A New Soil Cartography at 1:100,000 scale for mainland Portugal

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01

Introduction and Objectives

Introduction and Objectives

Portugal does not have detailed and complete soil maps at a scale that is useful for environmental management.

Existing data is:

- Inconsistent and spread across different organizations;
- Different in terms of scale, methods used and classification systems;
- Often old maps converted from paper to digital, with missing or incorrect information.

The **General Soil Map of Portugal (1:1,100,000)** is still the only national tool for soil information.

Create a **new soil map for mainland Portugal** at a 1:100,000 scale.

02

DATA

DATA

Soil Maps:

- Soil Map of the Entre Douro e Minho Region (1:100,000);
- Soil Map of the Central Interior Zone (1:100,000);
- Soil Map of Northeast Portugal (1:100,000);
- Soil Map of Southern Portugal (1:25,000).

Soil Data:

- Soil Profiles (INFOSOLO; LUCAS Program)

03

METHODS

METHODS

Information Survey: Collection and digitization of all used soil maps and available pedological information, and the combination of these datasets;

Topological Correction: Correction of cartographic errors (gaps), inconsistencies, and updating based on more recent data and modern geospatial analysis techniques;

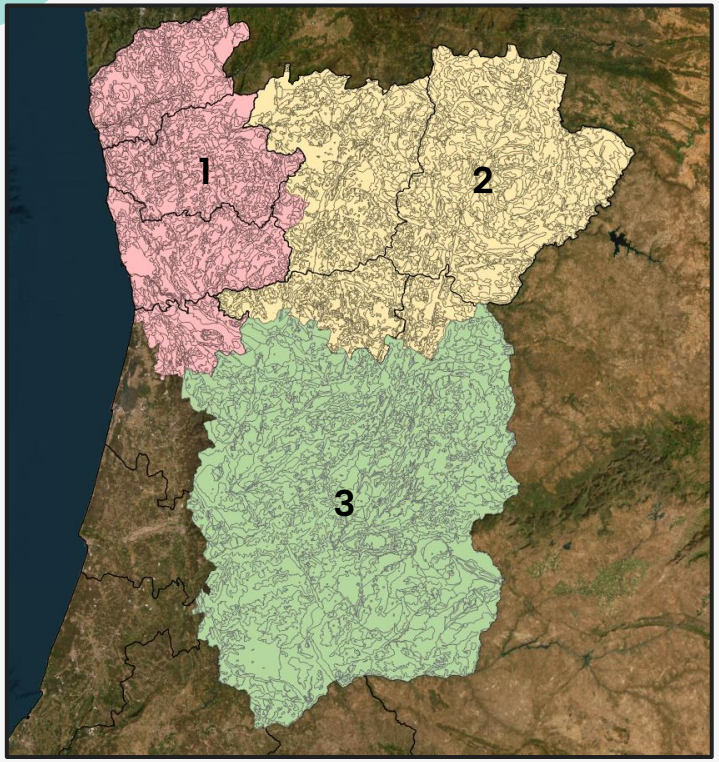
Conversion to Universal System: Transposition of old classifications to a modern and internationally recognized system (WRB* 2014);

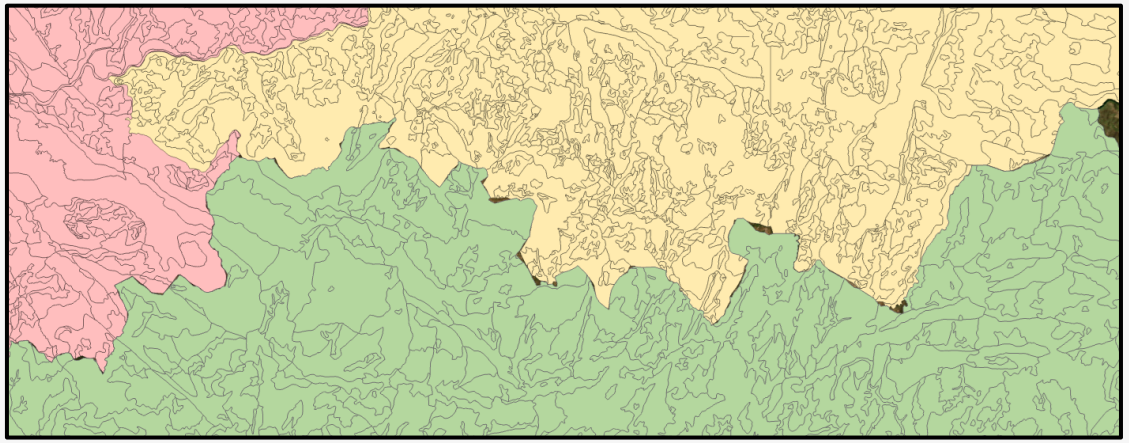
Validation: Verification of the accuracy of the new map through comparison with other datasets.

