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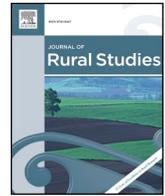
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# Sparsely populated regions as a specific geographical environment<sup>☆</sup>

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## ABSTRACT

The Amazon forests, the Northern arctic regions, the Australian bush and Siberian plains all have very low demographic densities, but they are rarely studied as pertaining to the same global category. It appears, however, that when considering sparsely populated regions (SPR) globally they share not only demographical characteristics, but also a number of features in their economic, political, spatial and social configuration, and more importantly in visions of nature and the environment, which make them different from more densely populated areas. The point of this paper is to demonstrate that despite obvious ecological and climatic differences, SPR can be considered as a specific geographical category and in so doing we are able to reveal and explain aspects until now imperfectly framed under the ‘rural’ category which they are generally put into. This point is far from anecdotal, since contrary to common assumptions, SPR are still largely dominant today on Earth in terms of extension. Considering them as a unique category can therefore be an important step forward in cross-continental rural studies.

The Amazon forests, the Northern arctic regions, the Australian bush and the Siberian plains have all something in common: they are sparsely populated. Linked with this same basic characteristic, a number of other common points appear when examining their spatial and social configuration and the place they hold in their respective national contexts. The point of this paper is therefore to explore if, despite obvious differences in their ecological environments and histories, the remarkable set of similarities found in sparsely populated regions (hereafter SPR) across the world can lead to addressing them as a specific socio-environment whose characteristics and dynamics were until now only partially captured by the concept of “rural” under which they are generally put. This is far from anecdotal since, contrary to common assumptions, SPR are still largely dominant today on Earth in terms of extension, and the growing concentration of human populations in densely populated areas is at the same time increasing SPR predominance and widening the cultural and economic rift between them.

The first part of this paper aims at situating SPR both in statistical and vernacular terms. In the second part, I show how SPR do not fit well under the rural category and how they relate to “wilderness”. In the third part, I explore how frameworks like the frontier theory and [Carson and Carson \(2014\)](#) “8Ds” help define common points which appear at all latitudes and development stages. The fourth part of the paper builds on these in order to point out a number of common features which characterize SPR across all environments and allow to consider

them construct as a specific spatial category. We then analyze how the relationship existing between SPR and the metropolis they are related to can be framed under the ‘telegovernance’ concept and how many contemporary conflicts about this governance can be at least partially explained by conflicting worldviews and diverging connections to space and nature.

## 1. Sparsely populated regions and belated geographical concepts

SPR still constitute a dominant landscape across the world, however they are framed under different vernacular concepts.

### 1.1. Still a sizeable portion of earth

Even if the figures are relatively well known, it is worth paying attention to the fact that the world is still composed mostly of loosely populated areas, especially since a number of works have insisted on the urban advance on rural areas ([Seto et al., 2011, 2012](#)) and that 2/3 of Humanity will probably live in cities by 2050 ([United Nations, 2018](#)).

Human occupation of Earth calculated after the Landsat dataset ([Bright et al., 2017, Table 1](#)) shows that areas under the threshold of 1 inhabitant/km<sup>2</sup> still account for the majority of the planet (61.9%), even in Asia, the world’s most populated continent. Only in Europe and Africa do they account for less than 50% of the area. SPR are especially

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Table 1

Distribution of the world's land contingent on demographic density (statistics calculated after Landscan 2016; see Bright et al., 2017).

CONTINENT	=<1/km <sup>2</sup>		>1 to =<10/km <sup>2</sup>		>10 to =<100/km <sup>2</sup>		>100/km <sup>2</sup>	
	Area	%	Area	%	Area	%	Area	%
Asia	26,194,554	<b>59.95</b>	7,461,012	<b>17.08</b>	5,746,670	<b>13.15</b>	4,292,578	<b>9.82</b>
North America	19,676,912	<b>82.00</b>	2,388,883	<b>9.96</b>	1,376,126	<b>5.74</b>	553,093.2	<b>2.31</b>
Europe	4,584,449	<b>46.46</b>	2,871,566	<b>29.10</b>	1,612,548	<b>16.34</b>	799,674.9	<b>8.10</b>
Africa	14,012,325	<b>46.99</b>	9,244,912	<b>31.00</b>	5,126,278	<b>17.19</b>	1,438,870	<b>4.82</b>
South America	10,618,349	<b>59.93</b>	5,544,263	<b>31.29</b>	1,340,203	<b>7.56</b>	214,096.4	<b>1.21</b>
Australia-Oceania	7,885,810	<b>88.10</b>	875625.8	<b>9.78</b>	143,727.5	<b>1.61</b>	45,503.03	<b>0.51</b>
<b>TOTAL</b>	<b>82,972,399</b>	<b>61.90</b>	<b>28386261.8</b>	<b>21.18</b>	<b>15,345,552.5</b>	<b>11.45</b>	<b>7,343,815.53</b>	<b>5.48</b>

predominant in Australia/Oceania (> 88%), North America (82%) and South America (nearly 60%). A significant portion of those areas are covered by different types of indigenous territories, as shown by the Landmark platform<sup>1</sup> and pointed out by Garnett et al. (2018). Statistics are presented in Table 2 for selected areas (Australia, Brazil, Canada, Alaska and Continental USA).

They show that indigenous territories form a sizeable portion of each of these countries (only 3.78% in continental USA, but up to 69.23% of Australia) and that over 90% of the indigenous territories in those areas are constantly under 1 inhabitant/km<sup>2</sup> in demographic density. Moreover, except for Alaska, the indigenous territories represent a larger share of the SPR than they do of the total area: 4.75% against 3.78% in the continental USA, 20.78% against 13.89% in Brazil and 70.79% against 69.23% in Australia.

As shown by this quick statistical resume, SPR are still a very important feature in today's world. One of the reasons this fact is not routinely brought out is that such areas are either considered uniformly as "rural" (see section 2), or designated by different geographical concepts, most of them specific to a country/region. Turning to this latter point, I will now show how this reveals that, most of the time, other values or inferences are associated with low-density areas.

## 1.2. Vocabulary of an intuitive but elusive concept as a starting point

If SPR - or "sparselands" as they are named in Holmes (1981) - points to a rather technical definition, there are also a number of vernacular expressions and geographical concepts used to refer to them, conveying a number of common features. They may be used as guidelines towards a less technical and richer definition of SPR.

English expressions stress the openness (*wide open spaces*) or put them as a place of unspoiled nature (*wilderness*, which has a special significance in the USA, see Meinig, 1979). Others stress the relationship with other, more densely populated areas. In general, they depict an opposition between the centers, implicitly defined by connectivity and progress, and the peripheries, implicitly defined by isolation and in many cases a certain backwardness (the mechanism of this projection is well described in Paulgaard, 2008: 52). One might cite "backland", "backcountry" or, in Australia, "outback", "bush". This latter word adds the nuance of a country also inhabited by native populations. Other related concepts would insist more on the political control of the regions (or lack thereof), like "borderlands" or "margin".

If we look at Brazil, a number of geographical concepts correspond

quite closely to those which we just pointed out.<sup>3</sup> The most interesting would probably be "sertão",<sup>4</sup> which is a good translation for "bush" but is also, as geographer Antônio Carlos De Moraes (2003) shows, an essential concept for the relationship between Brazilian society and its territory. Initially used generically, then more often to designate the interior of the Nordeste region (the Sertão), it conveys the idea of a partially unknown and isolated territory that will be conquered by civilization in a near future, but is still partly untamed and potentially dangerous, in any case rough and seen as a "demographic void" to be filled (De Moraes (2003)). More than a specific environment, the *sertão* is a condition put on certain areas by observers who are generally from cities or connected areas, that is the "non-sertão" (De Moraes (2003)).

