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Media adaptations of archives in scientific communication: A study of the 'transfrontier mountain tourism' semiotic scenario

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Translated by Hayley Wood

The object of study: 'transfrontier mountains'

In geography, mountains in their configuration as a frontier are seen as a boundary and a discontinuity to which various meanings are attached (Debarbieux, 1997). As a topographical obstacle, they have represented a strategic argument and a framework for the military mapping of borders since states first emerged in Europe. As a symbolic obstacle, they can represent the triumph of the collective and popular will, as was the case with crossings of the Rocky Mountains in the United States in the nineteenth century. Associated with an ideal of modernity, expressions of the mountain-as-boundary encompass both aesthetic representations (paintings, maps and literature) and stereotypes that supply a vast frontier mountain imaginary. The mountain-as-boundary is a highly visual landmark that separates countries but also potentially linguistic, economic and religious areas (Debarbieux and Marois, 1997), outlining the imaginary potential of the association 'mountain + frontier' and validating the territorial constructions associated with transfrontier mountain borders.

In the context of transnationalisation, the mountain configuration provides a new way of looking at space and scale. From a social and cultural point of view, transfrontier mountain spaces connect populations that are separated by a natural obstacle but often share similarities (Fourny and Crivelli, 2003). From a political, legal and organisational point of view, they reveal a desire to cooperate and pursue projects structured by funding programmes in order to address common issues (Jacob, 2016). Oiry-Varacca (2019) shows that transnationalisation does not in any case preclude territorialisation: individuals and groups continue to identify with spaces, but the scales are modified and reference points other than that of the state are created.

Depending on the context, transfrontier mountains are seen in a variety of positive and negative ways. In some cases they have been dismissively seen as geographically marginalised or economically weak areas, giving rise to images of mountain dwellers forced into exile for their economic survival. In others, enhanced by investment from industry or tourism, they have produced social distinction, supported by policies to support the delivery of high-performance technology and transport infrastructure and by an influx of wealthy residents. Today, transfrontier mountains are coming under heavy anthropogenic pressure and in many places have become a hub for international tourism and the site of predatory property practices.

These various motifs are evidence of the contribution made by transfrontier mountain spaces to the construction of a vast transfrontier semantic universe that can already be observed in many other areas (including health, education and economics).

Study question and hypothesis

While the purpose of tourism communication is to attract visitors to the mountains, the purpose of scientific communication is to disseminate constructed knowledge regarding this particular ecosystem. In order to understand how this process of communication is adapted

to different local realities, I will identify the components, aims and forms taken by the 'transfrontier mountain tourism' scenario in scientific communication.

My primary hypothesis consists of confirming, using situated examples, that the use of archives — as legitimate or legitimised reservoirs of discourse — frames our perceptions, representations, attitudes and behaviours in relation to mountains. First, these archives (re)connect mountains to their cultural and social dimensions, a necessary condition for management of ecology in the broadest sense; and second, they make the transition from a diverse range of tourism motifs historically associated with transfrontier mountains to the contemporary argument of ecotourism. To test this hypothesis, I will situate the 'transfrontier mountain tourism' communication scenario within the transfrontier semantic universe under construction, then identify a 'structure of transformations' (Greimas and Courtés, 1982: 349) of a semiotic nature that might affect this scenario.

This approach, inspired by Foucault's archaeology of knowledge, is in line with contemporary work to develop 'libraries of semantic models describing an area or object of knowledge using conceptual graphs' (Stockinger, 2018: 8). It consists of establishing a hierarchy of concepts to address an area, defining the relationships between these concepts, and then analysing the system of topoi that supplies the area by assigning characteristics and values to it. It also contributes to examining the key issue of the active reuse of data and archives – made possible by forms of conversion or qualitative adaptations – in response to specific needs, audiences and uses. This adaptation process gives the archive the status of a resource that can be exploited by means of various intellectual operations (such as recontextualising, redrawing, rewriting and re-editorialising) based on a determined need.

Theoretical and methodological framework

Natural heritage, mountain tourism and the green transition

Rather than considering the preservation and exploitation of nature in oppositional terms, Boidin et al. (2008) connect them by emphasising the management of relations between humans and nature. This is a valuable approach as it not only defines mountains as 'a natural resource understood as an existing raw material, one that can be exploited or protected' but as 'a social, cultural and symbolic resource that makes biodiversity a socially, economically and culturally constructed reality' (Tardy and Rautenberg, 2013). It is from this perspective of a natural heritage that is living and embedded in histories, territories and social processes that I will look at various scientific communication devices.

The development of mountain tourism has been inextricably linked to high mountain areas since the second half of the eighteenth century, and can be roughly divided into two models: day trips with a 'light' impact on the ecosystem, and winter sports tourism, which has a major impact (Dérioz and Bachimon, 2009). The discrepancy between collective representations of a 'mythical space of evasion' (*ibid.*) and the harsh environmental reality calls for a change of model in various parts of the world. The factors that might influence a shift in the model include shaping the environmental awareness of the public – a key lever that scientific communication seeks to influence.