***WRB:** World Reference Base for Soil Resources

METHODS: Topological Correction

Soil Maps at a 1:100,000 Scale

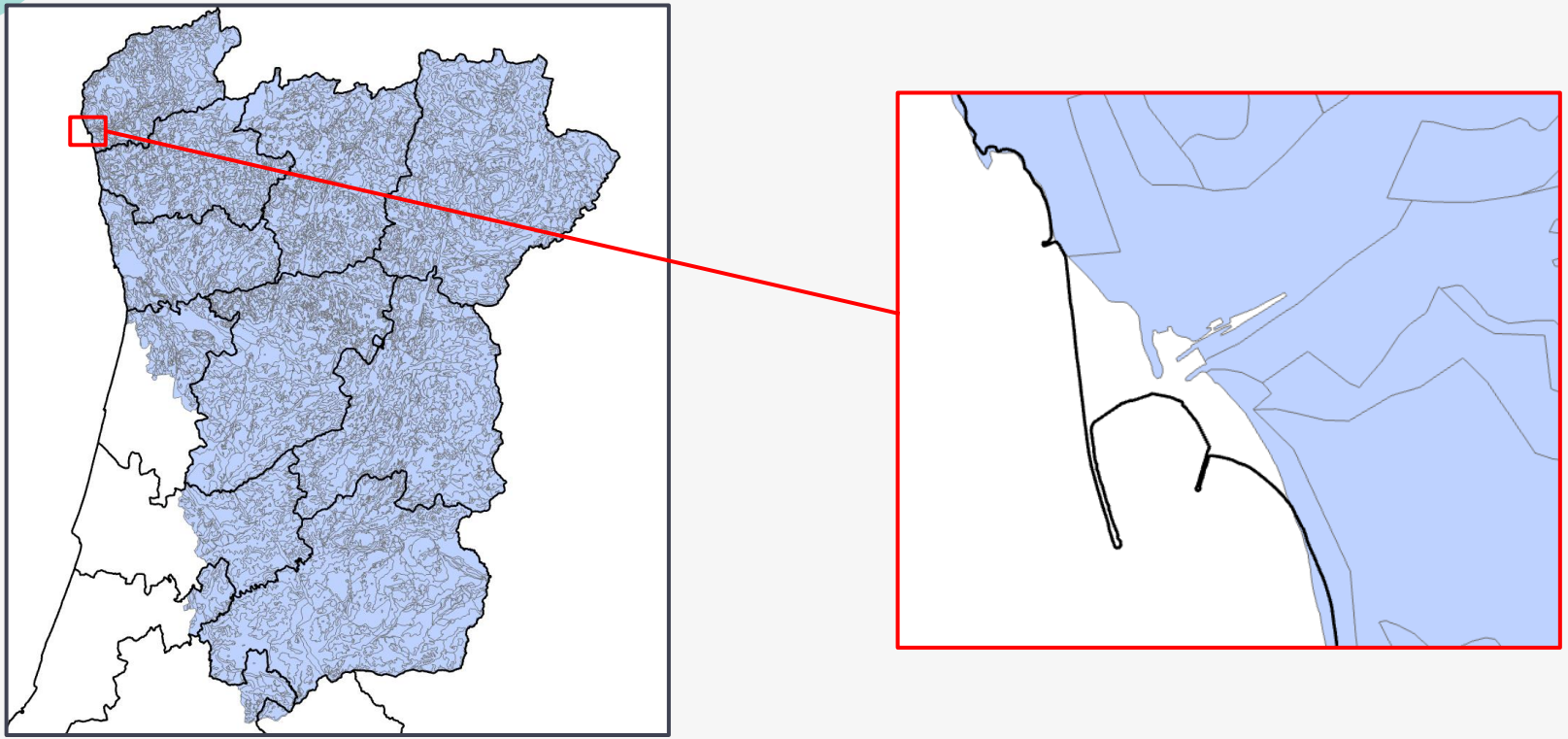




1 – Soil Map of the Entre Douro e Minho Region;
2 – Soil Map of Northeast Portugal;
3 – Soil Map of the Central Interior Zone.