French expressions would also echo the same nuances as the English and Portuguese words. "Grands espaces" is close to wide open spaces and stresses the idea of untouched nature and perspective. It adds the idea of scale, even without any precise threshold. To qualify as "grands espaces", areas need to be ... large. The word "bled" would be a rather good equivalent for "outback", "bush" or "sertão". Interestingly, it comes from the Arabic and was adopted as a military slang during the colonial conquest of the Maghreb to designate the countryside. Implicitly, the "bled" was isolated and not necessarily well controlled by authorities, therefore potentially dangerous. It is still in use today and has gained a new popularity as immigrants of Arabic origin and their descendants use it to designate the (in general rural) places where they visit their family when going back (Bidet and Wagner, 2012).

The review of these concepts, which could certainly be broadened to other languages, is useful to show that most equivalents to the technical "sparsely populated regions" convey ideas more complex than the mere low demographical density. Complementary to this fundamental trait, we find notions of isolation, weak or absent political control from the center of power, economic and cultural backwardness, and finally, the presence of other types of societies and ethnic groups. As De Moraes phrases it: "the sertão is deemed as the place of otherness" (2003: 4). All of this also means that the definition of SPR is relative and that it works by defining, even implicitly, its opposite, the densely connected areas. As such, it is difficult to know exactly where those regions start or end because the answer to this question depends a lot on the national context and on the spokesperson. As shown again by Paulgaard (2008), even small settlements can point out smaller ones and consider them as their periphery.

<sup>1</sup> [www.landmarkmap.org](http://www.landmarkmap.org).

<sup>2</sup> Demographical density derived from Landscan 2016 (Bright et al., 2017), geographical location of Indigenous territories derived from governmental sources for Canada, Landmark platform for USA, and Australia, RAISG and FUNAI for Brasil.

<sup>3</sup> Many can be cited: "rincão" or "interior" stress the backwardness and disconnection with the cultural and economic centers. "Margem", "periferia" or "confins" stress the remoteness from a political standpoint and the difficulty of controlling it by the central government.

<sup>4</sup> "Gerais" is another old word with a close meaning, but it is much less in use.

**Table 2**  
Repartition of total area and Indigenous territories in function of demographic density for selected areas <sup>2</sup>.

Country	Division	<1 / km <sup>2</sup>	1-10/km <sup>2</sup>	10-100/km <sup>2</sup>	100+/km <sup>2</sup>	Total
Brazil	Country (km <sup>2</sup> )	5226457	2548288	594272	93967	8462984
	IT in Country (km <sup>2</sup> )	1086140	82329	6323	866	1175657
	IT/Category (%)	<b>20,78</b>	<b>3,23</b>	<b>1,06</b>	<b>0,92</b>	<b>13,89</b>
	Category IT / Total IT (%)	<b>92,39</b>	<b>7,00</b>	<b>0,54</b>	<b>0,07</b>	<b>100,00</b>
Alaska	Country (km <sup>2</sup> )	1495470	7005	2231	996	1505703
	IT in Country (km <sup>2</sup> )	209261	2618	619	253	212751
	IT/Category (%)	<b>13,99</b>	<b>37,38</b>	<b>27,73</b>	<b>25,37</b>	<b>14,13</b>
	Category IT / Total IT (%)	<b>98,36</b>	<b>1,23</b>	<b>0,29</b>	<b>0,12</b>	<b>100,00</b>
Continental USA	Country (km <sup>2</sup> )	5729424	902106	760651	345318	7737498
	IT in Country (km <sup>2</sup> )	272251	12085	6426	1722	292484
	IT/Category (%)	<b>4,75</b>	<b>1,34</b>	<b>0,84</b>	<b>0,50</b>	<b>3,78</b>
	Category IT / Total IT (%)	<b>93,08</b>	<b>4,13</b>	<b>2,20</b>	<b>0,59</b>	<b>100,00</b>
Australie	Country (km <sup>2</sup> )	7233391	362148	38237	18909	7652685
	IT in Country (km <sup>2</sup> )	5120412	156690	13853	7068	5298024
	IT/Category (%)	<b>70,79</b>	<b>43,27</b>	<b>36,23</b>	<b>37,38</b>	<b>69,23</b>
	Category IT / Total IT (%)	<b>96,65</b>	<b>2,96</b>	<b>0,26</b>	<b>0,13</b>	<b>100,00</b>
Canada	Country (km <sup>2</sup> )	9283319	366587	79061	29935	9758902
	IT in Country (km <sup>2</sup> )	4269528	19630	3523	1279	4293959
	IT/Category (%)	<b>45,99</b>	<b>5,35</b>	<b>4,46</b>	<b>4,27</b>	<b>44,00</b>
	Category IT / Total IT (%)	<b>99,43</b>	<b>0,46</b>	<b>0,08</b>	<b>0,03</b>	<b>100,00</b>

## 2. Are sparsely populated regions rural?

Classifying SPR as being a part of the rural world or as a separate category from it is an important question if we want to coin SPR as a geographical category of its own. If rural is defined as “everything which is not urban”, then SPR are evidently part of the rural world. The research about rural and rurality has, however, come with much more refined definitions of what rural points out to. A number of differences appear when we consider those.

### 2.1. “an extreme case of rurality”?

Several works point out to the successive definitions and redefinitions of what rural is (Halfacree, 1993 & 2006; Lockie et al, 2001; Cloke, 2006; Woods, 2009). Elaborating on those and especially on the *Handbook of rural studies*, we can point out three successive main ones. The first is “functional”, linking the definition of rural essentially with agriculture or primary production. The second one is social, linking rurality with social characteristics such as small-scale coherent societies (the famous *gemeinschaft* model). The third one is cultural, considering that the rural is probably more a cultural construction than a concrete place.

The first two definitions are coherent with the set of “widely accepted characteristics of rural” pointed out by Hugo et al. (2003). Applying those definitions to SPR allows us to pinpoint how they do not fit well under them. Regarding the functional definition, SPR can be linked with primary production, but most of the time they are not important players in the agricultural field, seeing only very extensive land use like cattle ranching with low animal load *per* spatial unit. A large portion of SPR (far North, Australian bush, Amazon rainforest, etc.) are “unproductive” lands, even if some of them are being integrated to the

mainland as we will suggest in the next section on the frontier. As Holmes (1981) signals, many SPR consist in environments considered as “hostile”, while rural places are on the contrary generally considered as favorable to settlements (keeping in mind that what is a ‘suitable’ environment is very much place and time dependent, as the example of European mountain areas which were farmed and densely populated until the 1950s clearly shows). Still according to Holmes, since those regions are not easily used for agricultural production, the local economy is restricted to “opportune use of natural resources”.

If we turn to the characterization of rural from a social point of view, here also SPR do not fit well under the definition. Their population is mostly not homogeneous: in many places colonists or newcomers coexist with Indigenous peoples, such as in the Amazon and in Alaska. Also, as we will show in the third section, SPR are also often-times a refuge for minorities. They thus do not necessarily fit the stereotype of mainstream agricultural conservative societies that is ingrained in the social approach of rural.

In conclusion, the mismatches that appear between SPR and the two definitions of rural can lead us to accept Holmes’ (1981: 3) conclusion that SPR cannot be framed only as “an extreme case of rurality”.

