Showcase of Active Learning and Teaching Practices in Spatial Data Infrastructure (SDI) Education

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Mapping Europe's landscape

Towards multiple intersubjective understandings

According to the European Landscape Convention, the user's subjective view also belongs to the landscape. Therefore it is no longer enough to objectively map earth, soil, water, vegetation and climate. Including the inhabitant's spatial experiences, expectations and desires is just as important. Although there are various maps of Europe's landscape, they differ in sources, purpose, scale, structure and typology. What can we learn from their comparison?

landscape
mapping
toponyms
Europe

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The European Landscape Convention (ELC) of the Council of Europe (2000) wants to actively involve citizens in landscape planning and management. To this end, the landscape is regarded as "an area as perceived by people". According to Article 6 of the ELC, Member States should actively engage:

1. to identify its own landscapes throughout its territory;
2. to analyse their characteristics and
3. to assess the landscapes thus identified, taking into account (....) the population concerned (CoE, 2000).

The underlying idea is as simple as it is effective: when citizens recognise themselves in their own landscape and can identify with it, they also know how to value it and take responsibility for its management. Maps can play an important role in this, but they are always based on data selection and design choices influenced by context and aims. National landscape atlases often stand alone and differ from those of other countries by highlighting different features and attributes. This results in cartographies in line with local traditions.

Maps can be analysed objectively like the landscapes they depict. However, selecting data and creating categories always partially reflects cultural details. Hence, before the year 2000, European maps were mainly based on national atlases, thematic field research, landscape visions and plans. Since the end of the last century, several projects for an intersubjective European landscape map were executed based on objective and socially shared typologies. In the 21st century, data is increasingly shifting towards satellite recordings, as more and more aspects of the landscape can be detected remotely. Whether users recognise these "satellite" landscapes as their "home" remains to be seen. Europe's landscape is a cultural landscape that you have to learn to "read" and interpret. However, trying to include knowledge of inhabitant on maps is a challenge.

In this article, we draw attention to the way in which Europe's landscape has been mapped. The European Environment Agency (EEA) published one of the first maps of Europe's landscape (Meeus, 1995). Wascher *et al.* (2005) provided an overview of existing (inter)-national and regional landscape atlases, described the technique of landscape character assessment and presented LANMAP as a new generation of landscape classification and mapping. Several authors provided a systematic overview of methods of landscape characterisation. Simensen *et al.* (2018) saw a trend towards increasing observer-independence over time. Terkenli *et al.* (2021) asked for more balance between objectivity and subjectivity in landscape analyses. While they recognise differences in the perception

Photo: **Dirk Hilbers** (Saxifraga). Matapuszta, Hortobagy, Hadju-Bihar, Hungary.

of landscape between inhabitants and experts on regional and local scales, Loupa-Ramos and Pinto-Correia (2018) pleaded for a combined approach of big data sets and knowledge of experts and local users.

Comparing three integral European landscape maps

We look at three very different integral European landscape maps that have been published since 1995: European landscapes (EEA) (Meeus, 1995), Landscape Map Europe (LANMAP) (Mücher *et al.*, 2010) and European Landscape Character Areas (ELCA) (Pedroli *et al.*, 2018). We compare them on typology, toponomy (naming), scale and purpose, as well as the resulting cartography.

The cartography and landscape typologies vary widely, but they are similar in that they consider regional landscapes within the European context. Of course, there are many more maps made, as part of a centuries-old tradition. However, we have focused on the most recent and exemplary cases to ensure they can be of value for the ELC. The maps have had an important impact on the scientific debate and also (potential to) influence spatial policies.

The first two maps attempted to transcend the peculiarities of national atlases and landscape inventories by using typologies that are meaningful on the European level. In addition to the narrative and visual approach of the EEA map and the universality of the objective approach of LANMAP, the ELCA map offers the opportunity to unlock the cultural phenomena and

