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Combining place names and scientific knowledge on soil resources through an integrated ethnopedological approach

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ABSTRACT

Local knowledge refers to the understandings, skills, and philosophies developed by societies with long histories of interaction with their environment. Place names (toponyms) can be considered an important mirror of the local knowledge and perceptions about the surrounding living space. The aim of this research has been to investigate, through an integrated ethnopedological approach, the meaning and distribution of toponyms, with particular (but not sole) reference to *pedonyms* (toponyms connected to soil resources) used in the traditional and recent cartography of Sardinia (southern Italy). As a paradigmatic case study, the toponyms belonging to an important sub-region of Sardinia, the Gulf of Oristano (central-western Sardinia), have been investigated.

To draw appropriate comparisons between local and scientific knowledge, the research was conducted through the following approach: i) toponymy research and collection from different sources; ii) database creation and toponym translation; iii) categorization of toponyms; iv) soil field investigation and analysis of several physical–chemical parameters; and v) graphical, statistical (including multivariate analysis), and cartographic data processing.

Generally speaking, the research shows that toponymy cannot be intended merely as a contextual geographic practice aiming to attribute a specific place name to a predefined geographical space. It rather represents a complex and articulated dynamic objectivation (in terms of the conversion of a concept or abstraction into an object) of a geographic entity. This process is the consequence of a strong, deep, and often conflicting interaction among humans, culture, and the surrounding environment. During the Anthropocene period, the influence of human activities on toponymy has been so intensive that many place names are now coined to mainly indicate the "artificial" man-made features of an intensively anthropized environment. Such "technogenic toponyms" could represent the "written witness" of the Anthropocene during subsequent eras.

1. Introduction

Local knowledge, also labelled by many other terms (indigenous, folk or traditional), refers to the understandings, skills, and philosophies developed by local people as consequence of their long histories of interaction with the surrounding environment (UNESCO, 2008). With a truly evocative term, UNESCO (2003) defines local knowledge as an intangible cultural heritage. Indeed, local knowledge is integral to a cultural complex that encompasses language, systems of classification, resource use practices, social interactions, ritual and spirituality (UNESCO, 2008). It can be quite specific to location and is consequently transmitted and shared within very specific social and agro-ecological contexts (Warbuton and Martin, 1999). Although local knowledge is based on experience passed from one generation to the next, it changes, adapts, and assimilates new ideas (Oudwater and Martin, 2003). Local knowledge should not be seen as the counterpart to scientific knowledge, as it inevitably includes cultural, as well as technical knowledge and is interlinked with social and political knowledge and skills (Oudwater and Martin, 2003).

Place names or toponyms, represent a prominent consequence of local knowledge, as they reflect the extensive geographic knowledge of ancient indigenous people, accumulated through generations of interactions with their environment (Kadmon, 2000). Toponymy, has recently undergone a critical reformulation (Rose-Redwood et al., 2010) as also demonstrated by the development of a new discipline, called ethnophysiography (Mark and Turk, 2003), that has been developed in order to understand how landscape and its elements are conceptualized and expressed through languages belonging to different cultures (Derungs et al., 2011). From this very new perspective, it is interesting to stress that toponyms are often used as pure referencing expressions without any semantic meaning or sense (Derungs et al., 2011).

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However, Hollis and Valentine (2001) and Levinson (2011) demonstrated that toponyms (especially for landmark names rather than for country names) can be characterized by semantically-meaningful components that appear to make sense. On the whole, both perspectives can be true (Derungs et al., 2011) since the sense in toponyms strongly vary with circumstances, being greatly influenced from the different languages and cultures (Coates, 2006). Additionally, many researchers have emphasized the importance of understanding place naming as a contested spatial practice rather than viewing place names as transparent signifiers that designate places as "objects" or "artefacts" within a predefined geographical space (Rose-Redwood et al., 2010; Berg and Vuolteenaho, 2009). Toponyms are indeed an excellent research topic at the interface between local and scientific knowledge, containing many elements gathered from the physical, social, and inner dimension of the landscape (Elerie and Spek, 2010).

Ethnopedology (Barrera-Bassols and Zinck, 1998) aims to document and increase the understanding of local approaches to soil perception, classification, appraisal, use, and management (Barrera-Bassols and Zinck, 2003). As demonstrated by previous studies (Siderius and de Bakker, 2003; Capra et al., 2015), an ethnopedological approach can be used to better understand the connection of place names (representing local knowledge) and soil resources (explicated as scientific knowledge), which also means improving our understanding of possible connections existing between local and scientific knowledge. From this perspective, a particular type of toponyms connected to soil resources, the so-called pedonyms (from the Greek *pedon* meaning "soil" and *ónoma* meaning "name"), can be particularly interesting in terms of combining such knowledge.

Despite a recorded worldwide loss of original toponyms, in parallel with a dramatic loss of indigenous languages, with over 50% of some 6700 languages spoken today in danger of disappearing (Brozović, 2008), there are still some (few) places on earth where place names are reported, used, and known in their original or pseudo-original form, despite the changed linguistic, historic, and cultural conditions. Such places can represent an exceptional opportunity to investigate the link between the ancient local knowledge and the more recent acquisition of scientific knowledge on soil resources.