Turning to the cultural definition, Halfacree (2006: 55) proposed a threefold framework based on Lefebvre in order to overcome the limitations of considering rural only as a cultural artefact. In his model, the locality of rural, with its distinct practices, coexist with the representations of the rural, a cultural construct, and with the everyday lives of the rural, defined as “inevitably incoherent and fractured”. SPR fit relatively well under this model. As we have shown in the vocabulary review, they are as much a concrete locality as a cultural representation, and as pointed out, they are inhabited by diverse societies so that everyday life is “incoherent and fractured” as well. However, when it comes to representing each dimension, differences appear. In

Halfacree's paper, each one is represented by a symbol: the locality by a rural landscape, the representation by a picture of a tree, etc. In their study of the second home phenomenon in Norway, Rye and Berg (2011) have proposed an adaptation of Halfacree's framework to better reflect the changes they perceived in rural Norway and chose to substitute these symbols by other ones: a cabin instead of the "rural" landscape for locality, a carpenter instead of the rural-agricultural society symbol, etc. In the case of SPR, the symbols would probably be difficult to choose. The locality or SPR would be any "wild" landscape with a small presence of human artefacts. The representation could vary from jungle to arctic desert but should convey the meanings we have extracted from the vocabulary review in part I. The symbol for society should emphasize marginality. In the end, even if the threefold model applies as a generic system, it is obvious that the reality to be represented would be very far from the British landscape which is the support of Halfacree's paper, leading to question if it can be framed under the same concept of rurality.

## 2.2. SPR and wilderness

If SPR are not part of the rural world, should they be considered as "wilderness"<sup>5</sup>? Rurality is sometimes described as an interval existing between urban and wilderness areas - the "middle landscape" referred to by DuPuis (2006). By this definition, SPR are probably not rural since they are very incompletely tamed and controlled, either from an ecological or from a social point of view. Oftentimes they are undergoing violent processes to make them rural (frontier process, see III.). But on the other hand, by definition SPR are populated which seems to imply a radical difference with "wild areas".

However, considering that wilderness implies "empty" regions raises a scale issue: how do we define what spatial unit a given population group must be associated to? Even if they only inhabit small villages, many Indigenous people travel through extensive hunting, collecting and fishing grounds, like the Inuit of the Canadian North (Freeman, 2011), and the Yanomami of the Amazon (Le Tourneau, 2010). Should they be associated only to the village area, which they effectively inhabit most of the time, or to the whole territory they are using, even if their presence is quite elusive in most of it? Should they also be associated to areas which they do not currently use but which they view as either sacred and/or reserved for future expansion?

Historically, not taking into account territories used intermittently has led to the Western illusion that most of the Americas weren't occupied, thus justifying European expansion on them and giving the illusion of the Americas as mostly 'natural' areas. This same "emptiness" claimed under the "terra nullius" doctrine was also used by Europe to justify its colonial conquests in Asia, Africa or Australia (Buchan, 2007). In this latter case, the doctrine was invalidated by Australia's supreme court in 1992, allowing the Aborigines to reclaim ownership on lands.

Thus, if every type of use or presence is taken into account, the extent of 'wild' or 'pristine' areas in the world will probably dramatically shrink, and SPR rise accordingly. We should then abandon the idea of having a threshold below which SPR become human deserts and consider that they include all territories under a certain threshold, meaning also territories devoid of permanent population. This is how, for instance, the European Union defines the "NUTS-3 level regions", which span across unoccupied areas beyond the Northern Arctic circle (Gløersen, 2012). SPR therefore have a spectrum which goes from very isolated and unfrequently visited areas to part of the rural world.

But if SPR largely include pristine or barely transformed

<sup>5</sup> Even if the very possibility of it, i.e. areas completely virgin of human-originated transformations, can be heavily discussed. A number of new discoveries in the Amazon, for instance, increasingly point out the fact that what was seen as a pristine forest was most probably heavily influenced by human presence and activity (Denevan, 2011; Levis et al., 2018).

environments, they cannot however be exclusively associated with them. Many heavily explored and transformed environments are linked to a very small permanent human presence, like the large scale mechanized agricultural regions of Mato Grosso in Brazil where "deforested deserts" can be identified (Tritsch and Le Tourneau, 2016), and part of the Great Plains in the US (Curtis, 2008; Le Tourneau, 2017). Whether those are rural areas or SPR is an open question and should be investigated in further studies.

## 2.3. Where do SPR start?

Most censuses and surveys classify human settlements as urban or rural, but many authors have called to complement and enrich this division with other categories (Hugo et al., 2003). The interface between rural and urban, in particular, has been the subject of intense scrutiny in the past decades because of the extension of cities far beyond their former limits and because of the development of a host of mixed rural-urban landscapes framed by new concepts such as rurbanity or exurbanity (Theobald, 2001; Lichter and Brown, 2011). However, the other end and outer fringes of the rural spectrum have seen much less scrutiny.

The Roman Empire division of the rural space might help put this question in perspective. Outside the city walls (*urbs*), it defined three categories of space, according to the degree of human presence and human intervention on the landscape (Antrop, 2000). *Ager* (countryside) was the rural area near the city; *Saltus* was the range where extensive ranching and resource collection was taking place; and *silva* (forest) was the equivalent of the wilderness, places without permanent human presence but used for hunting purposes. It's likely that the latter two would fit quite neatly under the concept of SPR, whereas only part of the first one (if any) would. Here, we can underline that most authors point out that there is no clear break between urban and rural but a "continuum" of different situations and admit that there is also a continuum of different situations between rural and SPR. In part IV, I will introduce three axis which allow to grade this continuum.

One very interesting detail about the Roman classification is that it was associated with different population types and behaviors. As was also the case with the ancient Greeks (Vidal Naquet, 1981), they considered that people living in the "forests" had different living styles and worldviews, being oftentimes in contradiction with city values. Berque (2011) points out that this opposition between "forest" and rural areas is present in a number of civilizations and languages (including Chinese and Japanese) and was probably anterior to the urban/rural opposition which came to dominate the classification of space.

## 3. Sparsely populated regions and the frontier theory

If, as we have pointed out, SPR are in general marginal and incompletely incorporated in their nation's space, many of them have undergone or are undergoing expansion processes by more densely populated regions. Such processes are framed under the "frontier theory" derived by Frederick Jackson Turner's (Turner, 1894) observation of the colonization of the United States. It describes the advance of pioneers in the US as the incorporation of "empty"<sup>6</sup> lands (remembering the attributes of the "sertão") and considers that this process was the cradle of the American civilization. Among the qualities developed and exalted by the frontier are individualism, self-reliance, egalitarianism and democracy. If the frontier theory has been largely challenged, it still frames the interpretation of the relationship between densely populated areas and their margins, especially in the tropical world.

<sup>6</sup> To Turner's eye, the presence of Indigenous societies does not count as an occupation, precolonial societies being associated with the realm of Nature.

### 3.1. SPR and frontiers in the tropics

Geiger (2009) has thus developed an approach of tropical contemporary frontiers and shows how the frontier concept can still be used to define the areas that can be described as such. He points out 8 features which can help identify current frontiers if they are present to a certain degree:

- relatively weak population density;
- partial or absent control of the State;
- presence of non-native private actors;
- tendency to minimize the land claims by native and indigenous peoples;
- naturalization of indigenous groups;
- “exploit and move” mentality;
- predatory nature of the economic relationships between local people and outsiders;
- failure by the State to impose its monopoly on violence.

Moreover, Geiger defines three types of frontiers in the tropical regions he studies: frontiers of occupation, frontiers of exploration and frontiers of control. The first ones are the most classic. They are created by a process of expansion (colonization) by the societies which politically dominate the SPR, with the objective of changing their land use. Typical examples are the southern Amazon region and the interior of the Borneo island. The second type is defined by the exploration of natural resources in specific spots (mines, oil fields). As the exploration tends to last only as long as the resource is not exhausted, this type of frontier is temporary and the region may revert to isolation afterwards (see the former mining regions in the US turned into ghost towns). Lastly, the frontiers of control are where states are worried that their sovereignty might be challenged. It is characterized by the installation of permanent settlements (and military posts) which would not exist without governmental support.

