Is the coast a vector of socio-environmental inequalities in coastal urban areas?

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Abstract: Over 60% of the world population lives within a 150 km belt from the coastline. These territories that combine classic urban characteristics and natural features (coast, beaches, salt marshes, biodiversity reserves) are fragile but also attractive for residence, leisure and retirement. They are characterized by an unequal repartition of amenities, services, jobs as well as by uneven real estate prices. This geographical and social context raises the issue of inequality in the capability of using urban spaces, which can need a regulation from public authorities (ESCR Global Environmental Change Program, 2001).

A growing attention is paid by geographical research to uneven distribution of environmental properties. We propose to analyze environmental and ecological inequalities in the specific context of urban coastal areas in order to determine the influence of the coast on the structuring of this type of territories. Environmental and ecological inequalities can be defined as observed and perceived differences, in the relation between humans and their living environment, which can discriminate individuals or groups of individuals under 4 categories: territorial inequalities that refer to differences in the quality of territories and the distribution of population groups; inequalities in access to urban and environmental amenities that refer to unequal opportunities of mobility in the city, of access to spaces and public goods, as well as possibilities of choice of residence places; inequalities in nuisances and hazards exposure; inequalities in the capacity of action and interpellation of public authorities for the transformation of living conditions.

The aim of our study is to analyze through a quantitative analysis to what extent, coastal cities have specific socio-environmental characteristics compared to inland cities and to determine if those specificities may reinforce the socio-environmental inequalities in coastal territories.

Focusing on French medium sized urban spaces (between 100 000 and 200 000 inhabitants) we offer a comparative analysis of the spatial distribution of socio-environmental characteristics between coastal and inland urban areas. Then, still relying on this definition and on these indicators, we will focus on coastal urban areas.

Multivariate analysis of data show that cities are divided into two groups: coastal groups and continental ones. Coastal urban areas are defined by a more touristic profile. The population is older and lots of equipment is dedicated to this population. The building and development dynamic is strong. Among coastal cities, it is possible to define different geographical profiles whose characteristics can be analyzed in terms of socio-environmental inequalities. Inland urban areas are defined by a larger proportion of social, cultural and education equipment. The population is dominated by working population but the entrepreneurial dynamic is lower. The surface of agricultural land is higher and the use of green transportation is more common. Finally the risks exposure is lower. In a context of growing attractiveness, politic options can play a central part in limiting the development of inequalities and managing the consequences of the attraction of the coastal part of the city and the associated socio-environmental inequalities resulting from the competition between groups of population.

1. Introduction

The coast has played a significant role in the establishment and development of cities (Fujita and Mori, 1996). Coastal urban areas combine both attractive natural and urban features. Today, “half of the world’s population lives within 200 kilometers of a coastline and this figure could double in 2025” (Creel, 2003). Whether for leisure, vacation, retirement or workplace the coast is a very attractive area. The result of this growing attractiveness is an increase in urban development, sometimes over vulnerable coastal ecosystems such as wetlands, dunes and coral reefs (Piwowarczyk et al., 2013; Adger et al., 2005; Folke et al., 1991). Moreover these urban areas are characterized by an uneven distribution of services, jobs, infrastructures and natural amenities. This heterogeneity impacts strongly real estate prices, in average more expensive than in non-coastal urban areas.

Recently, a growing attention was paid to uneven distribution of environmental features (Haddad and Nedović-Budić, 2006; Werna, 2000). The link between the living environment and inhabitants is studied using measurements such as environmental justice (Gaffron, 2012; Mitchell and Norman, 2012; Ma, 2010), residential choices (Beer, 1999; Dökmeci and Berköz, 2000; Gottlieb and Lentnek, 2001; Hörnsten and Fredman, 2000; Ma, 2010; Margulis, 2002) or ecosystem services (Ahern et al., 2014; Karrasch et al., 2014; Maynard et al., n.d.; Piwowarczyk et al., 2013). It is recognized that those environmental disparities once they prevent people from developing properly - i.e., to have “an equal right of access to the system” which “is the most extensive of equal basic liberties for all” (Rawls, 1971) – can be considered as inequalities.

The specific social and geographical context of coastal urban areas raises the issue of access to urban and natural amenities for people, an issue that may lead to public authorities' regulation (ESCR Global Environmental Change Program, 2001). To understand and analyze the systemic distribution of inequalities in urban coastal areas it is important to know the global logic of amenities distribution.

Environmental and ecological inequalities (EEI) are observed and perceived differences, in the relation between humans and their living environment, which can discriminate individuals or groups of individuals under 4 categories:

- Territorial inequalities refer to differences in the quality of territories and the distribution of population groups on them.
- Inequalities in access to urban and environmental amenities refer to unequal opportunities of mobility in the city, of access to spaces and public goods, as well as possibilities of choice of residence places.
- Inequalities in nuisances and hazards exposure.
- Inequalities in capacity of action and interpellation of public authorities for the transformation of living conditions.