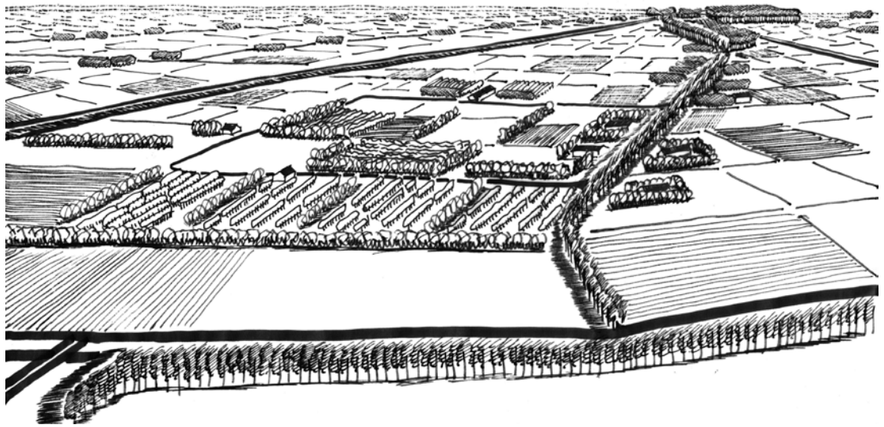
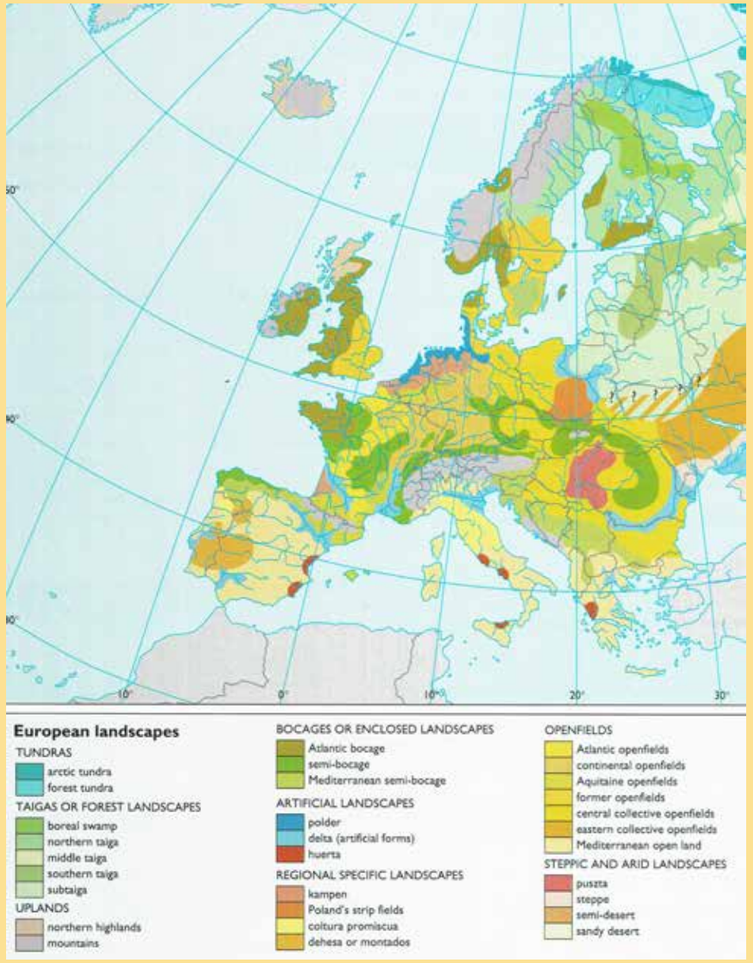


Figure 1 Recently reclaimed polder Flevoland. (Sketch: J. Meeus.)



European Landscapes (EEA)

Typology: J. Meeus, landscape architect, Arnhem

In the last decade of the twentieth century, the European environment and nature policy was being prepared. In this context, the European Environment Agency (EEA) presented a continental environmental inventory of Europe's Environment; The Dobris Assessment (Stanners & Bourdeau, 1995). Landscape played a prominent role, resulting in the map "European landscapes".

The sources consisted of national atlases, thematic maps, regional inventories and landscape plans. The map was compiled by combining different mapping approaches and nomenclatures across administrative borders. The main criteria to discern regional landscapes were climate, soil, landform, vegetation, field pattern, settlement and scenery.

The design of the map was fairly explorative and simple. The structure was rather sketchy, Regional experts were asked for more transparent and up-to-date information and plans. Inhabitants did not participate in the process of making the map.

On a scale of 1:6 million 30 "megatypes" are shown, consisting of zones of at least 50 x 50 km. These megatypes are: tundra, taiga, upland, bocage, artificial landscapes (polder, delta, huerta), regional-specific landscapes (e.g. kampen, dehesa or montados) open field and steppic and arid landscapes. The names of specific landscape types were derived from the region of origin. For example, the type "polder" was derived from the Netherlands and was applied for reclaimed land on former rivers and lakes in North-western Europe. Each landscape type was provided with a sketched perspective and narrative impression.