Geiger's work is a valuable resource to frame our approach of SPR. Obviously, the 8 characteristics he associates with frontier areas readily match the notions of our review of the vocabulary. His typology also broadens the scope of the frontier concept from pioneer settlements to areas where frontier dynamics do not necessarily lead to increased demographic density, such as mining regions and military controlled ones. It also gives the idea that SPR may contain a limited number of isolated urban settlements (mining operation, “control villages” in border areas, etc.) which are to be considered as part of them since they are completely embedded in their social and economic dynamics, and not as separated enclaves.

To complement his views, we can envision another type of frontier, the environmental protection frontier. In the last two decades, the world has seen a spur of new protected areas (Lewis et al., 2017), and a lot of them were established where they would encounter less resistance, that is in SPR (often further prolonging the “naturalization” of traditional and indigenous populations which were deemed to be evidently “compatible” with the land use restrictions that such a status implies). The sweeping nature of those creations reminds us of the frontier process.

### 3.2. Frontiers in the global north

If Geiger's approach is closely linked to tropical areas, we can ask whether the processes he describes could not also be found in the peripheries of the global North.

The framework developed by Carson and Carson (2014) helps answer this question. In order to analyze SPR of countries such as Australia and the European Nordic countries, they point out 8 characteristics of those regions which both help identify them and form the basis of a framework for their study. Distance is paramount (‘Distant’ and ‘Disconnected’), as well as the diversity of trajectories and histories

(‘Discontinuous’, ‘Diverse’ and ‘Detailed’) between those areas – which does not negate the fact that they share common traits. Moreover, Carson and Carson emphasize the rapidity of changes inside those regions (‘Dynamic’), their relationships with densely populated areas (framed under the ‘Dependent’ adjective) and the specific challenge they offer (‘Delicate’). Most of those characteristics match what we have been seeing in the vocabulary review and what Geiger points out in his frontier theory. Thus, SPR from developed countries and from tropical areas appear to share a number of common features, justifying a global approach.

## 4. Defining sparsely populated regions as a specific geographical environment

Based on what appears in the previous sections, some basic common characteristics can be used to define SPR, which I develop hereafter. This leads me to also propose a classification based on 3 axes and explore how the way they are largely governed remotely explains many of the current conflicts and controversies they are the subject of.

### 4.1. Four criteria to define SPR

The review of previous concepts and theories, especially Geiger's and Carson and Carson frameworks, has shown that a number of common characteristics arise when talking about SPR. Regions qualifying as such can be identified when four of those specific characteristics are all present at various levels.

#### 4.1.1. Low population

Under any perspective, SPR represent regions where space is abundant and human beings much less so, which translates into isolation for the population living there. However, defining global thresholds is probably impossible since the definition of sparsity is very culture dependent. Also, density is so dependent on the scale of the units which are considered that its measurement is often biased. As Gloersen (2012: 448) puts it: “as a ratio of population by land area unit, a demographic density does not adequately express the challenge of sparsely populated areas. The issue is indeed not that there are few persons per unit of land area, but that the total number of persons within a reasonable daily mobility distance is too low to build a well-functioning and robust labor market and to operate public and private services cost efficiently.” Defining SPR by considering the number of people living in a determined radius (for instance less than 50 000 people living in a radius of 50 km), as in Gloersen et al. (2006), might be a good way of bypassing the difficulty of considering only administrative units. Depending on the threshold which is adopted, projecting the overall population on a certain radius might also bypass the problem that SPR sometimes include small towns or isolated high density settlements like mining operations, military bases of frontier posts.

The weak population density often leads SPR to have a high percentage of their lands under the direct control of the State as “public lands” or other similar statuses. About 48% of the 15 US Western States' lands are under Federal control, and the situation is similar in the Brazilian Amazon (Le Tourneau, 2019).

#### 4.1.2. Remotely and incompletely controlled

SPR are in general under the control of central States originating in more densely populated spaces (hereafter “metropolises”). But due to the sparsity of population distribution and the size of the area, this control is incomplete and in any case inferior to that of more densely populated areas. SPR are marginal and more often than not places where illegal and/or informal (or unregulated) activities such as smuggling, poaching, informal exploration of natural resources, etc., take place (Fig. 1). They are also places where rules are more difficult to enforce. The environmental scandals about oil and gas exploration in the Canadian Alberta (Schindler, 2013) and in the Amazon portion of Ecuador

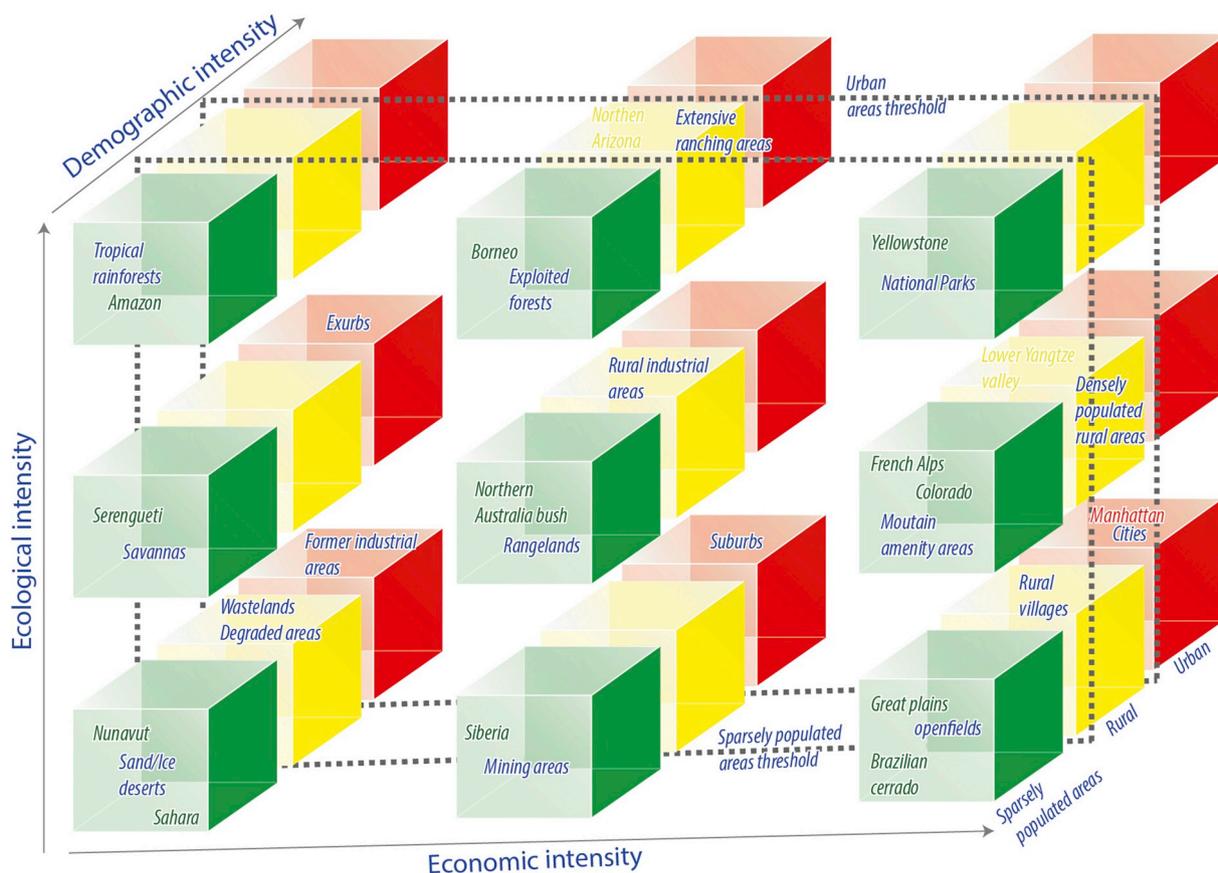


Fig. 1. Sign in Arizona showing the challenge of control in SPR (photo FMLT).