The concept of EEI covers both exposures and creation of inequalities, i.e. the influence of the environment on people and the influence of people's behavior on the environment. It is a systemic approach in which inequalities are considered interdependent (Bellan et al., 2007; Chaumel and La Branche, 2008; Deboudt, 2010; Durand and Jaglin, 2013; Emelianoff et al., 2007; Laigle, 2005; Laigle and Oehler, 2004). This definition allows addressing both social and environmental characteristics of urban coastal area. Most studies on EEI address only one facet of the concept. Indeed, the research field of EEI is investigated mainly through studies of environmental hazards but also of nuisance and risk, accessibility, empowerment, and territory quality, considering all these issues as inequalities (Brodach et al., 2007; Dozzi et al., 2008; Gueymard, 2006; Roussel, 2009; Tallet, 2012).

The purpose of this paper is thus to propose a systemic analysis of urban areas using the concept of EEI, through a quantitative approach, to study to what extent coastal cities have specific socio-environmental characteristics compared to inland cities and to determine if those specificities may reinforce the EEI in coastal territories.

2. Methods

a. Study area

Within the French territory, we studied 38 urban areas, defined following the French administrative category of inter-municipal areas, with populations between 100 000 and 200 000 inhabitants (table 1). These urban areas group several municipalities that are joined together so as to develop and manage a joint urban development project for their territory. Urban areas of the Paris area are not included because of specific dynamics linked to the proximity of the French capital. Focusing on urban areas level allows to study territories built by the interaction between political choices (economic development, urban planning, social balance of housing, urban policies) and residential choices (67, 5% of residential migration occurred inside the urban areas studied in 2008) and characterized by a stronger functional segregation of spaces and a greater diversity of natural and urban environments.

38 urban areas were studied who represent 979 municipalities, more than 5 million people and are spread relatively evenly throughout the national territory (figure 1). Among them, 11 are directly located on the coastline.

Name (UA: Urban Area)	Number of cities	Population 2013	Growing rate 2009-2013 (%)	Area size (km²)	Population density 2013
UA Boulonnais	22	120476	1,28	206,23	584,1
UA La Rochelle	28	161935	0,97	331,13	489
UA Pays de Lorient	19	191009	2,62	474,85	402,2
UA Sophia Antipolis	24	178954	1,39	486,37	367,9
UA Valenciennes Métropole	35	194408	1,52	263,84	736,8
UA Agglomération Côte Basque Adour	5	125911	3,3	82,39	1528,2
UA Alès Agglomération	50	100693	3,55	629,3	160
UA Amiens Métropole	33	179063	1,98	313,7	570,8
UA Annecy	13	144040	5,61	125,07	1151,6
UA Béziers Méditerranée	13	110589	2,29	251,26	440,1
UA Blois-Agglopolys	48	106818	3,6	793,5	134,6
UA Carcassonne Agglo	73	106148	2,94	980,13	108,2
UA Chalon - Val de Bourgogne	39	109304	3,72	446,83	244,6
UA Chambéry Métropole	24	127120	4,37	262,61	484
UA Chartres Métropole	47	124690	4,34	614,36	202,9
UA Colmar	14	104537	2,92	206,52	506,1
UA Douaisis	35	154768	1,62	236,5	654,4
UA Grand Angoulême	16	111054	4,42	193,39	574,2
UA Grand Avignon	13	179949	2,38	239,83	750,3
UA Grand Besançon	59	182627	3,07	433,23	421,5
UA Grand Poitiers	13	142088	2,17	275,38	515,9
UA Grand Troyes	18	133032	2,21	150,49	883,9
UA Hénin-Carvin	14	124820	1,31	112,45	1110
UA Laval	20	100081	5,08	438,55	228,2
UA le Grand Narbonne	38	123563	2,99	965,8	127,9
UA Niort	29	106443	4,69	542,92	196
UA Pau-Pyrénées	14	151642	2,06	182,97	828,7
UA Pays d'Aubagne et de l'Etoile	12	105547	1,45	246,21	428,6
UA Pays de Montbéliard	29	119996	1,89	179,57	668,2
UA Porte de l'Isère	22	101131	3,38	239,88	421,5
UA Porte du Hainaut	39	149685	1,22	324,04	461,9
UA Région Nazairienne et de l'Estuaire	10	121777	4,78	334,43	364,1
UA Roannais	40	104883	3,83	694,74	150,9
UA Saint-Brieuc Agglomération Baie d'Armor	14	118807	4,21	249,36	476,4
UA Salon Etang de Berre Durance	17	140085	2,37	516,69	271,1
UA Valence Agglo-Sud Rhône-Alpes	11	121889	2,13	235,99	516,5
UA Vannes Agglo	24	136655	4,59	520,78	262,4
UA Var Estérel Méditerranée	5	109337	0,71	352,16	310,4