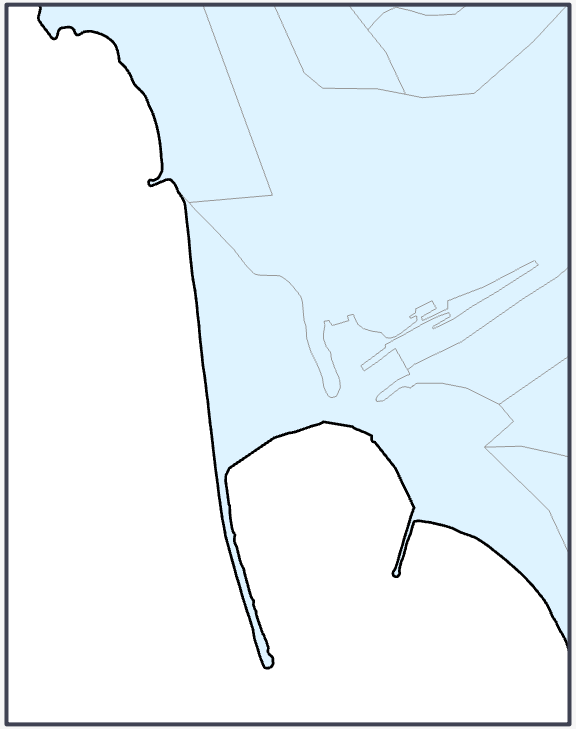
METHODS: Topological Correction

Soil Maps at a 1:100,000 Scale



METHODS: Topological Correction

Soil Maps at a 1:100,000 Scale



METHODS: Topological Correction

Soil Maps at a 1:100,000 Scale

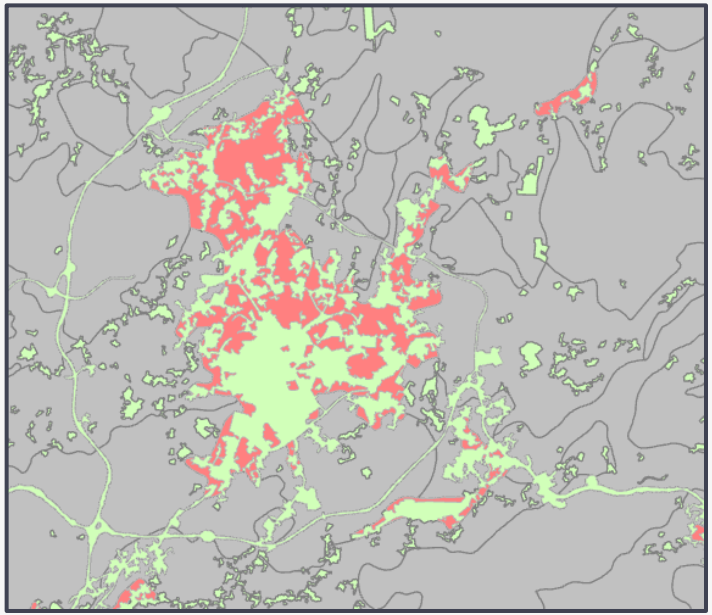
Displacement of watercourses

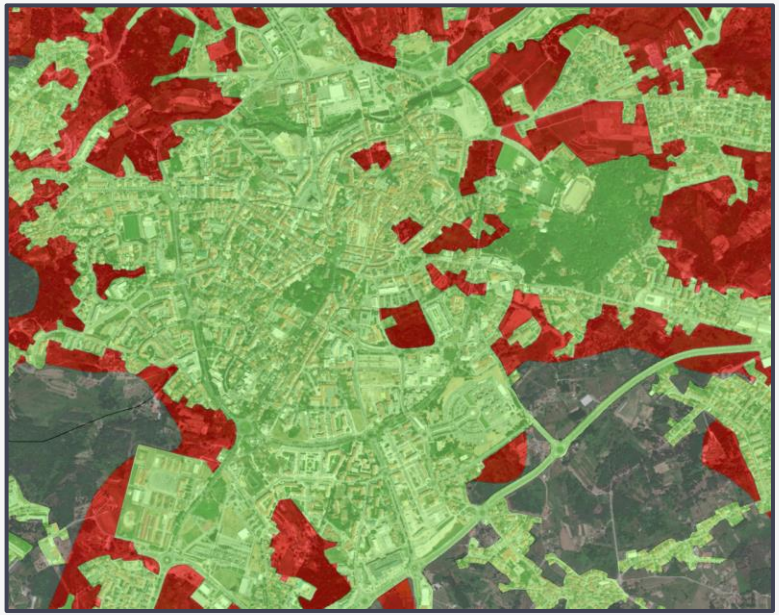
Correction

METHODS: Topological Correction

Soil Maps at a 1:100,000 Scale