(Cherry and Sneirson, 2012; San Sebastian et al, 2004), but also the difficulties by Sweden and Norway to regulate reindeer herding in their Far North (Tveraa et al., 2007) are all good examples of this particular feature.

4.1.3. Distant and isolated

Isolation is a key part of the definition of SPR. It can be expressed in terms of absolute distance, as does the Australian bureau of statistics which introduced in 2001 a “remoteness” criteria for its census units which goes from city to “remote” or “very remote” (Carrington and Scott, 2008). This is also the case of the European Union which added a remoteness criteria for its classification of rural, distinguishing “rural close to a city” and “remote rural”, the latter being defined as where more than 50% of the population has to drive more than 45 min to get to a city center (Dijkstra and Poelman, 2008, 2018). As another illustration of the issues surrounding the use of administrative areas for determining SPR, it is worth pointing out that French Guiana, a territory predominantly covered by tropical rainforest where road access is limited to the coastal region, is uniformly classified under “rural close to a city” in this EU classification, grossly misrepresenting the situation of most of its territory (but adequately representing the situation of most of its population). This illustrates that ‘hard data’, however indispensable it is to try to quantify the phenomenon, are probably not the best way to approach SPR. They are best described through a qualitative perspective.

Apart from the physical distance, isolation takes other forms, such as absence and low quality of vital infrastructure, communication and cellphone networks, but also hospitals and medical facilities. Examples can be found in Western US where a number of areas are close to transport infrastructures such as highways, but lack supermarkets as the cartography of “rural food deserts” by Morton and Blanchard (2007) shows. As the potential market is not very rewarding, companies are

reluctant to invest, and States are not always willing to guarantee equal access to services in all parts of their territory. As Carson and Cleary (2010) show, technical measures can also have important effects: according to them, the growing sophistication of airplane maintenance rules in Australia has greatly reduced the service and the availability of air transport in remote areas. The isolation of SPR from this point of view makes them quite different from the agricultural heartlands and rural core areas which are culturally integrated and well connected.

Distance can also be expressed in terms of missing knowledge, be it from a factual point of view (SPR are rarely in the headlines) or from a scientific point of view. But, as Geiger (2009) points out while studying tropical frontiers, there is a paradox here since if they were totally inaccessible or unknown, people would not talk about them or travel to them. Therefore, the connection between SPR and the densely populated territories is incomplete, but not inexistent.

Another point which must be addressed is what can be called the “illusion of technology”. It is true that the Internet, online services and improvement in road infrastructure and cars help diminish the isolation. However, even today, the concrete experience of distance still remains. Having to drive 2 h to a supermarket or to an hospital makes a big difference in everyday life, and one could say that it is a difference of nature and not of degree: people must be prepared to face challenges that most of the population don't, like the possibility of facing grave health issues without exterior help. Therefore, SPR could be defined as those where distance and remoteness impose themselves as an ever-present part of everyday life.

4.1.4. Place of Otherness and distinct lifestyle

SPR are frequently places where Indigenous groups were able to maintain a meaningful presence and control over important territories (see Table 2). Also, SPR often act as a refuge for social groups which are persecuted in the metropolises or disdained. Among thousands of

examples, the Mormon installation in Utah and the fact that they eventually achieved statehood (Mauss, 1994) is quite symbolic since the area given to them was really the ultra-periphery of the continental US. The Otherness linked with SPR is not only ethnic but also cultural and temporal as they can be places where distinctive cultural features lost elsewhere still live, with fishing and hunting (the latter currently heavily contested by animal rights groups mostly located in big cities) being on the top of the list. SPR are places with different activities, social behaviors and relationship to space and to the environment, revealing specific lifestyles, worldviews and sense of place and place attachment (Tuan, 1974; Lewicka, 2011), including a strong sense of ownership which may conflict with external influences and ideas about how these spaces should be used.

Drawing on the environmental psychology, one could postulate that being surrounded by vast spaces allows for a different connection with geography. Farrugia et al. (2016) show that this is the case with young non-indigenous people from the Australian bush who put forward their relationship to their land as a distinctive part of their identity and very often reject the city lifestyle. This is also the case in Little's study (2016) which points out specific links between domestic violence and rurality, and in Carrington and Scott (2008) who explore the links between masculinity, rurality and violence. The distinct lifestyles also influence the mentality (a reminder of Geiger's 'frontier mentality'), and common features such as individualism, self-reliance, a certain tolerance for violent self-justice and the defiance towards centralized government are frequent. Remembering the Greek and Roman consideration that the *silva* was a place of different lifestyles, DuPuis (2006) also points out the association made by the early supporters of protected areas like Teddy Roosevelt and the preservation of the woodsman mentality and qualities (which relates to the otherness pointed out in I.)

#### 4.2. Three axes to characterize SPR's spectrum

If the four criteria are useful to identify SPR, they cannot serve to build a typology of those, or to grade the continuum between rural areas and SPR that was pointed out in section 2. To that end, three axes can be defined<sup>7</sup> and used. Since defining concrete values for each would be very difficult and probably vary from region to region, we prefer to consider them as three axes of intensity which originate from a zero point (total absence of the phenomenon) and show growing strength when moving away from it.

The first axis can be called "demographic intensity" and it is obviously very correlated to the criteria #1. We postulate that at a certain value in this scale we quit the realm of SPR to enter other types of territories. At the end of this axis are of course city centers with extremely high population densities such as Tokyo and Manhattan. At the origin are the least densely populated areas of the world such as the Arctic, the Sahara and the Amazon rainforest.

The second axis can be called "ecological intensity", which is defined as a combination of biodiversity, vegetation density and human-induced transformation of the environment. This axis allows for discriminating between different types of SPR such as sand/ice deserts, tropical rainforests and almost rural SPR.

The last axis is the "economic intensity", and it accounts for the economic valorization of natural resources and the amount of agricultural production which is derived from SPR. It allows for the discrimination between rural and "wild" regions as well as between regions under heavy exploitation for their natural resources (especially by mining/oil and gas exploration) and those which are not currently valorized. It can also incorporate valorization based on the amenities and recreational activities, which create another type of SPR such as

mountains where ski resorts are installed and very famous National Parks like Yellowstone and the Grand Canyon.

The three axes allow for a tri-dimension representation of the different types (Fig. 2). But it should be read in a dynamic way, considering that the position of each region on each of the three axes can move according to economic, political and social factors. Mined areas can be abandoned when the resources are exhausted and SPR can be populated under government induced policies. Inversely, formerly densely populated regions can see a dramatic decrease of their demographic density, such as rural mountain areas in France and in Spain.

#### 4.3. 'Telegovernance' and conflicting worldviews: the relationship between SPR and their metropolises

One of the interesting points about recognizing SPR as a specific type of geographical environment is that it allows us to pinpoint similarities in numerous conflicts about environmental governance, which, in our opinion, could be framed under a general difference of approach from SPR and densely populated areas about nature, space and the environment.

##### 4.3.1. Telegovernance

At the heart of the four criteria that we have pointed out is the question of relationship between SPR and their metropolises. Based on the telecoupling (Friis et al., 2015; Liu et al., 2015) and coupled human and nature systems (CHANS, see An et al., 2014) approaches, we propose to consider the concept of 'telegovernance' to frame this relationship. 'Telegovernance' is to be understood as the sum of all the direct (laws, votes, etc.) and indirect (cultural influence, economic unbalances, etc.) mechanisms that allow the metropolises to determine the way SPR are managed.

