

Assessing the visual landscape potential of coastal territories for spatial planning. A case study in the French Mediterranean

Samuel Robert*

ESPACE, UMR 7300, CNRS, Aix Marseille Université, Avignon Université, Université Nice Sophia-Antipolis, F-06204 Nice, France



ARTICLE INFO

Keywords:

Viewshed analysis
Spatial planning
Coastal areas
French Mediterranean

ABSTRACT

Mapping landscape visibility to reveal and measure the visual interactions between places within a territory is common practice today, especially in the context of visual impact studies. Maps of landscape visibility are also a powerful aid to considering development options and anticipating the future for territories that face a variety of challenges. On coasts, where landscape and views form part of the territorial resources, spatial planning particularly requires awareness of the visual properties of the space. Because of their attractiveness for residential and other types of development, coastal areas present management issues that often have a visual landscape dimension. This article proposes a method of characterizing the visual potential of coastal municipalities in the south of France, with a view to promoting consideration of landscape views in spatial planning. Developed in a GIS environment, this method defines the extent of the potentially visible landscape as well as the different landscape components of a municipality, which can then be compared to spatial planning data. Discussion of our results with stakeholders involved in local development revealed a positive perception and suggest that the approach could be extended to other coastal areas subject to urban pressure.

1. Introduction

In recent decades, the character, aesthetics and visibility of landscapes have taken on increasing importance in the management of the environment and territories. They are included in the political agenda (Antrop, 2004), are referred to in evaluations of ecosystem services (Crossman et al., 2013; Milenium Ecosystem Assessment, 2005; Ungaro et al., 2016) and are taken into account in local and regional development (De Vries et al., 2007; Vizzari, 2011; Waltert et al., 2011). In particular, landscape views are the subject of increasing attention, as reflected in the scientific literature. Views of water (river, lake, sea), vegetation (trees in the city, lawns, forest), natural sites (mountain summit, rock), historical monuments, wide open areas, for example, are regular objects of economic valuation (Damigos and Anyfantis, 2011; Fleischer, 2012; Hamilton and Morgan, 2010; Hui et al., 2012; Jim and Chen, 2009; Luttik, 2000; Sander and Polasky, 2009; Sander and Zhao, 2015; Sayadi et al., 2009). They are also studied for their symbolic, affective or functional value (Clay and Daniel, 2000; Daniel, 2001; Fyhri et al., 2009; Herzog, 1985; Laumann et al., 2001; Sevenant and Antrop, 2010; Ulrich, 1984). Conversely, studies show that some developments, constructions or production sites have a negatively perceived visual impact, which other studies develop methodologies to conceal (Falconer et al., 2013; Mouflis et al., 2008; Pedersen and

Larsman, 2008; Rogge et al., 2008).

The preferences and value attached to the visual landscape may have considerable implications in terms of spatial planning. They impede or facilitate new development and, in countries where it is mandatory, they are often the subject of visual impact assessment studies (Bishop and Miller, 2007; Landscape Institute and Institute of Environmental Management and Assessment, 2002; Perez et al., 2003; Rogge et al., 2008). They also generate extensive research on the perception and social acceptability of landscape change, as well as spatial management of environmental amenity (Chamberlain and Meitner, 2009; Chamberlain and Meitner, 2013; Jerpåsen and Larsen, 2011; Palmer, 2015; Sander and Zhao, 2015; Westerberg et al., 2013). Thus, as a component of territories, landscape views need to be known and managed (Tavernor, 2007).

In coastal areas, the impact of landscape views on territorial development is obvious. Since the advent of seaside tourism and of seaside resorts, the lure of the coast is based in large part on landscape aesthetics (Boyer, 2002; Corbin, 1988). Early on, development took advantage of views (cliff-top roads, gazebos, hotels) and coastal resorts were designed in relation to landscapes' visual properties. Today, the importance of the tourism and residential economy still reflects the attractiveness of coastal landscapes, and studies have sought to objectify their quality and evaluate visitors' perceptions (Fleischer, 2012;

* Corresponding author at: ESPACE UMR 7300 CNRS/Aix Marseille Université, Technopôle de l'Environnement Arbois Méditerranée, BP 80-13545 Aix-en-Provence Cedex 04, France.
E-mail address: samuel.robert@univ-amu.fr.

Fyhri et al., 2009; Povilanskas et al., 2016). At the same time, developments such as offshore wind farms or aquaculture units run counter to both residents' and visitors' expectations of the visual quality of landscapes. Moreover, urbanization has become a subject of environmental and territorial concern (Antrop, 2004; EEA, 2006; Small and Nicholls, 2003), and management of the visual landscape appears to have become a major issue on the coast. On the one hand, tourism and real estate investors, promoters of offshore renewable energies and marine resource entrepreneurs are quick to take advantage of the opportunities offered by coastal environments. On the other hand, public opinion is increasingly sensitive to potential landscape degradation from new developments, sometimes leading to virulent opposition and an insistence on concerted spatial planning (Dutton et al., 1995; Möeller, 2010).