Table 1: Description of the urban areas studied

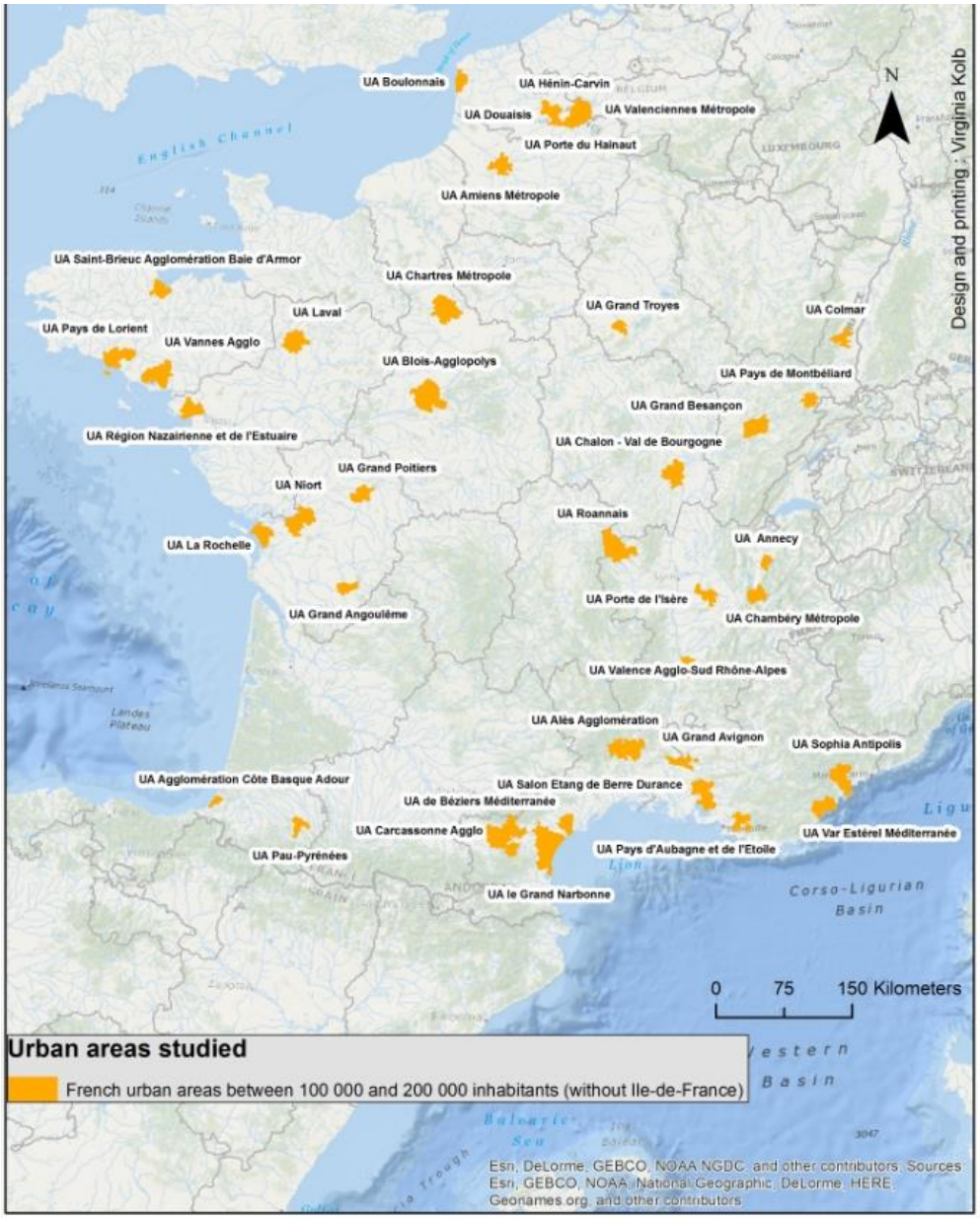

Figure 1 : Urban areas studied

b. Data selection

From the ESPON dataset (Hyper Atlas software © ESPON, 2013) we selected 42 variables a) describing both territories and population, b) relevant for the analysis of IEE and c) sensitive to the gradient coast-inland. The table below shows the selected variables (table 2). The data were standardized by using the data discrepancy to the global mean (Equ. 1), in order to work not only on the variables themselves but more on the differences existing between them.

$$x = \frac{\frac{Numerator}{Denominator}}{\left[\frac{\Sigma\, Numerator}{\Sigma\, Denominator}\right]_{context}} \times 100$$

(Equ.1)