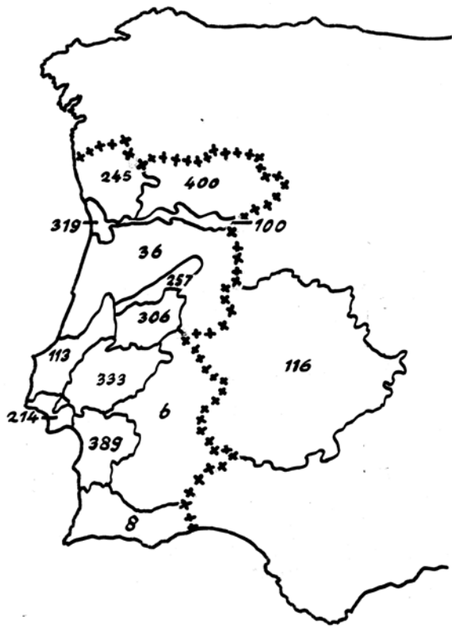


Figure 2 West Iberian regions and their names according to ELCA. (Cut-out: J. Meeus.)

6. Alentejo, Portugal
8. Algarve, Portugal
36. Beira, Portugal
100. Douro, Portugal
113. Estremadura, Portugal
116. Extremadura, Spain
214. Lisboa, Portugal
245. Minho, Portugal
306. Pinhal, Portugal
319. Porto, Portugal
333. Ribatejo, Portugal
357. S. da Estrala, Portugal
389. Terras do Sado, Portugal
400. Tras-os-Montes, Portugal

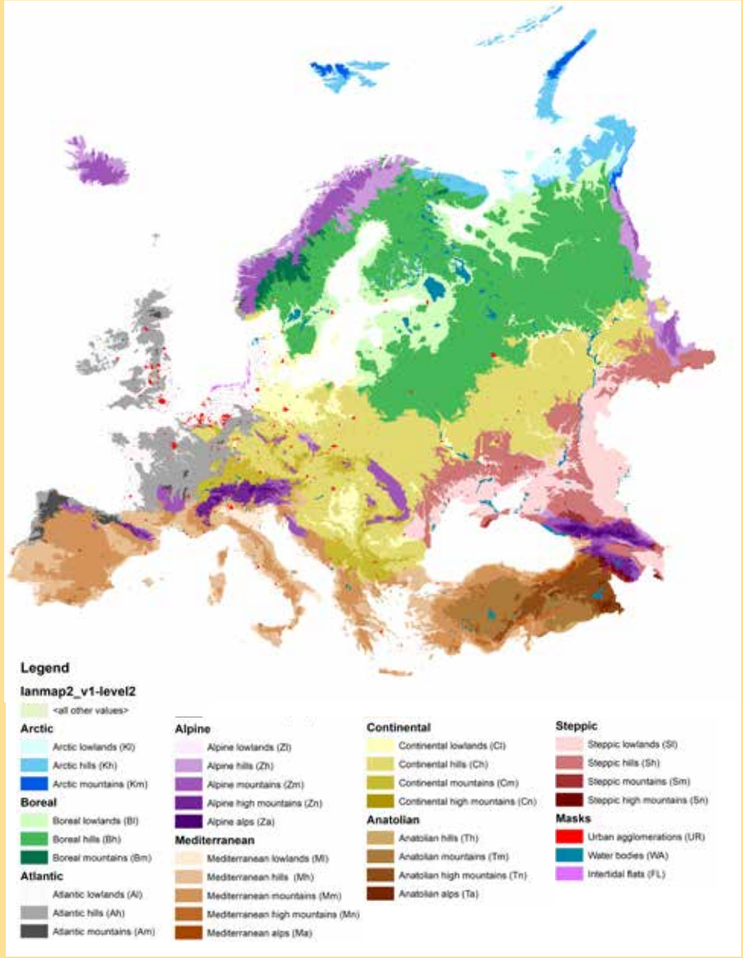
identity of the landscape. Not as a replacement but as a supplement to the visual approach and objective physical geographical data processing.
We focus on names of the landscape types because a name is a lens through which people perceive and understand their landscape. A name offers the opportunity to belong to a territory. Maps are tools for the experience, perception and appreciation of the landscape and names of regions can be important for identification. They create an intersubjective reality through their imagination and channel the users' experience. From the perspective of the ELC, the challenge was to find the best fitting name that allowed mental ownership of people living in the landscape based on their perception and cultural background.

Two regions; one landscape

An example of two adjacent regions follows to clarify what binds the three previous maps and what sets them apart. Alentejo in southern Portugal and Extremadura in southern Spain have a similar agro-sylvopastoral system (figures 2 and 3). Both areas consist of an undulating ground level of grazed oak orchards, with trees in a wide band.