Making use of natural heritage archives

Archival disciplines describe communication processes that enable the exchange, appropriation and transformation of knowledge and values in society (Jeanneret, 2013). Associated with the concepts of source, trace, data and document, archives invite us to

observe the rewriting processes that facilitate the appropriation of a specialised discourse by others. As polysemous resources that can be interpreted based on the context, archives have an ability to draw on or postulate a past that is useful for understanding the present. Emphasising the distorting and creative nature of archives – or their 'triviality,' as this is understood by Yves Jeanneret (2008) – enables us to observe how scientific communication becomes fundamentally political (as it is designed to frame our perceptions) and social (as it promotes human communication).

The archive-based approach is particularly suited to studying natural heritage communication since, as Anna Pajard and Bruno Ollivier emphasise (2017: 386), 'the UNESCO Convention features documentation prominently in its definition of safeguarding.' The 'documentological' approach (Couzinet, 2018), which combines a description of documents with a contextualised analysis of their content, enables us to examine multifaceted, complex contemporary documents by identifying in them influences of memory, inherited motifs and historical roots.

According to Davallon (2015: 210), 'the heritagisation of intangible objects is without doubt the most archive-generating activity, as if the object were scattered across documents.' In addition to administrative documents, collective memories and recorded traces of the intangible heritage object provide opportunities for developing scientific and cultural archives in the form of written, visual and audiovisual documents. These documents can then be gathered into databases, exploited, and even commercialised, in the form of cultural and scientific products. The production of archives lies at the heart of questions about the socioeducational role of the scientific education of citizens (Albe, 2011), and also poses the question of how the documents developed are organised, not only by researchers but also by the authorities and the public.

Semantic modelling of discourse

With respect to the genealogy of transfrontier discourses, in a separate article (Hermand, forthcoming) I have proposed a theoretical and methodological framework centred on the identification of 'self-constituting discourses' (Maingueneau and Cossuta, 1995) and 'edifying narratives': two categories that are useful for thinking about the referential discourses and inaugural narratives that condition the existence of discourses about the transfrontier space. Since the discursive genealogy of transfrontier mountains provides enough material for a study in its own right, here I have chosen to focus directly on discursive adaptations of scientific communication content. My aim is to pursue the construction of a semio-pragmatic analytical model of the transfrontier universe of discourse, with the aim of this ultimately being able to connect situated discursive structures with their historical construction.

My approach is guided by three key concepts: topos, scenario and argument.

A topos (or commonplace of argument) is a central concept in argumentation theory (Anscombre and Ducrot, 1994) by which an analytical representation of discourses about a referent can be proposed by taking into consideration various discursive genres (Martí, 2008). Shared by society and relatively stable in nature, a topos – which can be general or specific (Perelman and Olbrechts-Tyteca, 2000: 112) – gives meaning to a discourse, and represents a fundamental cognitive mechanism through which we interpret reality.

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¹ UNESCO, 2003, Article 2.

The concept of the scenario has been developed in semiotics by Peter Stockinger (2005: 10) to analyse digital scenes, and is a constituent element of the topos. It refers to 'the content of a web service, the ways in which it is appropriated, and the expression and staging of the service via editing regions and zones in the form of a communication interface.' A scenario can be subjected to various semiotic operations, such as the expansion of content (Hermand, forthcoming) or, as we shall see here, the adaptation of content to specific contexts, media types, resources, audiences or uses.

Finally, the concept of argument refers to the development of a scenario in the form of a narrative or an example, with a view to establishing the pertinence of the topos. Arguments in support of the topos are opposed to counter-arguments that in turn sketch out a 'counter-discourse' (Auboussier, 2015). Arguments are identified by the use of various verbal means (such as the appeal to reason or to emotions, sympathetic figures, rhetorical figures and the implicit) that are designed to 'secure agreement with a thesis, to modify or strengthen representations and opinions' (Amossy, 2010: 36) in relation to a specific issue.

Figure 1 below shows how these main concepts are connected in my provisional model of semiotic description of the transfrontier universe of discourse.

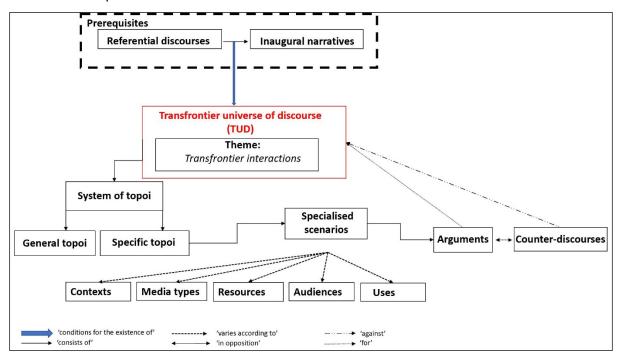


Figure 1. Initial model of semiotic description of the transfrontier universe of discourse.

