Larnaka Local Plan revised in 2011 and approved in 2013, (e) the Municipality of Larnaka, Technical Department and Financial Department.The District of Larnaka has an area of 102,100 hectares (which accounts for 18.6% of the total area controlled by the Republic of Cyprus). The Greater Urban Area of Larnaka has an area of 12,155 hectares of which 3,206 hectares comprise the Municipality of Larnaka.

The total population of Larnaka as of the 1st October 2011 was 143,192 (urban and rural areas combined) which corresponds to 17% of the total population. In the urban area of Larnaka the population was 84,279 and the rural area was 58,435. Of the 84,279 in the urban area of Larnaka, 51,468 reside in the area pertaining to the Municipality of Larnaka. Larnaka is the third largest province in population number with an annual growth rate of 2.5% (an increase of approximately 3,000 per year). The limits of the Larnaka Local Plan comprise the following communities: Larnaka Municipality, the Municipality Aradhippou, the Municipality of Livadia, the Community Councils of Dromolaxia and Meneou, the seafront of the Community Councils of Voroklini and Pyla, and part of the area of the Community Council of KaloChorio. The largest communities in the periphery of the Municipality of Larnaka, in terms of population, according to data collected from the census of population of 2011 are: the Municipality of Aradippou with 19,228 residents, the Municipality of Livadia with 7,206 residents, the Community Councils of Voroklini with 6,134 inhabitants, Dromolaxia with 5,064 inhabitants, Kiti with 4,252 residents, Pervolia with 3,009 residents and Pyla with 2,771 inhabitants. With lower populations, follow the Community Councils of Meneou with 1,625 inhabitants, KaloChorio with 1,518 inhabitants,

Tersefanou with 1,299 residents, Troulloi with 1,175 inhabitants, Klavdia with 427 residents, Kelia with 387 inhabitants, and finally Avdellero with 218 inhabitants. According to the census of population of 2011, the urban area of Larnaka ranks third in population compared to the other urban areas in Cyprus, whereas its rural area ranks second compared to the other rural areas in the country. Larnaka presents a more balanced distribution between the urban and rural population compared to the other districts. Specifically, the urban population in the district of Larnaka accounts for 59% of the total population of the province compared to 73% in Nicosia, 77% in Limassol and 70% in Paphos. This scene may change over time and we may see population concentration in the urban area following the national trend if we take into consideration the population growth of the urban population in Larnaka recorded over the period 2001-2011.

5.1.1 Tourism Development in Cyprus

The physicalbeauty and cultural heritage of Cyprus provided the resources for the development oftourism whereas the mass tourism explosion in the 1960s transformed Cyprus into a masstourism centre (Ayres, 2000). Initially, tourist arrivals were limited, with accommodation units being confined to small-scale, family-run enterprises that were primarily located inthe hill resorts whereas less than one third were situated in the island's coastal towns (Christodoulou,1992). With the consent of the UN the Cyprus government was urged in 1963 todevise a tourism development plan in order to diversify from an agrarian economy andincrease foreign exchange earnings. By 1966 bed capacity increased by almost 10% withan increasing number of tourists being attracted to the coastal towns of Kyrenia and Famagusta,which from 1970 onwards accounted for 50% of total tourist arrivals (Ioannides,1992). However, tourism development was disrupted abruptly in 1974 when Turkeyinvaded Cyprus and occupied the northern part of the island (Figure 2).The invasion had a devastating effect on the economy as the majority of the touristfacilities were concentrated in the occupied areas of Cyprus (Ayres, 2000).The increase in tourist arrivals resulted from the emergence of large tour operators whopromoted the all-inclusive package at lower prices (Pearce, 1987), and technologicaladvances in the aircraft industry that made Cyprus accessible to northern Europeans (Ioannides,1992). By the early 1990s, Cyprus tourism had entered into a consolidation stagewith the economy becoming dependent on the tourism industry that served as the mainemployer and export earner with tourism accounting for 20% of the country's GNP. Inaddition, tourism supported other industries including the construction industry, agriculture,manufacturing, financial services, communications and transport (Hotiet al.,2006); hence,

tourism growth resulted in the destination enjoying a high standard ofliving, education, real incomes and healthcare access. However, as a result of the rapidgrowth of Cyprus tourism and the influence of external factors on the industry, a seriesof problems emerged including environmental pressures, infrastructure erosion andsocial tensions between locals and tourists. The unregulated construction of hotels at aclose proximity to the beach resulted in coastal pollution and change in the natural landscape.With the impacts of mass tourism development being evident in the Cyprus industry andfacing the threat of increasing competition from emerging destinations, the CTO decided to initiate a repositioning strategy

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