Table 1 Comparison of three European landscape maps.

	Source	Scale; minimal map unit	Netherlands example	West Iberian example	Purpose
EEA 1995	**experts atlases**	continental 2500 km²	polder	montados or dehesa	exploration
LANMAP 2010	**remote sensing geodata experts**	regional/local 1-10 km²	'Al' (Atlantic lowlands)	'Mh' (Mediterranean hills)	monitoring management
ELCA 2018	**citizens travel guides experts**	national/regional 50 km²	Flevoland	Alentejo/Extremadura	identification



LANMAP

Typology: C. Mücher and D. Wascher, Wageningen Environmental Research (Alterra)

The main object of LANMAP was to develop a quantitative methodology to discern ecological habitats and landscapes at a European scale. The aim was to harmonise the various ways of characterising the landscape in different countries using quantitative data produced by remote sensing (Wascher 2005).

LANMAP integrates an expert based satellite imagery analysis with in situ information, e.g. vegetation and landscape inventories. The methods of data processing and categorisation are scientific and transparent. However, there is a lack of information about landscape scenery, settlement history and public perception. Besides, fragmented mosaic habitats and linear landscape elements like hedges could not be included.

The map is the first attempt to produce a hierarchical framework of a landscape classification. Every type got a unique code of climate zone, altitude and land use, resulting in 350 landscape types, on a scale of 1:2 million, with details of 1 to 10 km². They are aggregated into 34 "major landscapes" which are categorised as lowlands, hills, mountains and high mountains in different climate zones: Arctic, Boreal, Atlantic, Alpine, Mediterranean, Continental, Anatolian and Steppic. Polders in the western part of the Netherlands are categorised as "Al'"(Atlantic lowlands).

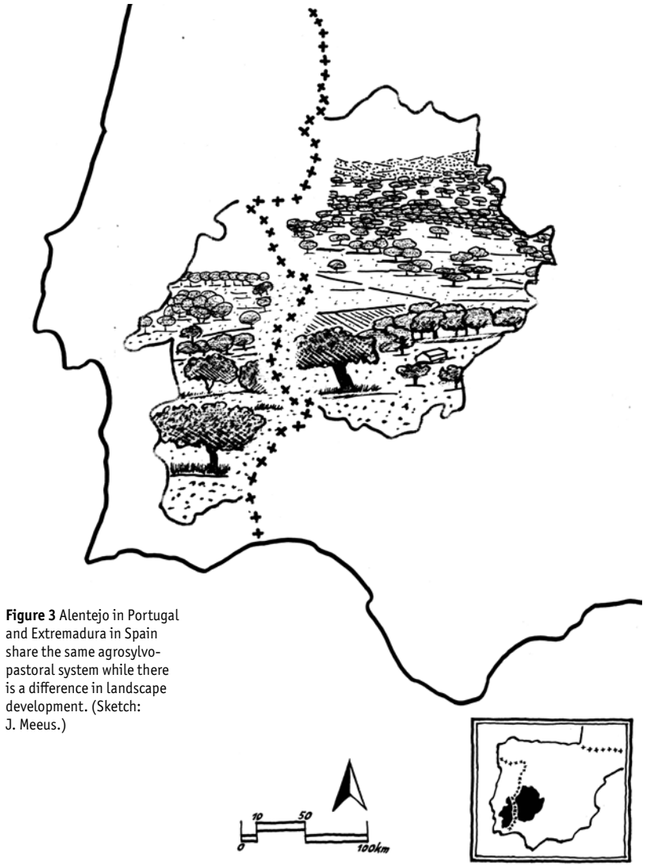


Figure 3 Alentejo in Portugal and Extremadura in Spain share the same agrosylvo-pastoral system while there is a difference in landscape development. (Sketch: J. Meeus.)

According to the EEA map, it is a landscape of "montados or dehesa". The most detailed land code: "Mhr_sh" (Mediterranean hills dominated by rocks and scrubs) of LANMAP can be found in both Alentejo and Extremadura. However, according to ELCA, it concerns two different regions, Alentejo and Extremadura. On either side of the national border, management and development differ. In southern Portugal, the logging of trees dominates and in southern Spain, ecotourism possibilities are being explored. Thus, where a landscape unit in the objective typology can pass through several countries, within the ELCA approach, the national boundaries can create significant cultural differences.