Study corpus

The study corpus has been compiled to explore how scientific communication constructs transfrontier mountain environmental study regions by using, enriching and adapting archives. The chosen medium is shared by the constituent elements of the corpus: the web, as a distribution channel, makes it possible to consider a range of media types (websites, an exhibition, documentary, online conference and game). The content is taken from two different sets of situated examples: one from the Dolomites (with immediate transfrontier interactions between Austria and Italy) and one from the High Atlas (with delayed and long-range transfrontier interactions between the Maghreb region and Europe/the Maghreb

region and Asia). Using a variety of examples is useful for understanding how mountains as an object of meaning form part of different communication contexts.

The examples from the Dolomites are designed to raise awareness about the impact of humans on transformation of the landscape and the introduction of forms of transport that are sensitive to the mountain environment. They consist of a multifaceted bilingual (Italianentitled Connessioni montane: German) website Viaggio dalla turismo/Bergverbindungen: Reise vom Krieg zum Tourismus, which forms part of a subdomain (2021.euregio.info) of the institutional website of the Tyrol-South Tyrol-Trentino Euroregion (euregio.info). Within the media framework of the Year of Museums 2021, it brings together a set of archives provided by various contributors (museums, universities, foundations, nonprofit organisations and tourist information centres) from both sides of the Italian-Austrian border. Finally, the series includes digital exhibitions copyrighted to the Euroregion, and university webinars. The various enunciators pursue the same objective of transfrontier cooperation in response to the environmental issues faced by a shared mountain area.

The examples from the Maghreb region are designed to raise awareness about the nutritional value of mountain landscapes, here in particular the dimorphic ash tree and the need to preserve this species. Silvopastoral practices are examined in a documentary entitled *Bergers sculpteurs d'arbres du Haut Atlas* (2016), an online conference of the same name (2020) and the downloadable game *ChèvreFeuille* (2021). These three scientific communication devices have been developed by public scientific research bodies (a research institute, universities and laboratories) and inform the public about the historical process of preserving trees in response to nutritional needs. Here the intention of the enunciators stems from one of the missions of research institutions, namely, to provide scientific communication media to enable citizens to better understand research concerns, consisting here of global environmental change and relations with countries in the Mediterranean and intertropical zone.

Table 1 presents a summary of the study corpus:

Series of examples	Mountain context	Editorial responsibility	Distribution channel	Types of media
Series no. 1	Dolomites	Tyrol-South Tyrol-Trentino Euroregion + partners (museums, universities, foundations, non- profit organisations and	Euroregion institutional web portal ²	- Year of Museums 2021 subsite, bilingual section, 'Connessioni montane/ Bergverbindungen'3 - digital exhibition ⁴ - webinars ⁵

² www.euregio.info

³ https://2021.euregio.info/it/connessioni-montane-viaggio-dalla-guerra-al-turismo/; https://2021.euregio.info/bergverbindungen-reise-vom-krieg-zum-tourismus/

⁴ https://www.mountain-connections.eu/

⁵ https://webconference.uibk.ac.at/b/tob-edm-wdn-3xx

		tourist information centres)		
Series no. 2	High Atlas	French National Research Institute for Sustainable Development (IRD) + partners (universities, public research laboratories)	IRD web portal ⁶	- audiovisual documentary, Bergers sculpteurs d'arbres du Haut Atlas (28'35") ⁷ - online conference of the same name ⁸ - ChèvreFeuille downloadable game ⁹

Table 1. Summary of the study corpus.

Results

Step 1: the situation of the 'transfrontier mountain' topos

In Figure 2 below, a partial, provisional representation of the transfrontier universe of discourse enables us to situate the topos that recounts the 'drama' (in the sense of theatrical staging) of transfrontier mountains and to identify the archives that supply it.

⁶ https://www.ird.fr/

⁷ https://www.canal-u.tv/chaines/labexmed/bergers-sculpteurs-d-arbres-du-haut-atlas; https://youtu.be/JnKocP5E9ac

 $^{^{8}\} https://www.ird.fr/e-conference-bergers-sculpteurs-darbres-du-haut-atlas-de-mohamed-alifriqui$

⁹ https://www.ird.fr/chevrefeuille-un-jeu-autour-du-developpement-durable

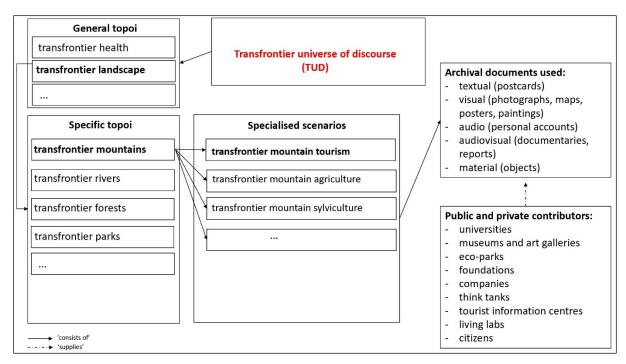


Figure 2. Partial representation of the transfrontier universe of discourse based on the 'transfrontier mountain' specific topos.