Field	Data	Year of publication	Organization
Equipment (ratio between the equipment and the population of the area)	Social	2011	BPE/ INSEE
	Health	2011	BPE/ INSEE
	Medical and paramedical	2011	BPE/ INSEE
	Commercial	2011	BPE/ INSEE
	Education : primary school, middle school and high school, post high school infrastructure	2011	BPE/ INSEE
	Services	2011	BPE/ INSEE
	Sport socio-cultural	2011	BPE/ INSEE
	Tourism	2011	BPE/ INSEE
Population	Age : 0-14/15-29/45-59/60-74 (ratio calculated with the population of the area)	2009	INSEE
	Median income (ratio calculated with the all tax household)	2009	INSEE
	Employment status: permanent job , temporary job (ratio calculated with the working population)	2009	INSEE
	Migratory inflows (ratio calculated with the population)	2008	INSEE
	Work location: in the city of residence, in another city (ratio calculated with the working population)	2010	INSEE
Entrepreneurial dynamic	Business creation rate (ratio calculated with the total business)	2011	INSEE
	Businesses 5 year survival rate (ratio calculated with the total business)	2011	INSEE
	Number of job (ratio calculated with the working population)	2009	INSEE
Land use and transformation	Urbanized land (ratio calculated with the non built space)	2006	CORINE LAND COVER
	Agricultural land (ratio calculated with the area)	2006	CORINE LAND COVER
	Vegetation land (ratio calculated with the area)	2012	BD Topo
	Protected area (ZNIEFF) (ratio calculated with the area)	2013	MNHN MEDD
Residential specialization	Second Home (ratio calculated with the housing stock)	2008	INSEE
	Housing stock age: built before 1981, built between 1982 and 2005 (ratio calculated with the housing stock)	2008	INSEE
	Pace of building: house, apartment, total (ratio calculated with the area)	(2001-2013)	SITADEL
	Housing occupancy status of residence: owner, renter (ratio calculated with the residence)	2009	INSEE
	Public Housing (ratio calculated with the residence)	2009	INSEE
	Housing type: house, apartment (ratio calculated with the residence)	2009	INSEE
Risk and Nuisance	Number of risks (natural, industrial) (ratio calculated with the total number of possible risk)	2013	BD Gaspar
	Transport for commuting: green , motorized (ratio calculated with the working population)	2009	INSEE
Local life	Municipal election abstention (ratio calculated on the number of registered)	2008	Data.gouv

Table 2: Description of the data selected

The variables concerning equipment and entrepreneurial dynamism inform respectively on residential and entrepreneurial attractiveness. The data concerning population and housing explain the social and residential specialization. The land use and transformation variables describe the urban pressure on the territory but also the

environmental potential. All those data are good indicators to analyze inequalities of access and territorial inequalities. The variables about risk and nuisance describe the inequalities in risks and nuisance exposure and creation. Finally the data related to local life inform about the action capacity of local population.

c. Geographical context

Two spatial contexts were analyzed. The first approach focuses on the national level in order to highlight differences between coastal and inland urban areas. The second approach is the coastal context. This context of study permits an analysis of the variations between the 11 coastal urban areas

For each stage, we used the same method: a correlation matrix is performed with R software in order to discard inter-correlated variables (R Development Core Team, 2005). The confidence level chosen is 90%. A Principal Component Analysis is performed on the selected variables. All variables whose correlation is higher than 0, 75 are added as additional variables. These variables are not taken into account in the construction of the axis of the Principal Component Analysis. Then a Hierarchical Clustering is done on the results of the Principal Component Analysis to group individuals into classes.

3. Results

a. National context analysis: The differences between inland and coastal urban areas

Out of 42 variables, 35 were taken in consideration in the Principal Component Analysis once the inter-correlated variables discarded. The principal component analysis identified five principal components, which explained over 70% of variance in the data. Six out of the 35 variables - vegetation, protected area, businesses 5 years survival rate, median income, urbanized land and middle school equipment – did not load heavily on any of the principal components.

The Hierarchical Clustering (table 3) performed proposes a classification into 6 classes: 3 classes with mostly inland urban areas, 2 classes predominantly coastal and 1 class grouping southeastern urban areas (Figure 3).

Table 3: Description of the results of the Hierarchical Clustering of the national context (standardized data)

a)

Touristic urban areas	Mean in category	Overall mean
Tourism equipment	274,86	100,71
Service equipment	178,73	100,60
Second home	357,30	81,13
Commercial equipment	153,51	100,30
Risks	161,22	106,93
Building pace in apartment	464,23	147,99
60 to 74 years old	124,63	100,62
Urbanized land	492,08	170,73
Medical and para medical equipment	138,30	99,84
Building pace	246,96	129,06
Apartment	137,25	98,08
Social equipment	75,85	101,11
Median income	35,45	104,34
House	68,82	101,63
Public housing	50,06	100,22
Primary school equipment	77,64	100,91
0 to 14 years old	83,74	100,17
Agricultural land	20,13	95,42

b)

Dense urban areas	Mean in category	Overall mean
Green transport for commuting	126,83	97,55
Renter	114,06	99,09
15 to 29 years old	116,14	98,60
Temporary job	111,72	99,06
Social equipment	124,37	101,11
Apartment	131,52	98,08
Number of job	112,61	99,73
Post high school equipment	143,60	97,64
Middle school and high school equipment	116,63	100,38
Migratory inflows	106,37	87,81
Municipal election abstention rate	106,03	99,42
Businesses 5 year survival rate	93,16	99,08
Motorized transport for commuting	95,57	100,40
45 to 59 years old	96,30	100,24
House	73,75	101,63
Owner	89,05	100,77

c)

Unattractive urban areas with ancient housing	Mean in category	Overall mean
0 to 14 years old	116,50	100,17
House	133,55	101,63
Work location in another city	117,68	99,96
Public housing	138,28	100,22
Business creation rate	110,17	99,10
Housing stock built before 1981	109,97	100,71
Social equipment	83,01	101,11
Housing stock built between 1982 and 2005	75,23	98,24
Migratory inflows	66,97	87,81
Tourism equipment	36,33	100,71
Service equipment	66,77	100,60
Number of job	84,56	99,73
Apartment	60,13	98,08
60 to 74 year old	84,07	100,62
Commercial equipment	70,13	100,30
Work location in the city of residence	63,04	100,01

d)