Due to a combination of majority-rule political systems, absolute wealth, economic, military and law enforcement capacities, densely populated areas tend to have the political, economic and technological power to drain resources from SPR, whereas the reverse relation is not true. Although this influence can vary along historical periods, densely populated areas thus impose and, in many cases, control governance arrangements in SPR, favoring perceived needs and dominant worldviews about economic development and conservation. As pointed out by Carson et al. (2011), such relationships have been highlighted in different theories. The core/periphery approach, derived from I. Wallerstein's work (2004), has pointed out dependencies and unequal relationships between regions, but it is mostly used as a tool to explain geopolitical situations, and it tends to be focused on economic imbalances between developed and undeveloped territories. The internal colonialism theory (Gonzalez Casanova, 1965; Hechter, 1975) can also be brought forward, as the clash between telegovernance and local expectations may lead to profound conflicts and be interpreted locally as a type of colonial rule. However, this theory focuses on political relations between constituted regions that include both cities and rural areas (Scotland and Ireland, for instance) and does not raise population density as one of the determining factors.

Historically, 'telegovernance' has played strongly in favor of draining natural resources from SPR to the metropolises, where they are consumed. This drain is realized through many channels, including in cooperation with local societies and stakeholders who may benefit from employment, local economic activities, and/or rent and fees. The "staples theory", originally developed for Canada - but also applied to Australia by Argent (2013), even considered that such a drain and its modalities have framed the personality of the different regions, especially in the North (Innis, 1956; Neill, 1991), but not only. As Murphy and Steward (1956) have shown, the effect of fur trade on local populations can be compared to the effect of the rubber boom in the Amazon. This strengthens the idea that such mechanisms are not specific to one region, but that they regularly appear in many other SPR.

Even if the "drain" type of relation is still very active, the

<sup>7</sup> The discussion around these three axes and Fig. 1 are a product of the ANR funded GUYINT collective research project (ANR-17-CE03-0002-01). The author wishes to acknowledge here the participation of each project member to it.



Fig. 2. Using the three axes to situate SPR among other types of landscapes and geographical environments.

governance projected by the metropolises today tends to insist more and more on the protection of the environment, leading to other forms of impositions as exemplified by the creation of protected areas. With global efforts to mitigate climate change, SPR will probably be impacted by even more regulations since they seem “empty” in the eyes of most governments (cf. the aforementioned “terra nullius” doctrine), meaning that the political cost of such a move is low or negligible at the national level. Conflicts will probably increasingly appear as these areas are summoned to follow ecological guidelines and their population nurtures a growing feeling of “territorial dispossession” or *telistokome* as Laslaz (2005) points out in the case of the farmers surrounding the French Vanoise national park. Such conflicts might also appear with Indigenous peoples when their practices are considered “unecological” by the center of power, leading to eviction from their territories or restriction of their activities, in a “good guy vs good guy” fight as depicted by Dowie (2009). Given the conservation value of indigenous lands across the world (Garnett et al., 2018), it is vital to avoid such conflicts and to take into account indigenous voices in defining the governance of their lands (Bronzizio and Le Tourneau, 2016). The same can be said for lands under customary rights, which are a crucial in many places and especially in Africa.<sup>8</sup>

#### 4.3.2. Conflicting worldviews about nature and the environment

Conflicts involving SPR mostly involve the exploitation of natural resources or its opposite, the prohibition to do so. The intrinsic value of “nature” is in many cases the focal point of conflict between urban citizens and the inhabitants of the SPR. A good example is the Malheur wildlife refuge in Oregon which has been invaded by militiamen claiming that environmental regulations were making it impossible for them to earn a living on lands they consider theirs, commenting that: “The people cannot survive without their land and resources, [...] We cannot have the government restricting the use of that to the point that it puts us in poverty.”<sup>9</sup> In the French Pyrenees mountains, the reintroduction of bears is denounced by sheep and goat herders who see it as an imposition from the “people from the capital” who want to “naturalize” places which they only frequent during their vacation at the expense of those who effectively inhabit and explore them. Hunting (Knezevic, 2009) is another example of a practice widely accepted by societies living in SPR which is increasingly challenged.

Yet, this relationship is far from being only one way. There are many examples where areas of low population density and indigenous and

traditional population groups have successfully maintained their territorial claims, resource rights and views of governance, eventually in close association with external actors, such as in Brazil where Indigenous peoples are now in control of more than 20% of the Amazon (Le Tourneau, 2015), and in Canada where the Inuits have been granted rights on a 2 million km<sup>2</sup> territory<sup>10</sup>. Other examples might be pointed out in the US West, where local governments are trying to partner with ranchers to maintain the ranches and the open landscapes associated with them (Charnley et al., 2014).

#### 4.3.3. A “wilderness idyll” in some SPR?

Another issue which at times puts SPR and urban regions at odds is the immigration from the latter to the former because of second residencies or retirement, which affects directly or indirectly political arrangements and expectations. In some areas, local societies may even feel threatened by the “invasion” of newcomers coming from cities and having different values over landscape and economic activities (DuPuis, 2006; Ulrich-Schad, 2015). In the US for instance, there is a strong migratory flux of retirees towards rural areas which transforms their demographic profiles, and also has consequences on the real estate market, the economy and community life in general (Lichter and Brown, 2011). In the case of “high amenity areas”, the landscape has now acquired other values with the development of tourism, while some SPR have become pleasure peripheries (Navrátil et al., 2015). One could talk about a “wilderness idyll”, which would be the SPR parallel of the “rural idyll” (DuPuis, 2006) and would probably be grounded on the same paradox that the installation of newcomers in numbers destroys what they precisely were looking for when they came, i.e. wilderness and isolation.

## 5. Conclusion

SPR occupy a significant portion of Earth and share common features making it legitimate for them to be considered as a specific geographical environment, even if they span from arctic permafrost areas to tropical forest to high mountain temperate zones.

In this paper, I have pointed out how theoretical frameworks as well as vernacular concepts show the similarities between SPR, not only on demographical aspects, but also on governance issues (such as the lower level of control by the State), a specific relationship with the environment and distinct societies. In great part, the originality of SPR comes from their being marginal politically, culturally, socially and economically.

As SPR are a pluri-dimensional object, they are not easily identified by statistics or GIS analyses, even if those give an indispensable basis to start framing them. Four main criteria, quantitative and qualitative, can be used to identify them: low overall population density, incomplete control by central states, remoteness and the existence of distinct lifestyles and societies. The cumulative effect of these parameters lead to differences in the man/land relationship, which seems to differ not only in degree but also in nature when space is abundant and human beings much less so. It explains why SPR do not fit well under the rural qualification under which they are generally framed. SPR are not, I argue, a form of extreme or remote rural, but a different category with distinct economic, political and social mechanisms at play.

One of those lays in the fact that SPR are mostly under the dependence of external centers of power (‘metropolises’) which mostly define the rules and norms for land use and land management. This can be framed under the ‘telegovernance’ concept. As this governance is grounded mainly on urban perceptions of social needs and natural balances, it increasingly enters in collision with local views and beliefs, causing cultural and environmental conflicts and leading to a feeling of

<sup>8</sup> See their mapping on the Landmark platform.

<sup>9</sup> The New York Times article by Liam Stack, 01/02/2015.

<sup>10</sup> However, they only have exclusive surface and subsoil rights of a small part of this area.

“territorial dispossession” which can provoke violent outbursts.