Discussion and conclusion

What characterises this development of mapping the European landscape? The EEA map (Meeus, 1995) was one of the first attempts to explore the diversity of Europe's landscape. The LANMAP (Mücher *et al.*, 2010) is the most scientific and transparent approach to detecting objective landscape units. The ELCA map (Pedroli *et al.*, 2018) is the most cultural-subjective one, including regional-historically developed sensitivities with regional-specific names illustrating how people perceive their landscape (table 1).

The ELCA map captures more of the vast cultural diversity of the European landscape, as it exists in the minds of its citizens. Toponyms refer to a kaleidoscope of identifiers as diverse as language, natural phenomena, geographical position, historical events, ethnicity, cultivation systems, sometimes with a time depth of centuries. The ELCA toponyms also draw attention to cultural landscape phenomena that can yield interesting questions about their genesis.

ELCA

Typology: B. Pedroli & T.M. van den Brink, Wageningen Environmental Research (Alterra)

This map aimed to arrive at a European landscape typology that would appeal to inhabitants, policymakers and professionals. This would bridge an important gap between the different conceptualisations and approaches to landscape cartography so far. Something that is provided for by the ELC that speaks about "perceived by people", but which is often difficult to implement in landscape research on a European level.

The two main principles for including a landscape were:

- The landscape has a unique toponym because this is how people perceive it;
- The toponym and its landscape had to be familiar; it should at least be known in the capital of the state the landscape belonged to and preferably internationally.

National boundaries were kept intact because of geopolitical issues stemming from cross-boundary landscapes and the difficulties with toponyms that – by their nature – are in a certain language and thus potentially represent a political claim. It was decided that the landscapes should not overlap, nor have gaps between them. The level was directly below the national scale.

The three main sources of the ELCA map were:

- Travel guides;
- Online versions of landscapes and national maps and atlases;
- Data received from national professional experts, consisting of topological, spatial divisions and descriptions (including explanations of toponyms).

The landscape boundaries could only be drawn precisely when there were clear administrative borders or natural phenomena like rivers and mountain tops. The colours were added randomly to distinguish the different regions.
Around 550 areas with well-known toponyms were found (1:10 million) with a minimum mapping unit of 50 km². The ELCA map has no legend but represents landscapes with a unique (own) name.

What do toponyms with a similar name reveal about the origin of that toponym? For example, Champagne (northern France) and Campania (southern Italy), or Overijssel (Over the (river) IJssel in the Netherlands) and Alentejo (over the (river) Tagus in Portugal), Wallonia (south Belgium) and Walachije (south Romania) and Wales (west United Kingdom)?

What does it mean for the landscape perception of inhabitants if a toponym landscape does not necessarily coincide with a physical geographical region, but is instead located at a transition area in between? Are there areas in Europe where this is more or less the case?

A promising further research step is to involve inhabitants, visitors, planners and managers in mapping and naming landscapes to further bridge the gap between citizens, science and policy. The way landscape observatories try to do that with an interactive open source structure is inspirational. See the landscape observatory projects of Catalonia (Sala i Martí, in this issue).

Public support is indispensable for managing the landscape. Existing and future challenges, such as climate adaptation and the Green Deal in an EU context, are leading to spatial transitions. Europe's landscape is changing visibly.

Decisions on this cannot exclusively be made in Brussels or in the capitals. It concerns the territory of residents and visitors who should feel "at home".

Europe's landscape can only be successfully developed if it considers how residents experience their own landscape. This requires a representation of the landscape that is based on features that, on the one hand, can be determined objectively and, on the other, takes into account the qualities that residents attribute to their immediate living environment. The ELCA map hopes to contribute to this by drawing attention to more or less known region names. Unique regional names stand for special combinations of qualities and cultural phenomena. Achieving intersubjectivity about this is a challenge. That is not to say that one landscape map is better than another. On the contrary, no map provides a panacea for all problems. An ongoing dialogue about landscape character and quality will promote the future of Europe's landscape.

Summary

Landscape maps could be important for the implementation of the European Landscape Convention. Many maps of the European landscape have been made. We look at three integral maps: European landscapes (EEA) (1995), Landscape Map Europe (LANMAP) (2010) and European Landscape Character Areas (ELCA) (2018). They differ significantly in purpose, sources, structure, scale and typology. We focus on naming the landscape types. Names are important to give people the opportunity to identify with the landscape where they live in.

The EEA map explored the diversity of Europe's landscape. LANMAP is the most scientific one. ELCA is the most cultural one. All maps have strengths and weaknesses. From the ELC perspective, the ELCA toponomy fits best to take into account the names residents attribute to their own landscape.

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