On the European shores of the Mediterranean, urban sprawl resulting from residential urbanization is widespread (Benoit and Comeau, 2005; Catalàn et al., 2008; Cori, 1999; Pons and Rullan, 2014; Romano and Zullo, 2014). Continuous coastal conurbations have developed, agriculture has regressed and natural areas are threatened. In order to frame urban development, appropriate spatial planning for coastal territories is needed (Prévost and Robert, 2016). Parameters specific to coastal areas are already taken into account in the legislation of certain countries such as France and Spain (Deboudt et al., 2008; Torres Alfosea, 2010). However, though landscape views have an impact on households' residential strategies and inhabitants are strongly attached to their landscapes, urban planning is still not designed with an eye to the visual landscape characteristics of the territories. Given the major role that tourism and real estate play in the economy of coastal areas, it is vital that urban planning documents be based on an objective characterization of the landscape properties of the spaces, i.e. the capacity of the territories to offer views and panoramas of the sea and landscapes. Provided with maps showing places from which landscape features can be viewed, local authorities could refine their planning choices and define public policies that preserve and take advantage of the landscape resource. This hypothesis is the basis of this article, which proposes a method of evaluating and mapping the visual

landscape potential of territories located in the coastal zone, using as a case study seven municipalities lying on the French Mediterranean coast. Intended for administrative or environmental spatial management units subject to public policies (a municipality, an island, a national park), this methodology uses GIS, viewshed analysis and spatial analysis to determine the components of the visible landscape, so they can be taken into account in spatial planning. The result is an innovative approach to spatial planning: here, landscape is not considered in its physical, ecological or perceived dimension (as recommended by the European landscape convention, 2000), but through its potentially visible dimension.

2. Materials and methods

2.1. Study area

The study was carried out on the French Mediterranean coast (Fig. 1). The Mediterranean regions of France are a tourism hot spot, in addition to having a highly developed residential economy, especially along the coast. In 2011, according to INSEE (National Institute of Statistics and Economic Studies, URL: <http://www.insee.fr>), tourism consumption reached 28.6 billion euros in the Provence-Alpes-Côte d'Azur, Languedoc-Roussillon and Corsica regions, accounting for 21% of national tourism consumption (but with only 12% of the total population). Here, we chose the commune as the geographical reference unit. Administered by a municipal council elected by its inhabitants, it is the cornerstone of France's territorial organization. In particular, it is responsible for management of the cadastre and allocation of building rights. From 1967–2014, it was responsible for drawing up local planning documents: land use plans (*plan d'occupation des sols*, POS), followed by local urban plans (*plan local d'urbanisme*, PLU) after 2000. Since 2014 (ALUR bill), spatial planning has taken place at inter-municipal level (*plan local d'urbanisme intercommunal*, PLUi), but the commune remains an essential level in the design of urban planning. Created by the French Revolution in 1789, the commune is firmly entrenched in territorial practices and is regarded with a relatively strong

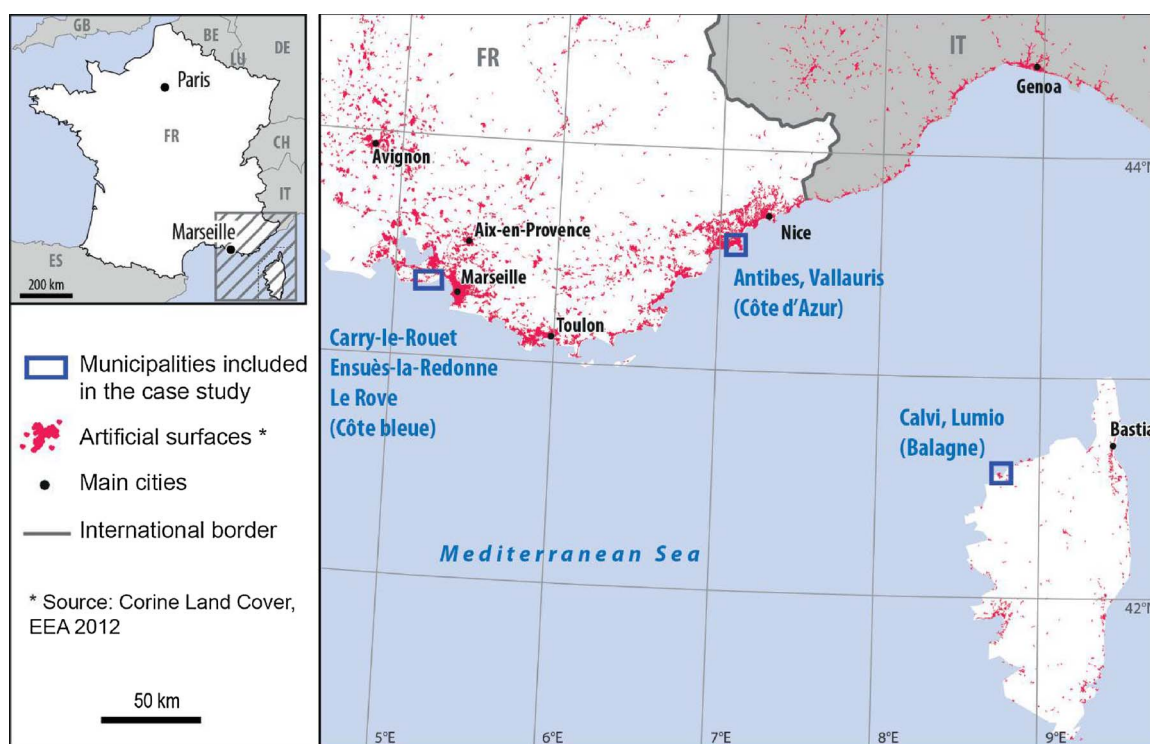


Fig. 1. Location of the municipalities included in the case study.

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