As SPR comprise enormous extents of territory across the world, their role in mitigating climate change will be overwhelming. The interest in approaching them as a specific global environment is to allow for a better monitoring of their evolution by taking into account the features that make them distinct from other areas in their national context and by drawing attention to similar mechanisms which can span across different biomes, continents and development levels. More research should now be undertaken, on the one hand to try to better identify where SPR are located and what would be their (probably fuzzy) boundaries by spatializing the aforementioned criteria, and on the other hand to test how the concepts and mechanisms pointed out in this paper play into them. The general framework depicted here should then be applied to case studies to test the validity of its hypotheses.

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## References

- An, L., Zvoleff, A., Liu, J., et al., 2014. Agent-based modeling in coupled human and natural systems (CHANS): lessons from a comparative analysis. *Ann. Assoc. Am. Geogr.* 104 (4), 723–745. <https://doi.org/10.1080/00045608.2014.910085>.
- Antrop, M., 2000. Changing patterns in the urbanized countryside of Western Europe. *Landscape Ecol.* 15, 257–270.
- Argent, N., 2013. Reinterpreting core and periphery in Australia's mineral and energy resources Boom : an ininnisian perspective on the pilbara. *Aust. Geogr.* 44 (3), 323–340. <https://doi.org/10.1080/00049182.2013.817033>.
- Berque, A., 2011. Le rural, le sauvage, l'urbain. *Études Rural.* 187, 51–61.
- Bidet, J., Wagner, L., 2012. Vacances au bled et appartenances diasporiques des descendants d'immigrés algériens et marocains en France. *Tracés. Revue de Sciences humaines* 23, 5554. <https://doi.org/10.4000/traces.5554>.
- Bright, E.A., Rose, A.N., Urban, M.L., et al., 2017. *Landscan 2016*. Oak Ridge. Oak Ridge National Laboratory. <http://www.ornl.gov/landscan>.
- Bronzizio, E.S., Le Tourneau, F.-M., 2016. Environmental governance for all. *Science* 352, 1272–1273.
- Buchan, B., 2007. Traffic of Empire: trade, treaty and terra nullius in Australia and North America, 1750–1800. *Hist. Compass* 5 (2), 386–405. <https://doi.org/10.1111/j.1478-0542.2007.00392.x>.
- Carrington, K., Scott, J., 2008. Masculinity, rurality and violence. *Br. J. Criminol.* 48 (5), 641–666.
- Carson, D.B., Carson, D.A., 2014. Local economies of mobility in sparsely populated areas: cases from Australia's spine. *J. Rural Stud.* 36, 340–349.
- Carson, D.B., Cleary, J., 2010. Virtual realities: how remote dwelling populations become more remote over time despite technological improvements. *Sustainability* 2 (5), 1282–1296. <https://doi.org/10.3390/su2051282>.
- Carson, D.B., Ensign, P.C., Rasmussen, R.O., Taylor, A., 2011. Perspectives on demography at the edge. In: Carson, D.B., Ensign, P.C., Rasmussen, R.O., Taylor, A. (Eds.), *Demography at the Edge. Remote Human Populations in Developed Nations*. Ashgate, Farnham, pp. 3–20.
- Charnley, S., Sheridan, T.E., Nabhan, G.P., 2014. *Stitching the West Back Together*. University of Chicago Press, Chicago.
- Cherry, M.A., Sneirson, J.F., 2012. Chevron, greenwashing, and the myth of 'green oil companies. *Journal of Energy, Climate, and the Environment* 3/2012 3.
- Cloke, P., 2006. Conceptualizing rurality. In: Cloke, P., Marsden, T., Mooney, P. (Eds.), *The Handbook of Rural Studies*. Sage, New York, pp. 18–28. <https://doi.org/10.4135/9781848608016.n2>.
- Curtis, K., 2008. Population change and farm dependence: temporal and spatial variation in the U.S. Great plains, 1900–2000. *Demography* 45 (2), 363–386.
- De Moraes, A.C., 2003. O sertão. online. *Terra Brasilis* 2003 (4–5). <https://journals.openedition.org/terrabrasilis/341>. <https://doi.org/10.4000/terrabrasilis.341>.
- Denevan, W., 2011. The pristine myth revisited. *Geogr. Rev.* 101 (4), 576–591.
- Dijkstra, L., Poelman, H., 2008. Remote Rural Regions. How proximity to a city influences the performance of rural regions. *Regional Focus* 1/2008(1).
- Dijkstra, L., Poelman, H., 2018. Regional Typologies Overview, *Statistics Explained*. July 2018.
- Dowie, M., 2009. *Conservation Refugees: the Hundred-Year-Conflict between Global Conservation and Native Peoples*. MIT Press, Cambridge.
- DuPuis, E.M., 2006. Landscapes of desires? In: Cloke, P., Marsden, T., Mooney, P. (Eds.), *The Handbook of Rural Studies*. Sage, New York, pp. 124–132. <https://doi.org/10.4135/9781848608016.n8>.
- Farrugia, D., Smyth, J., Harrison, T., 2016. Affective topologies of rural youth embodiment. *Sociol. Rural.* 56 (1). <https://doi.org/10.1111/soru.12077>.
- Freeman, M., 2011. Looking back—and looking ahead—35 years after the Inuit land use and occupancy project. *Can. Geogr.* 55 (1), 20–31.
- Friis, C., Østergaard, N.J., Otero, I., et al., 2015. From teleconnection to telecoupling: taking stock of an emerging framework in land system science. *J. Land Use Sci.* 11 (2), 131–153. <https://doi.org/10.1080/1747423X.2015.1096423>.
- Garnett, S.T., Burgess, N.D., Fa, J.E., Fernández-Llamazares, A., Molnár, Z., Robinson, C.J., Watson, J.E.M., Zander, K.K., Austin, B., Brondizio, E.S., et al., 2018. A spatial overview of the global importance of Indigenous lands for conservation. *Nature Sustainability* 2018 (1), 369–374.
- Geiger, D., 2009. *Turner in the Tropics: the Frontier Concept Revisited*, PhD Thesis. Université de Lucerne.
- Gløersen, E., 2012. Renewing the theory and practice of European applied territorial research on mountains, islands and sparsely populated areas. *Reg. Stud.* 46 (4), 443–457. <https://doi.org/10.1080/00343404.2012.665989>.
- Gløersen, E., Dubois, A., Copus, A., et al., 2006. *Study on Northern Peripheral, Sparsely Populated Regions in the European Union and in Norway*. Nordregio, Stockholm Report Number 2006:2.
- Gonzalez Casanova, P., 1965. Internal colonialism and national development. *Stud. Comp. Int. Dev.* 1 (4), 27–37.
- Halfacree, K.H., 1993. Locality and social representation : space, discourse and alternative definitions of the rural. *J. Rural Stud.* 9 (1), 23–37. [https://doi.org/10.1016/0743-0167\(93\)90003-3](https://doi.org/10.1016/0743-0167(93)90003-3).
- Halfacree, K., 2006. Rural Space : constructing a three-fold architecture. In: Cloke, P., Marsden, T., Mooney, P. (Eds.), *The Handbook of Rural Studies*. Sage, New York, pp. 44–62. <https://doi.org/10.4135/9781848608016.n4>.
- Hechter, M., 1975. *Internal Colonialism: the Celtic Fringe in British National Development*. University of California Press, Berkeley.
- Holmes, J., 1981. Lands of distant promise. In: Lonsdale, R., Holmes, J. (Eds.), *Settlement Systems in Sparsely Populated Regions. The United States and Australia*. Pergamon, New York.
- Hugo, G., Champion, A., Lattes, A., 2003. Toward a new conceptualization of settlements in demography. *Popul. Dev. Rev.* 29 (2), 277–297. <https://doi.org/10.1111/j.1728-4457.2003.00277.x>.
- (1930)Innis, H., 1956. *The Fur Trade in Canada: an Introduction to Canadian Economic History*, Revised edition (1956). University of Toronto Press, Toronto.
- Knezevic, I., 2009. Hunting and environmentalism: conflict or misperceptions. *Hum. Dimens. Wildl.* 14 (1), 12–20. <https://doi.org/10.1080/10871200802562372>.
- Laslaz, L., 2005. Les zones centrales des Parcs nationaux alpins français (Vanoise, Écrins, Mercantour), des conflits au consensus social ? PhD Thesis In: *Contribution critique à l'analyse des processus territoriaux d'admission des espaces protégés et des rapports entre sociétés et politiques d'aménagement en milieux montagnards*. Université de Savoie, pp. 644.
- Le Tourneau, F.-M., 2010. Les Yanomami du Brésil, géographie d'un territoire amérindien. collection Mappedonde, Belin : Paris, pp. 480.
- Le Tourneau, F.-M., 2015. The sustainability challenges of indigenous territories in Brazil's amazonia. *Current Opinions on Sustainability* 14, 213–220. <https://doi.org/10.1016/j.cosust.2015.07.017>.
- Le Tourneau, F.-M., 2017. Using small spatial units to refine our perception of rural America. *Geojournal* 83 (4), 803–817. <https://doi.org/10.1007/s10708-017-9802-y>.
- Le Tourneau, F.-M., 2019. *L'Amazonie*. CNRS Editions, Paris.
- Levis, C., Flores, B.M., Moreira, P.A., Luiz, B.G., et al., 2018. How people domesticated amazonian forests. *Frontiers in Ecology & Evolution* 5 (171). <https://doi.org/10.3389/fevo.2017.00171>.
- Lewicka, M., 2011. Place attachment: how far have we come in the last 40 years? *J. Environ. Psychol.* n°31, 207–230.
- Lewis, E., MacSharry, B., Juffe-Bignoli, D., et al., 2017. “Dynamics in the global protected-area estate since 2004”. *Conserv. Biol.* <https://doi.org/10.1111/cobi.13056>. Accepted.
- Lichter, D.T., Brown, D.L., 2011. Rural America in an urban society: changing spatial and social boundaries. *Annu. Rev. Sociol.* 37, 565–592. <https://doi.org/10.1146/annurev-soc-081309-150208>.
- Little, J., 2016. Understanding domestic violence in rural space. *Prog. Hum. Geogr.* 41 (4), 472–488. <https://doi.org/10.1177/0309132516645960>.
- Liu, J., Mooney, H., Hull, V., et al., 2015. Systems integration for global sustainability. *Science* 347 (6225), 1258832 1–9.
- Lockie, S., Bourke, L., 2001. Rural Australia: an introduction. In: Lockie, S., Bourke, L. (Eds.), *Rurality Bites: the Social and Environmental Transformation of Rural Australia*. Pluto Press, Annandale, NSW, Australia, pp. 1–15.
- Mauss, A.L., 1994. Refuge and retrenchment: the Mormon quest for identity. In: Cornwall, M., Heaton, T.B., Young, L.A. (Eds.), *Contemporary Mormonism: Social Science Perspectives*. University of Illinois Press, Urbana, pp. 29–42.
- Meinig, D.W., 1979. Symbolic landscapes. Some idealizations of American communities. In: Meinig, D.W. (Ed.), *The Interpretation of Ordinary Landscapes*. Oxford University Press, New York.
- Morton, L., Blanchard, T., 2007. Starved for access: life in rural America's food deserts, *Rural realities* 1:4 DuPuis, E. M., 2006. Landscapes of desires? In: Cloke, P., Marsden, T., Mooney, P. (Eds.), *The Handbook of Rural Studies*. Sage, New York, pp. 124–132. <https://doi.org/10.4135/9781848608016.n8>.
- Murphy, R.F., Steward, J.H., 1956. Tappers and trappers: parallel process in acculturation. *Econ. Dev. Cult. Change* 4 (4), 335–355.
- Navrátil, J., Knotek, J., Pícha, K., Fialová, J., 2015. The protected areas: are they still in the 'pleasure periphery' or are they destinations for sustainable tourism activities? *European Journal of Tourism Research* 11, 57–72.
- Neill, R., 1991. *The Staple Thesis. A History of Canadian Economic Thought*. Routledge History of Economic Thought Series. Routledge, London.
- Paulgaard, G., 2008. Re-centring Periphery : negotiating identities in time and space. In: Bærenholdt, J.O., Brynhild, G. (Eds.), *Mobility and Place : Enacting Northern European Peripheries*. Taylor & Francis Group 2008. ProQuest Ebook Central. <https://ebookcentral.proquest.com/lib/uaz/detail.action?docID=438402>.