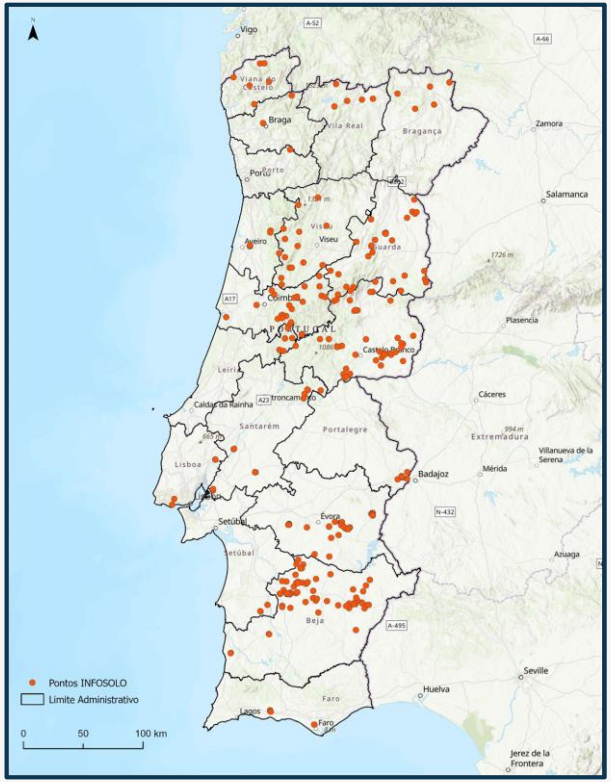
In the new Soil Map for mainland Portugal (1:100,000), there will be a **distinction between watercourses and artificialized areas**, as in the previous maps they were both grouped under **Social Area**.





METHODS: Databases Unions

INFOSOLO Points (309)



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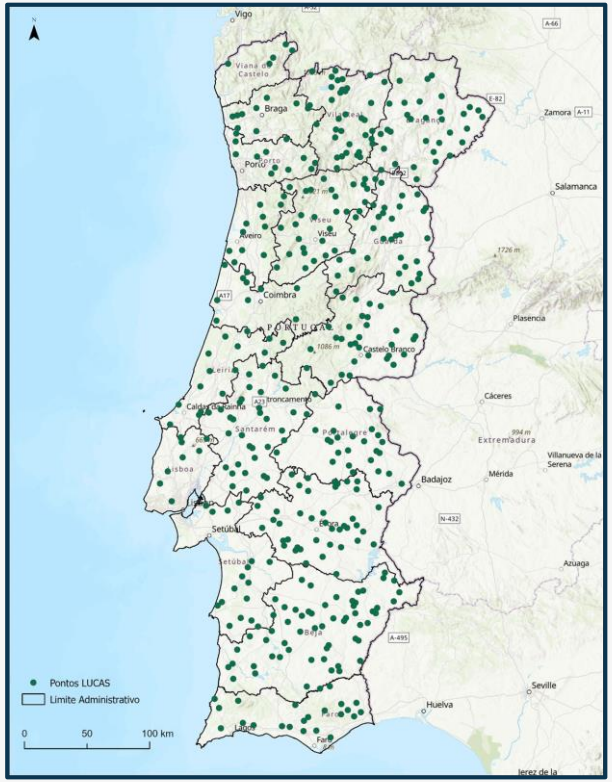
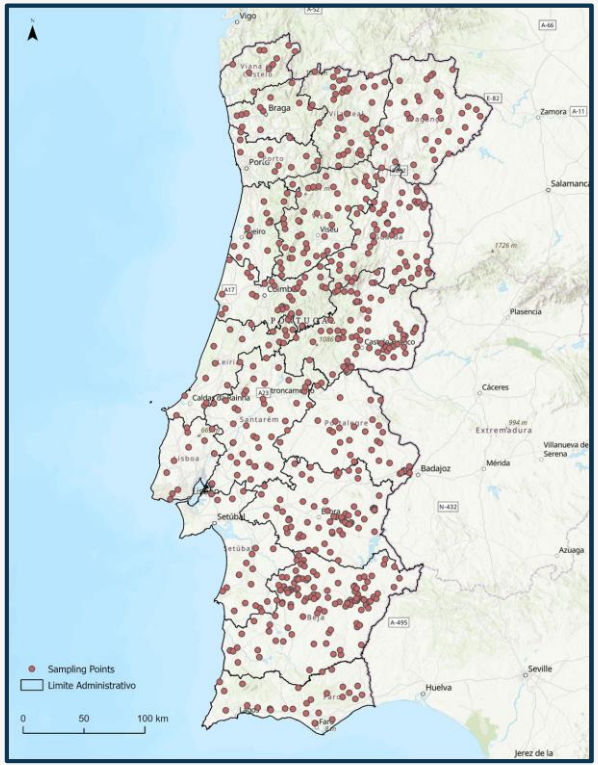