Spread urban areas with high environmental quality	Mean in category	Overall mean
Vegetation land	174,04	96,81
Protected area	166,11	88,03
Owner	110,25	100,77
Business creation rate	107,86	99,10
Green tranport for commuting	75,97	97,55
15 to 29 year old	84,36	98,60
Migratory inflows	66,72	87,81
Permanent job	95,24	99,97
Public housing	66,48	100,22
Middle school and high school equipment	80,72	100,38
Renter	85,62	99,09
Post high school equipment	43,28	97,64
Number of job	80,32	99,73
Municipal election abstention rate	78,30	99,42

e)

Urban areas with a middle-age population's profile	Mean in category	Overall mean
Median income	173,99	104,34
Permanent job	105,32	99,97
Sport and socio-cultural equipment	129,28	101,83
Primary school equipment	113,70	100,91
45 to 59 years old	103,71	100,24
Social equipment	118,94	101,11
Agricultural land	122,52	95,42
Business creation rate	90,75	99,10
Temporary job	89,58	99,06
Building pace	65,31	129,06
Building pace in individual houses	80,26	114,86
Risks	79,83	106,93
Medical and para medical equipment	75,05	99,84

f)

Areas with urban sprawl and economic dynamism	Mean in category	Overall mean
Building pace in individual houses	166,60	114,86
Business survival rate	105,70	99,08
Median income	61,46	104,34

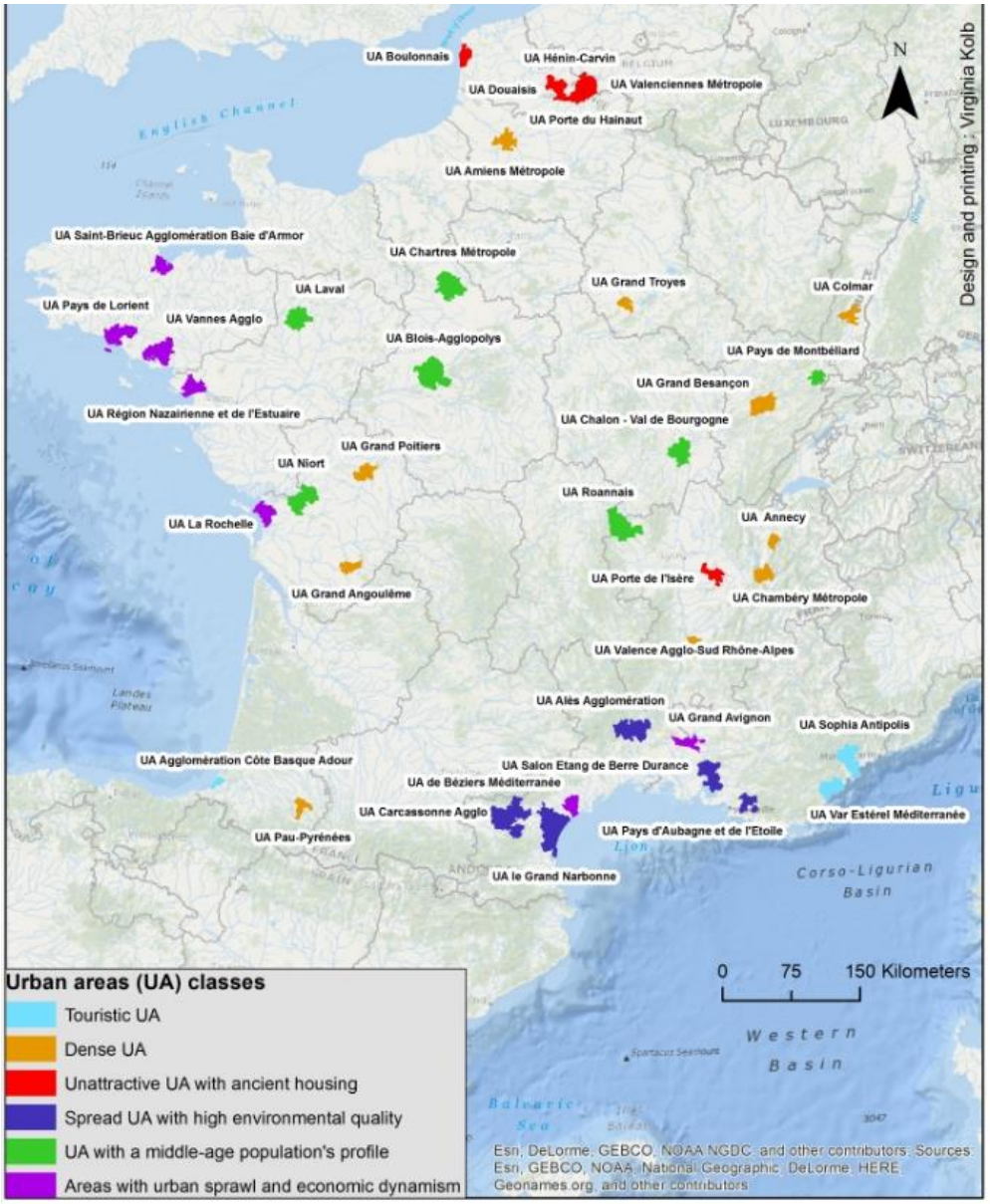

Figure 2: Urban areas' location according to the Hierarchical Clustering at the national context

