



European Geosciences Union General Assembly 2017

Vienna | Austria | 23–28 April 2017

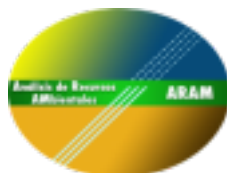
EGU.eu

SOILS DIVERSITY IN THE SOUTHWEST OF IBERIAN PENINSULA

Beatriz Ramírez¹; Luís Fernández-Pozo¹; José Cabezas¹; Rui Alexandre Castanho^{1*}; Luís Loures²

1 Environmental Resources Analysis Research Group (ARAM). University of Extremadura. Badajoz. Spain.

2 ESAE – Portalegre Polytechnic School, Portugal and Research Centre for Spatial and Organizational Dynamics (CIEO), University of Algarve, Portugal.



INTRODUCTION

An increase in the development of Digital Soil Cartography methods has been noticed in recent decades. The proposal put forward by the World Reference Base for Soil Resource (WRB) (FAO, 1998) establishes that, for the World Map Soils, a first level with 30 soils typologies and for the second 531.

In Europe, the development of this mapping has been coordinated by European Soil Bureau Network (ESBN), the European Environment Agency (EEA) and also by Food and Agriculture Organization of the United Nations (FAO), identifying 26 first level soils typologies and 134 from the second level.



INTRODUCTION

Taking as reference the mentioned soil map, the research group have been studied the pedodiversity in the Southwest of Iberian Peninsula (Euro region Alentejo-Centro-Extremadura, EUROACE) through the use of Geographical Information Systems and diversity algorithms.

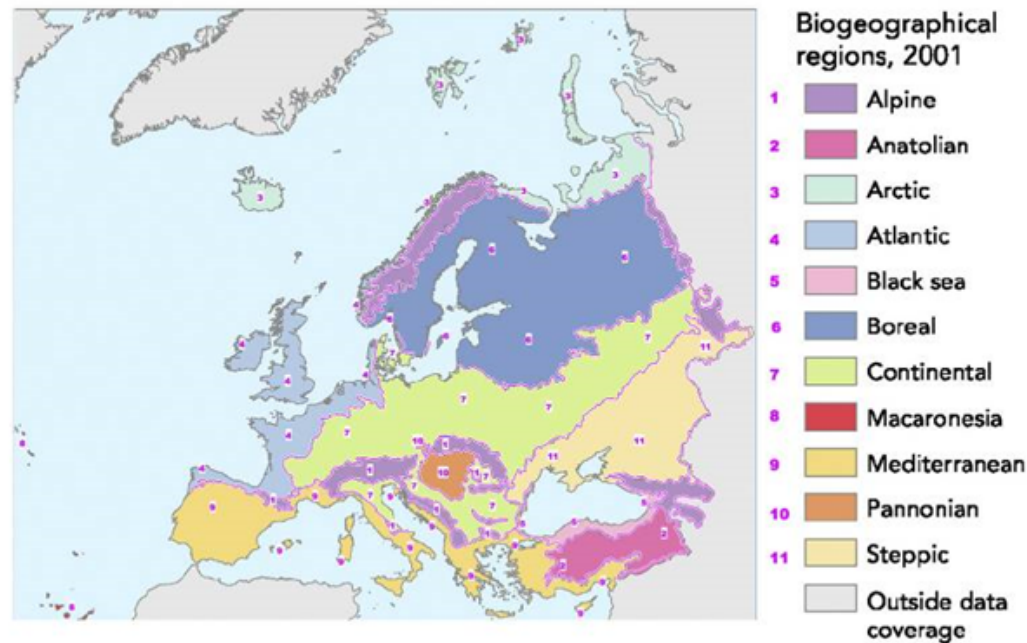


Fig. 1. Biogeographical Regions of Europe.

The pedodiversity concept, takes its origin in ecological measures and defines, according to Ibañez et al., (1998): “the soil variability in a specific area or region, determined by its constitution, types, attributes and the conditions in which the different types of soils were formed ”.

The edafodiversity analysis, using diversity indexes, has allowed to approach in a quantitative and rigorous way the soils geography, and also enable to classify to the edafo-rate according to their spatial distribution typologies.



MATERIALS AND METHODS

Cartography:

European Soil Database, ESDB V2.0, (EC,2004)

Soil Atlas of Europe (EC, 2005)

Pedodiversity :