METHODS: Databases Unions

737 Sampling Points



METHODS: WRB 2014 Nomenclatures

FID	Shape *	cod
0	Polygon	Albufeira
1	Polygon	Area
2	Polygon	Bdod1
3	Polygon	Bdog
4	Polygon	Bdog1
5	Polygon	Bdos
6	Polygon	Bdos1
7	Polygon	Bdox
8	Polygon	Bdox1

Northeast Portugal

FID	Shape *	UCSOLOS	legenda_so	SDOM1_D
0	Polygon		AS	Área Social
1	Polygon		PA	Plano de Água
2	Polygon	AT 1.1	AT	Antrossolos Plágicos Régicos (Regi-Plaggic Antrosols)
3	Polygon	AT 1.2	AT	Antrossolos Plágicos Régicos (Regi-Plaggic Antrosols)
4	Polygon	AT 1.3	AT	Antrossolos Plágicos Régicos (Regi-Plaggic Antrosols)
5	Polygon	CM 1.1	CM	Cambissolos Endolépticos Esqueléticos (Skeleti-Endoleptic Cambisols)
6	Polygon	CM 1.2	CM	Cambissolos Endolépticos Esqueléticos (Skeleti-Endoleptic Cambisols)
7	Polygon	CM 1.3	CM	Cambissolos Endolépticos Esqueléticos (Skeleti-Endoleptic Cambisols)
8	Polygon	CM 2.1	CM	Cambissolos Endolépticos Dístricos (Endolepti-Dystric Cambisols)

Central Interior Zone

FID	Shape *	Solo	Classifica
0	Polygon	Agua	Agua
1	Polygon	Ah1.1	Arenossolos
2	Polygon	Ah2.1	Arenossolos
3	Polygon	Cd1.1	Cambissolos
4	Polygon	Cd2.1	Cambissolos
5	Polygon	Cd2.2	Cambissolos
6	Polygon	Cd2.3	Cambissolos
7	Polygon	Cd2.4	Cambissolos
8	Polygon	Cd2.5	Cambissolos

Entre Douro e Minho Region

METHODS: WRB 2014 Nomenclatures

Each **classification code** is associated with the **lithology** and **topography** of the soils.

FID	Shape *	Solo	Classifica
0	Polygon	Agua	Agua
1	Polygon	Ah1.1	Arenossolos
2	Polygon	Ah2.1	Arenossolos
3	Polygon	Cd1.1	Cambissolos
4	Polygon	Cd2.1	Cambissolos
5	Polygon	Cd2.2	Cambissolos
6	Polygon	Cd2.3	Cambissolos
7	Polygon	Cd2.4	Cambissolos
8	Polygon	Cd2.5	Cambissolos

Litology: x
Topography: s

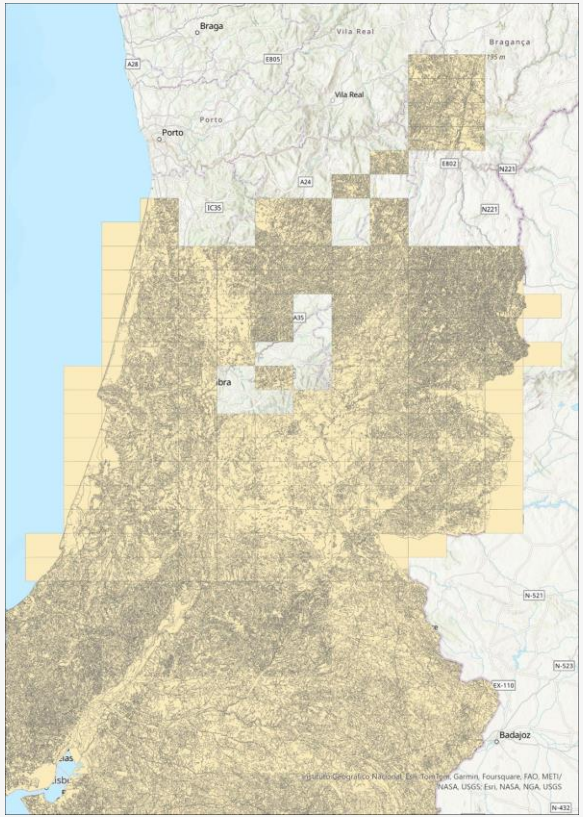
Litologia	**a** - depósitos aluvionares: aluviões recentes e aluviões antigas
	b - rochas básicas (e metabásicas): vulcanitos básicos; xistos verdes; xistos anfibólicos; anfibolitos; blastomilonitos básicos; granulitos; gabros
	d - granodioritos
	g - granitos e rochas afins: granitos diversos; granitos gnáissicos, nodulares e migmatíticos; ortognaisses, gnaisses ocelares, paragnaisses
	m - migmatitos e gnaisses blastomiloníticos
	q - rochas quartzíticas e afins: quartzitos; xistos quartzíticos e grés quartzíticos
	s - formações sedimentares não ou pouco consolidadas: formações de cobertura do Plio-Plistocénico e do Paleogénico indiferenciados; terraços fluviais antigos
	u - rochas ultrabásicas: peridotitos e serpentinitos
	x - xistos e rochas afins: xistos e grauvaques do Complexo Xisto-Grauváquico (Précâmbrico-Câmbrico); complexo xistento (Ordovícico e Silúrico); quartzofiládios, filádios e metagrauvaques; rochas do Complexo Vulcano-Silicioso (xistos dominantes); micaxistos do Complexo Monometamórfico de Morais; metavulcanitos ácidos e peralcalinos
Relevo	**b** - fundos de vales e de encostas adjacentes, constituído por superfícies planas ou plano-côncavas com declives muito suaves (até 2-3 %) e com aluviação ou coluviação dominantes
	c - superfícies predominantemente plano-côncavas ou côncavas com declives suaves (5-6 %), com coluviação muito significativa
	e - superfícies onduladas a muito onduladas ou acidentadas, com declives moderados a fortes (> 12 -15 %)
	o - Superfícies suavemente onduladas a onduladas, com declives moderados (5-6 a 12-15 %)
	s - superfícies muito suavemente onduladas com predomínio de formas planas a plano-convexas e declives suaves (< 5-6 %)