The island of Sardinia (southern Italy) is one of the most interesting areas in this respect, for several historical, geographical, and linguistic reasons. In comparison with other areas characterized by neo-Latin languages, the Sardinian toponymy heritage is noticeably more conservative. In fact, while the European mean of pre-Romanic toponyms is of approximately 2%, in some Sardinian sub-regions such prehistoric toponyms can represent over 50% of total toponyms (Virdis, 2009). Such indigenous toponyms represent an example of the so-called "*Sa Limba Sarda*", *i.e.*, "The Sardinian Language", a Romance or archaic neo-Latin language (Wagner, 1950). Among the tongues of Latin origin, Sardinian Language is considered the most characteristic because it best preserves traits and words from the mother tongue, including lexical and phonetic factors as well as morphological aspects (Wagner, 1950). It also reveals many other influences (Phoenician, Catalan, Spanish, and Italian), bearing witness to the island's rich history and the numerous rules to which Sardinia has been subjected (Wagner, 1950). Indeed, Sardinian inhabitants have lived through the presence in one form or another of numerous foreign invaders, occupants, and overlords (van Dommelen, 1998). The UNESCO considers Sardinian Language an endangered language (Salminen, 1993), which urges core and applied studies on the multifaceted uses of Sardinian Language, including through an ethnopedological approach (Capra et al., 2015).

In a previous study (Capra et al., 2015) the toponyms belonging to an important sub-region of Sardinia (Ogliastra, central-eastern Sardinia) were investigated in order to understand their meaning and distribution in comparison with qualitative soil (pedodiversity) and environmental (morphology) features. In this paper the toponyms belonging to a different Sardinian sub-region (Gulf of Oristano, central-western Sardinia), characterized by strongly different historical vicissitudes, socio-economic conditions and environmental features have been investigated striving to represent a further step toward toponymic research renovation. An integrated ethnopedological approach based on a mixed methodology aiming to combine classical archival research with participant observation, ethnographic methods, qualitative pedological information, quantitative physical–chemical soil parameters, and multivariate statistics has been used for this purpose.

On the whole, the study aims to investigate the following aspects: i) the meaning of the distribution of the toponyms used in traditional and recent cartography of the region of Sardinia with particular but not exclusive emphasis on pedonyms; and ii) to compare and understand how local and scientific knowledge are linked to improve the overall knowledge on pedo-environmental resources and endangered ancient cultural heritage. For the first aim, the distribution and diversity of toponyms were assessed using the compiled database, coupled with a geographical information system (GIS). For the second aim, compositional data, such as qualitative (toponyms) and quantitative (soil physical–chemical parameters) data, have been compared through multivariate statistical analysis.

2. Materials and methods

2.1. Study area

While the Sardinian landscape is highly complex and articulated, three main landscapes strongly characterize the island (van Dommelen, 1998): hills and mountains (representing 86% of the territory); the plains (generally of limited dimensions); the coastal plain areas. Due to their peculiar location, the low-lying coastal areas constitute a critical zone that allows the interior of the island to communicate with other parts of the Mediterranean, and Braudel (1972) geographically conceptualizes them as "windows" of incomparable value.

One of the "Braudelian windows of Sardinia" (van Dommelen, 1998) is represented by the Gulf of Oristano (central-western Sardinia), which is geomorphologically defined in such a way that the other two major landscapes, of Sardinia are well represented. For these reasons, and because it is characterized by peculiar and very specific historic vicissitudes, cultural heritage, environmental features, agronomic uses, and landscape conditions, this area will be investigated as a paradigmatic Sardinian case study (Fig. 1, Table 1).

On the whole, the entire territory has been historically patterned by the great interaction between what the native evocatively calls "water" and "land places". The first consists of the following: i) the wetlands, representing, by extension, 50% of the Sardinian wetlands (Regione Autonoma della Sardegna, 2007); ii) the river ecosystems, represented by the delta ecosystem of the most important river of Sardinia (The Tirso). The "land places" are represented by several enhanced human activities such as the following: i) massive and extended hydraulic reclamation works; ii) intensive agricultural activities; and iii) urban agglomerates and industrial districts.

2.2. Methodological approach in local knowledge investigation

Geographers and linguists currently recognize that the traditional reliance on maps and gazetteers to study toponymy is entirely inadequate and should be supplemented with a sort of mixed methodology (Rose-Redwood et al., 2010). In this research, this type of approach has been adopted and further improved by an integrated ethnopedological approach.

2.2.1. Toponyms collection

Toponyms were collected from the following sources: i) the Sardinia Geoportal (SITRAS, 2012); ii) the Municipal Library and State Archives of Sardinia; and iii) personal narratives recorded during informal interviews conducted with the attenders and/or owners of the investigated areas. On the whole, more than one hundred interviews were realized.