- Rye, J.F., Berg, N.G., 2011. The second home phenomenon and Norwegian rurality. *Nor. J. Geogr.* 65 (3), 126–136. <https://doi.org/10.1080/00291951.2011.597873>.
- San Sebastián, M., Hurtig, A.-K., 2004. Oil exploitation in the Amazon basin of Ecuador: a public health emergency. *Rev. Panam. Salud Pública* 15 (3), 205–211. [http://www.scielosp.org/scielo.php?script=sci\\_arttext&pid=S1020-49892004000300014](http://www.scielosp.org/scielo.php?script=sci_arttext&pid=S1020-49892004000300014).
- Schindler, D.W., 2013. Water quality issues in the oil sands region of the lower athabasca river, Alberta. *Geosci. Can.* 12, 202–214. <https://doi.org/10.12789/geocanj.2013.40.012>.
- Seto, K., Güneralp, B., Hutyrá, L.R., 2012. Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proc. Natl. Acad. Sci.* 109 (40), 16083–16088.
- Seto, K.C., Fragkias, M., Güneralp, B., et al., 2011. A meta-analysis of global urban land expansion. *PLoS One* 6 (8), e23777.
- Theobald, D.M., 2001. Land-use dynamics beyond the american urban fringe. *Geogr. Rev.* 91 (3), 544–564.
- Tritsch, I., Le Tourneau, F.-M., 2016. Population densities and deforestation in the Brazilian Amazon: new insights on the current human settlement patterns. *Appl. Geogr.* 76, 163–172. <https://doi.org/10.1016/j.apgeog.2016.09.022>.
- Tuan, Y.F., 1974. *Topophilia: A Study of Environmental Perception, Attitudes, and Values*. Columbia University Press, New York.
- Turner, F.J., 1894. *The Significance of the Frontier in American History and Other Essays*. Holt, New York.
- Tveraa, T., Fuachald, P., Yoccoz, N., et al., 2007. What regulate and limit reindeer populations Norway? *Oikos* 116 (4), 706–715. <https://doi.org/10.1111/j.0030-1299.2007.15257.x>.
- Ulrich-Schad, J., 2015. Recreational amenities, rural migration patterns, and the Great Recession. *Popul. Environ.* 37, 157–180. <https://doi.org/10.1007/s11111-015-0238-3>.
- United Nations, 2018. *World Urbanization Prospects: the 2018 Revision*. Department of Economic and Social Affairs, Population Division Online Edition. <https://esa.un.org/unpd/wup/>.
- Vidal-Naquet, P., 1981. *Le chasseur noir. Formes de pensée et formes de société dans le monde grec*. Maspéro, Paris.
- Wallerstein, I.M., 2004. *World-systems Analysis: an Introduction*. Duke University Press.
- Woods, M., 2009. Rural geography : blurring boundaries and making connections. *Prog. Hum. Geogr.* 33 (6), 849–858. <https://doi.org/10.1177/0309132508105001>.