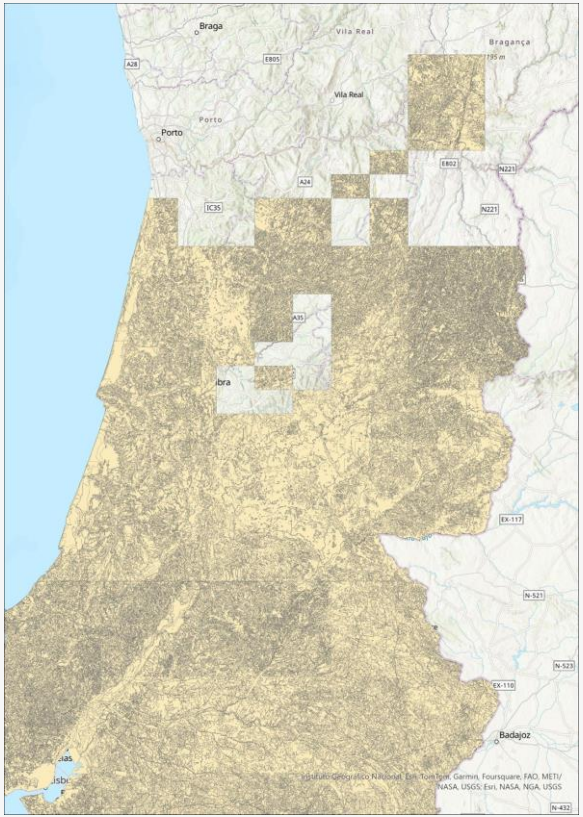
Martins, A & Lourenço, J. (1991)