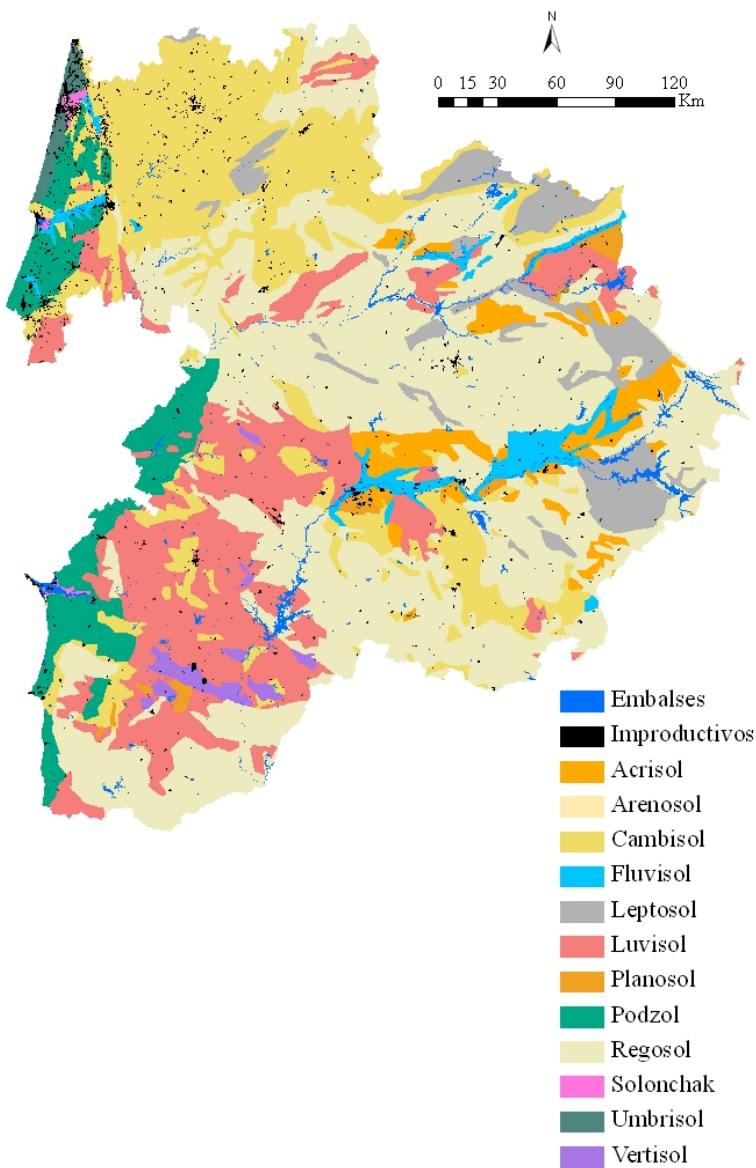
Shannon Index (H')

Shannon Uniformity (E)



EUROACE is located in the Southwest of Europe, covering the regions of Alentejo and Centro (Portugal), and Extremadura (Spain). Those regions shared not only the borderline but also a large range of similar features such as: ecological, socioeconomic and environmental. It occupies an area of 92532 Km².

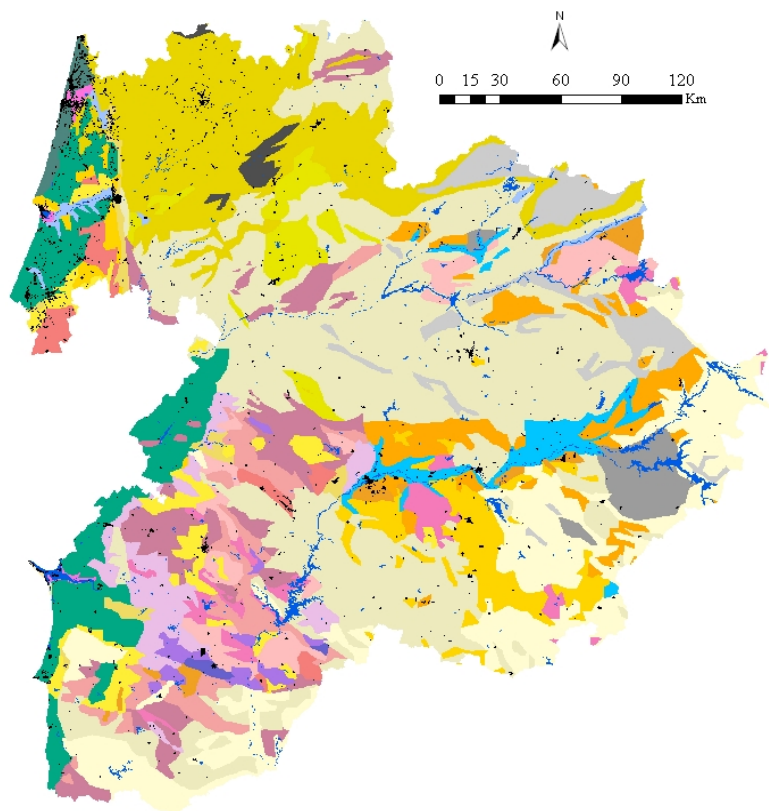
RESULTS



FIRST LEVEL SOILS

12 Types of First Level Soils. NP (Number of polygons). A (Total surface in km²). S (% of occupied surface). H' (Shannon Index). E (Shannon Uniformity)