Continental urban areas are characterized by two different profiles: dense urban areas (Table 3 b) and urban areas with a middle-age population's profile (Table 3 e). They have both a higher number of equipment compare to other classes. Dense urban areas have a larger level of social and education facilities. Urban areas with a middle-age population's profile are well equipped with more sociocultural, sports and social infrastructures. These two types are characterized by specific social profiles. Populations are mainly composed of employed people. The population of dense urban areas is dominated by young people (15-29 years), tenants, and temporary jobs. The population of urban areas with a middle-age population's profile consists of persons (with steady jobs and higher incomes. Dense urban areas have a larger dense urban core than other urban areas (Poitiers: 89 000 inhabitants, Besançon: 116 000 inhabitants). Urban areas of this class cover smaller land area (table 1) and have less available space for housing construction. Thanks to a large number of locally available jobs, people living in dense urban areas use more green transportation to get to work. Housing is mostly apartments. Migratory flows are higher than the average. The municipal election abstention rate is higher and survival rate of businesses is lower than in other classes. Urban areas with a middle-age population's profile have more agricultural land, are less subject to risks and have a lower building dynamic.

Coastal urban areas have very different profiles compared to continental ones. Two geographical groups are constituted. Touristic urban areas (Table 3 a) are strongly defined by touristic equipment and second homes. Touristic urban areas group entities of the south of France with 2 urban areas located on the East part of the Mediterranean Sea and 1 urban area located on the South Atlantic Coast. Touristic urban areas are characterized by high level of

equipment related to tourism, services and commerce. Urban areas of this group have a higher proportion of old people and more medical and paramedical equipment. The number of second homes is higher than in other groups. Touristic urban areas are subject to a higher number of risks than other area. Collective housing proportion is high and these territories are strongly urbanized. The urban areas of this class have little social equipment and less public housing than other territories. Urban areas with urban sprawl and economic dynamism (Table 3 f) are located at the center of the Hierarchical Clustering. The determinant data are a building pace clearly focused on individual housing and a higher business survival rate. Median incomes of the populations are below the national income average.

Two coastal urban areas are grouped with two continental classes. These classes show a spatial logic of grouping. Unattractive urban areas with ancient housing stock (Table 3 c) are characterized by high proportion of social housing. The population works in another town than the one where they live. The housing stock is mainly composed of old houses built before 1981. The rate of businesses creation is high. Unattractive urban areas with ancient housing stock have few social, services, commercial and tourism equipment and do not generate large migratory inflows. Finally spread urban areas with high environmental quality (Table 3 d) compose the last group. For this group the main factor is the proportion of vegetation and protected area. These two criteria are highly dominant. The businesses rate is high but the migratory inflow is low. People of this class are owners rather than tenants, have less stable employment and benefit from less equipment for education. The population is more involved in local life as the municipal election abstention rate is low.

b. Coastal context analysis : the differences between coastal urban areas

The same method is applied on coastal urban areas. Out of 42 variables, 21 were considered for the Principal Component Analysis once the inter-correlated variables discarded. The principal component analysis identified four principal components, which explained over 79% of variance in the data. The Hierarchical Clustering (table 4) performed proposes a classification into 5 classes: two are composed of only one urban area (Figure 4). The group of urban areas located in the middle of the Atlantic Coast still appears indicating a real closeness in the functioning of these territories. Two groups appear on the Mediterranean Coast.

Table 4: Description of the results of the Hierarchical Clustering at the coastal context (standardized data)

a)

Dense area with ongoing densification of urban fabric	Mean in category	Overall mean
Urbanized land	1140,79	201,76
Bulding pace in apartment	725,57	153,49
Bulding pace	394,50	129,86
Health equipment	134,11	100,63
Medical and para medical equipment	153,70	100,74
Migratory inflows	128,89	91,99
Houses	55,88	102,17
0 to 14 years old	79,66	100,20

b)

Touristic urban areas	Mean in category	Overall mean
Service equipment	154,59	100,04
Apartment	155,02	100,16
Tourism equipment	175,78	100,17
Risks	143,52	105,02
Vegetation land	167,42	96,63
House	71,54	102,17
Social equipment	83,46	100,48
Sport and socio-cultural equipment	64,71	99,51
middle school and high school equipment	74,30	100,17
Agricultural land	21,18	99,43
Primary school	79,84	100,41

c)

Urban area characterized by public actions	Mean in category	Overall mean
Public Housing	194,77	101,03
Green transport for commuting	130,95	99,22
Motorized transport for commuting	90,16	99,77

d)

Urban areas with low commuting and migratory flows	Mean in category	Overall mean
Work in the city of residence	124,45	101,74
Migratory inflows	67,22	91,99
Work in another city	73,54	98,13
Permanent job	91,26	99,55

e)