METHODS: Soil Map at a 1:25,000 Scale

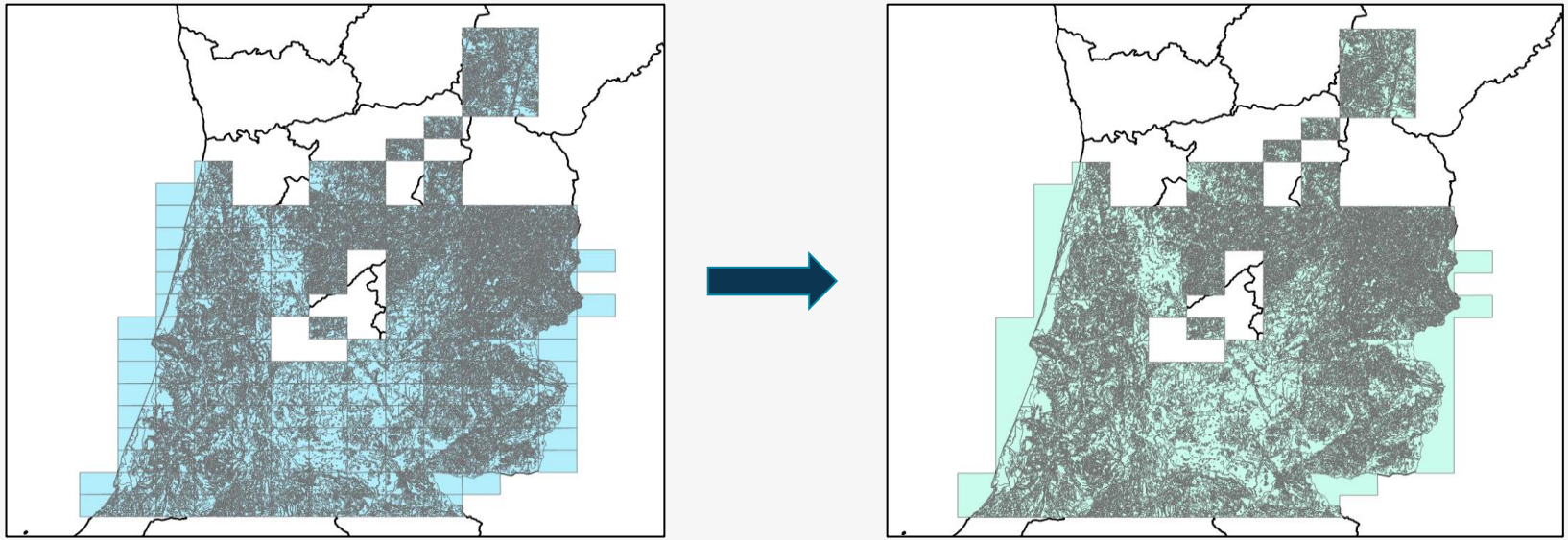
- **Georeferencing** and **automatic vectorization** of 112 soil maps at 1:25,000 scale;
- **Merging** of maps with **matching edges**;
- **Correction** of **topological errors**;
- **Merging** of soil polygons with **identical nomenclature** (WRB 2014).