First Level Soils	WRBF	NP	A	S	H'	E
Acrisol	AC	26	3406	3.8	0.13	
Arenosol	AR	2	15	0.0	0.00	
Cambisol	CM	92	18520	20.9	0.33	
Fluvisol	FL	27	2196	2.5	0.09	
Leptosol	LP	21	5258	5.9	0.17	
Luvisol	LV	102	14985	16.9	0.30	
Planosol	PL	11	784	0.9	0.04	
Podzol	PZ	11	5353	6.0	0.17	
Regosol	RG	49	36767	41.4	0.37	
Solonchak	SC	14	128	0.1	0.01	
Umbrisol	UM	11	441	0.5	0.03	
Vertisol	VR	13	856	1.0	0.04	
TOTAL	12	379	8708	100.0	1.67	0.67



Embalses	Luvisol cálcico
Improductivos	Luvisol crómico
Acrisol gléico	Luvisol férreo
Arenosol háplico	Luvisol gléico
Cambisol calcárico	Luvisol háplico
Cambisol crómico	Luvisol vértico
Cambisol dístico	Planosol eútrico
Cambisol eútrico	Podzol háplico
Cambisol mólico	Regosol dístico
Fluvisol calcárico	Regosol eútrico
Fluvisol eútrico	Solonchak gléico
Leptosol dístico	Umbrisol arénico
Leptosol eútrico	Vertisol crómico
Leptosol háplico	Vertisol pélico

SECOND LEVEL SOILS

26 Tipos de First Level Soils. NP (Number of polygons). A (Total surface in km²). S (% of occupied surface). H' (Shannon Index). E (Shannon Uniformity)

Second Level Soils	WRBF	NP	A	S	H'	E
Acrisol gleico	ACgl	26	3406	3.8	0.13	
Arenosol háplico	ARha	2	15	0.0	0.00	
Cambisol calcárico	CMca	34	3363	3.8	0.12	
Cambisol crómico	CMcr	7	702	0.8	0.04	
Cambisol dístico	CMdy	10	1921	2.2	0.08	
Cambisol eútrico	CMeu	22	2164	2.4	0.09	
Cambisol mólico	CMmo	19	10371	11.7	0.25	
Fluvisol calcárico	FLca	9	1695	1.9	0.08	
Fluvisol eútrico	FLeu	18	501	0.6	0.03	
Leptosol dístico	LPdy	15	3220	3.6	0.12	
Leptosol eútrico	LPeu	3	1562	1.8	0.07	
Leptosol háplico	LPha	3	476	0.5	0.03	
Luvisol cálcico	LVcc	8	1136	1.3	0.06	
Luvisol crómico	LVcr	20	1615	1.8	0.07	
Luvisol férreo	LVfr	15	2820	3.2	0.11	
Luvisol gleico	LVgl	11	2381	2.7	0.10	
Luvisol háplico	LVha	34	4515	5.1	0.15	
Luvisol vértico	LVvr	14	2518	2.8	0.10	
Planosol eútrico	PLeu	11	784	0.9	0.04	
Podzol háplico	PZha	11	5353	6.0	0.17	
Regosol dístico	RGdy	38	27266	30.7	0.36	
Regosol eútrico	RGeu	11	9501	10.7	0.24	
Solonchak gleico	SCgl	14	128	0.1	0.01	
Umbrisol arénico	UMar	11	441	0.5	0.03	
Vertisol crómico	VRcr	11	700	0.8	0.04	
Vertisol pélico	VRpe	2	156	0.2	0.01	
TOTAL	26	379	88708	100.0	2.52	0.77

DISCUSSION

At EUROACE the research was identified 12 first level soil typologies and 26 of the second level, prevailing Regosols and Dystric Regosols respectively, whereas in the Euro-mediterranean Region (Ibañez et al., 2013) the soils types were 22 and 71 respectively, with predominant for Cambisols and Calcic Cambisols.

The Shannon index (H') is lower in EUROACE (1.67 vs 2.52) for first and second level soils typologies, that in the Euro-mediterranean Region (2.42 vs 3.35), so EUROACE has lower pedodiversity.

The EUROACE soils show a more balanced distribution (E) regarding the second level of soils types, 0.77 vs 0.67, while in the Euro-mediterranean Region the opposite scenario occurs, once are the first level soils, against the seconds, which presents a more balanced distribution, 0.70 vs 0.67.

CONCLUSIONS

The present study contributes to the development of pedodiversity inventories, and also aims to establish and promote tools for further studies on soils degradation susceptibility, which allows not only to protect a pivotal piece of the European Natural Heritage, and even adopting specific measures to increase the soil management/land use and the spatial planning, basic principles for the sustainability of the all system.

The present work may enable further researches, highlighting the sustainability of the territory, to get closer to a sustainable development and land use management.



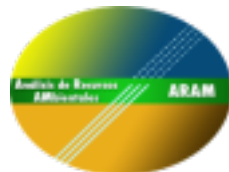
European Geosciences Union General Assembly 2017

Vienna | Austria | 23–28 April 2017

EGU.eu



THANK YOU FOR YOUR ATTENTION



JUNTA DE EXTREMADURA

The assistance to the congress has been possible by the research help GR15149 financed by the Junta of Extremadura (Spain) and the European Regional Development Fund.