Urban areas with a middle-age population's profile	Mean in category	Overall mean
Permanent job	103,42	99,55
45 to 59 years old	102,42	99,61
Sport and socio cultural equipment	117,25	99,51
Business survival rate	104,79	99,74
House	118,91	102,17
Tourism equipment	66,96	100,17
Second home	34,91	104,22
Service equipment	75,60	100,04
Business creation rate	89,67	97,97
Commercial equipment	83,45	100,55
Apartment	70,34	100,16

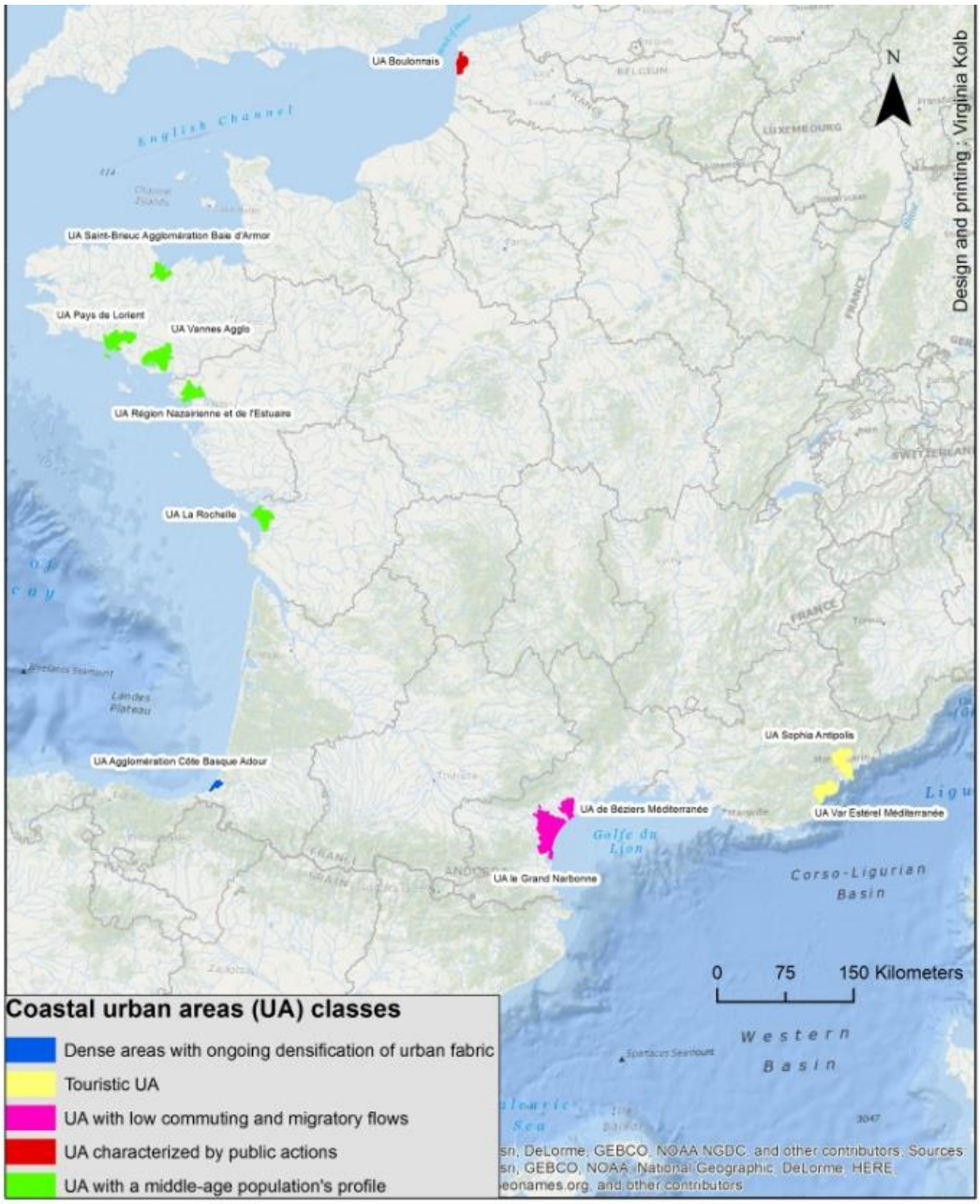

Figure 3: Urban areas' location according to the Hierarchical Clustering at the coastal context

Dense urban area with ongoing densification of urban fabric (Table 4 a) represented by the Côte Basque Adour stands out because of a very fast pace of building and a territory highly urbanized. This pace of construction is supported by the importance of migratory inflow. This urban area is more equipped with medical and paramedical infrastructure. The population is older and the proportion of children under 14 years old is lower. The urban area characterized by public actions (Table 4 c), like the Urban Area of the Boulonnais is defined by an important number of public housing and an increased use of green transport (walking and public transport). Touristic urban areas (Table 4 b) are more oriented towards tourism. These areas have a significant number of services and tourism equipment, are more exposed to risks and have a significant part of the territory cover by vegetation. Touristic urban areas are characterized by less education facilities for young people and the space dedicated to agricultural land is smaller. Urban areas with low commuting and migratory flows (Table 4 d) are defined by a large number of people working in their town of residence. Migratory flows are lower than the average of coastal urban area and the proportion of permanent jobs is lower too. The group of urban areas with a middle-age population's profile(Table 4 e) located in the middle of the Atlantic Coast is characterized by a population around the fifties, with permanent jobs and a great number of houses. Urban areas with a middle-age population's profile offer more cultural and sports facilities. There

are less second homes, less equipment in tourism, commerce, and services. Businesses have a good survival rate, but the rate of business creation is below average. With more houses than apartments the sprawl of the territory is wider.