METHODS: Soil Map at a 1:25,000 Scale

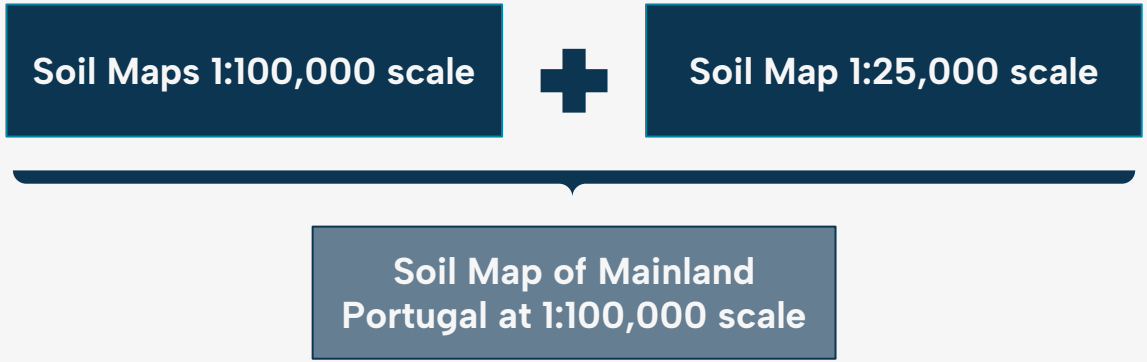




METHODS: Soil Map at a 1:25,000 Scale



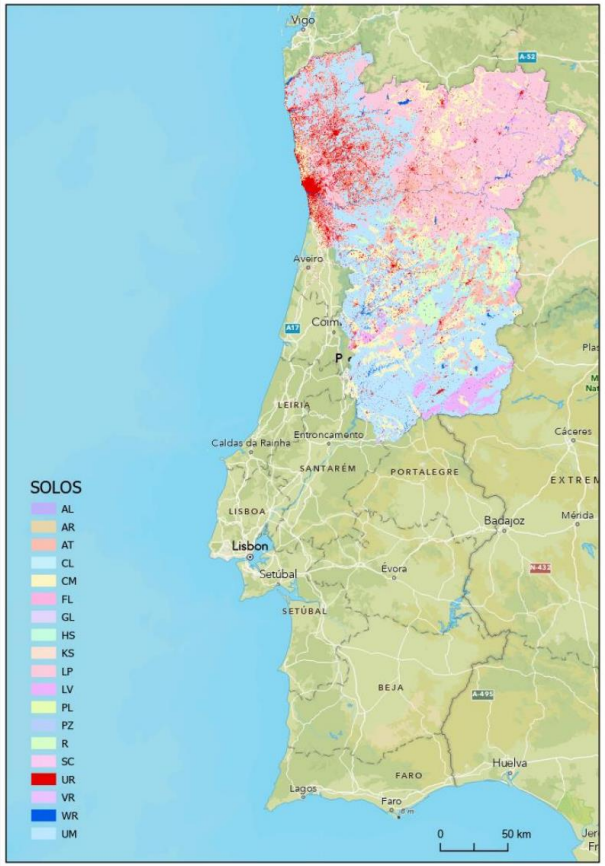
METHODS: Harmonization of Soil Maps



04

RESULTS

RESULTS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Aveiro
Coim
LEIRIA
Caldas da Rainha
Entroncamento
SANTARÉM
PORTALEGRE
LISBOA
Lisbon
Setúbal
SETÚBAL
Évora
Badajoz
Mérida
Cáceres
BEJA
FARO
Lagos
Faro
Huelva
0
50 km
SOLOS
AL
AR
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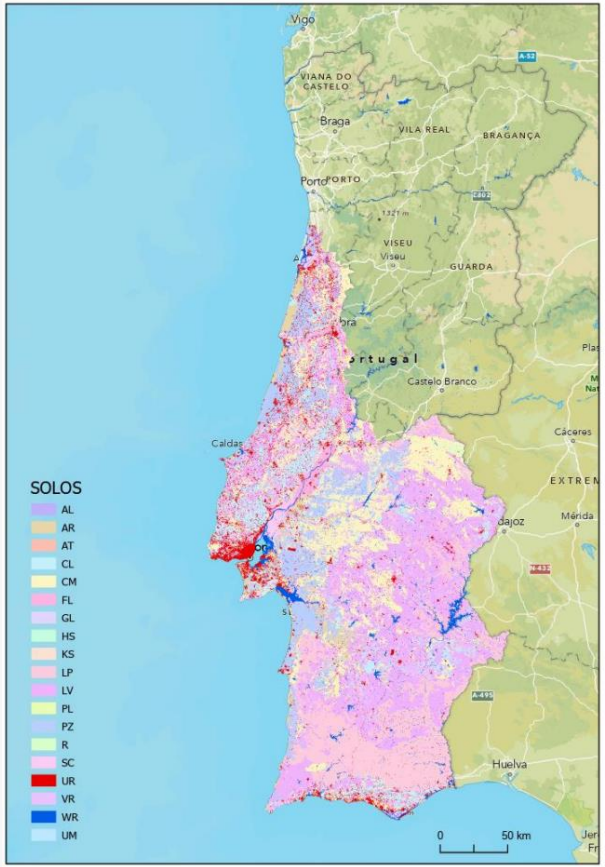
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VIANA DO CASTELO
Braga
VILA REAL
BRAGANÇA
Porto
PORTO
VISEU
Viseu
GUARDA
Castelo Branco
Cáceres
Mérida
Huelva
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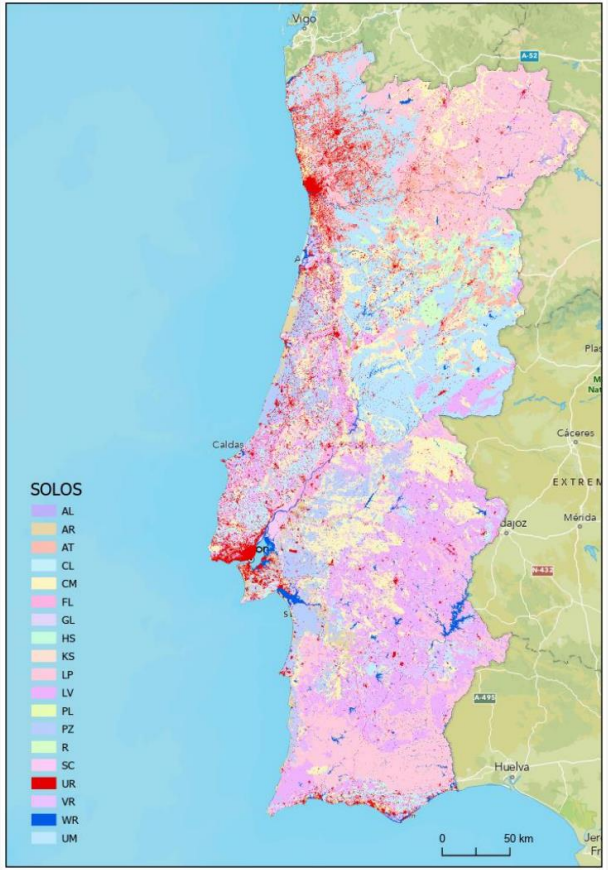
RESULTS


Vigo
Caldas
Cáceres
Mérida
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SOLOS
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LV
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PZ
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UR
VR
WR
UM
0
50 km

05

REFERENCES

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