4. Discussion

Our study confirms that coastal cities have specific socio-environmental characteristics compared to inland cities and that those specificities may reinforce the EEI in coastal territories. In medium sized urban areas different criteria influence the distribution of environmental and ecological inequalities (EEI). Being located on the coastline is a vector of inequalities but not the only one. Other geographical factors play a key role in the distribution of socio-environmental and ecological inequalities. We verified that medium sized urban areas located on the coast are different from others located far from the coast. The socio-economic indicators show that EEI are stronger. The coastal factor alone, do not explain that they are more unequal than others, but the location on the coast often result to more specialized urban areas where certain equipment or investments are adverse to public policy or choices that could reduce EEI. Conversely, more inland cities where the effect of specialization related to the coast does not appear have properties that make them places with less EEI. As far as EEI in coastal cities is concerned, it is important to note that the change of perspective from a national context to a coastal context allows a better understanding of spatial distribution of inequalities. When considering the 38 selected urban areas, the group of urban areas located in the middle of the Atlantic Coast stands out with a strong building and entrepreneurial dynamism ; on the other hand, when considering only the coastal urban areas, the middle Atlantic regions is described by a population in their fifties with stable jobs and a non-touristic profile.

The second criterion is the urban area surface. This criterion is critical in the existence of certain inequalities because our results show that in compact urban territories (Table 1) populations are younger and more vulnerable (temporary job, renter, municipal election abstention rate) as in less compact territories where populations have better socioeconomic situations (permanent job, median income, and owner). It also affects the impact of population on territories because in compact urban areas, populations have less impact on their living environment but have less access to natural amenities inside the urban area because of a higher building density. People are less subject to the production of EEI externalities related to transportation because they have the ability to use sustainable transportation modes, those infrastructures being easier to plan by public authorities in compact cities. Finally, it appears that a more concentrated urban territory, often defined by more precarious and young populations negatively influences citizens' participation in local life as the municipal abstention rate is higher in these territories.

Last but not least the third criterion that adds its influence to the distribution of EEI is the coastal profile. Coastal urban areas have generally more dynamism as far as business is concerned, strong urban sprawl or densification dynamics and strong social specialization. They are under rapid and intense change but they face difficulties of access to urbanity for young and precarious people. Variables related to vegetation or environmental protection, have little weight in our analysis; it still remains that coastal territories provide obvious environmental amenities, although sometimes vulnerable to urban changes and artificialization. The societal valuation of the sea and of the coast is a factor of attractiveness (Creel, 2003) and increases anthropogenic pressures on natural environments through urbanization and the competition between different groups of populations. The coast can thus be considered as a vector of socio-environmental inequalities in urban areas. The coastal amenity generates a competition for land resources between groups. It also affects local equipment supply. All this, is of course dependent on urban planning policies and options; policies may be more or less prone to inequalities regulation, even though at international level the French and European context could be considered as more regulated than other regions. For example, one can think here about the pre-emption right that some urban areas in France can use. Established by the Act of July 10 1985, the right of pre-emption is a decentralized procedure that allows inter-municipal institutions, when a property is sold, to acquire in priority for a better implementation of their land-use, urban planning and environmental policies (Joye and Struillou, 2012). One can also think of rent control policies aiming at supporting access and affordability of housing (Haffner et al., 2012; Sims, 2007; Yates and Milligan, 2012). A law is currently being considered in France in order to regulate rents in certain cities (*LOI n° 2014-366 du 24 mars 2014 pour l'accès au logement et un urbanisme rénové*, 2014). The opportunity and consequences of this type of long-term regulatory approach are still extensively discussed. Although it gives to precarious people the possibility to access to housing, it does not guarantee the availability of housing, or the quality of this housing (Sims, 2007). One of the negative effects may be the decrease rental accommodation.

5. Conclusion

Highlighting inequalities involves comparing spaces, places or social groups to determine those who are less endowed than others. The concept of environmental and ecological inequalities argues that social and environmental inequalities are intrinsically linked and influence each other (Durand and Jaglin, 2013). Therefore revealing

environmental and ecological inequalities is revealing a system of inequality. This approach requires data available at comparable scales.

In this paper a systemic analysis of urban areas was proposed using the concept of environmental and ecological inequalities. The question that guided our research was to understand the influence of the coastal factor on the distribution of environmental and ecological inequalities. We have seen that the coast is not the first determining factor but can act as a strong indirect factor. Yet it has an important weight in the distribution of EEI including increasing competition between population groups, and decreasing access to urban amenities for young and precarious people. In order to get a better knowledge of inhabitants' logics and choices, it is necessary to adopt, at local scale, a different methodology. This is why this work will be followed by another phase with a focus on the realization of interviews with people to understand how these inequalities impact their daily lives.

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