The left-hand and central parts of the diagram show various (general and specific) topoi that proliferate in the transfrontier universe of discourse. The general topos of 'transfrontier landscape', for example, develops concomitantly with other highly general topoi (such as health, education and economics). It gives rise to a specific 'transfrontier mountain' topos and other specific concomitant topoi (rivers, forests and parks) that are found in numerous discursive manifestations (in political, institutional, economic, non-profit and media contexts). Specialised scenarios – understood as compositions of specialised scenes and documents – develop and are responsible for supplying the specific topoi. The 'transfrontier mountain tourism' scenario, together with other scenarios (including agriculture and sylviculture), thus supplies the 'transfrontier mountain' specific topos. Broadly speaking, the specific topoi diversify while the scenarios that supply them are developed and transformed in order to enrich the transfrontier universe of discourse.

The right-hand part of Figure 2 shows the diverse range of archives – in the sense of historical sources (textual, visual and audio) – and contributors identified in the scenarios.

Step 2: adaptations of the 'transfrontier mountain tourism' scenario

Several aspects of the process of semiotic adaptation of the 'transfrontier mountain tourism' scenario were identified in the study corpus: diversification, substitution, expansion and displacement.

The diversification of archives is particularly apparent in the Dolomite series, in which photographs, videos, posters, patents, maps and objects supply the narrative of how mountain populations are 'connected' to one another and highlight the challenge of sustainable transport in a landscape that has changed a great deal since the last century (Image 1).



1. Photograph (connected by cable car).



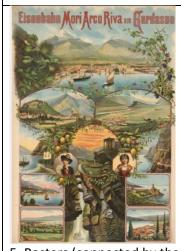
2. Video (connected by cable car).



3. Objects on display (connected by the telephone).



4. Objects on display (connected by travel).



5. Posters (connected by the railway)



6. Interactive map (connected by the route)

Image 1. Taken from series no. 1 (Dolomites) of the study corpus: ©2021.euregio.info.

These archives document the historical evolution of the region and herald the transition between the past and the future of transfrontier mountain transport. The emphasis is on the evolution of infrastructure dating from the early twentieth century and the First World War (cable car stations and railway lines), the conditions of population mobility (immigration and travel), travel paraphernalia (trolleys and suitcases) and modes of transport related to winegrowing (back-carrying and wagons). The archives also illustrate life stories centring on endurance and striving for economic survival: two values that can be transposed to the present goal of environmental survival.

The diversification of archives can also be observed in the examples from Morocco's High Atlas, in which the depiction of various ancestral acts gives the message a historical dimension (Image 2).





1. Act (plough making).

2. Act (protecting ash seedlings).

Image 2. Screenshots from the documentary Bergers sculpteurs d'arbres (IRD et al., 2016).

Muscle memory supplies the memory dimension of the High Atlas and illustrates a cyclical narrative (life cycle of the ash tree, cycle of pastoralism, nutrient cycle). It also introduces the concept of 'culturally modified landscapes', meaning a historical, cultural, functional and evolving landscape heritage to be passed on to future generations.

Substitution, expansion and displacement are other forms of semiotic adaptation that can be observed in the two geographical contexts of the study.

In the High Atlas example, they are particularly apparent when comparing the documentary *Bergers sculpteurs d'arbres* (2016) with the game *ChèvreFeuille* (2021), which is presented as a derivative of the documentary. This board game is aimed at an audience aged 8 years and up, and simulates the management of trees as a food resource. The changes made between the documentary and the game include:

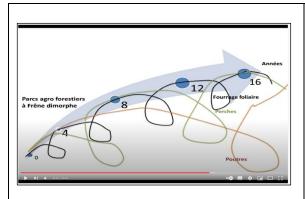
- substitution of the geographical area of the Global South for that of the Global North: the documentary depicts the memories and history of a Moroccan shepherd on his ancestral lands, while the game shows a French family appropriating this history.
- expansion of the initial intention of transmission to the younger generation: the documentary calls for the transmission of endogenous knowledge to young people living in the High Atlas, while the game poses the French family with the problem of landscape conservation. The documentary also expands its message to the countries immediately adjacent to the Maghreb region and to the more remote mountains of Western Asia, which face the same problem of managing dimorphic ash trees.
- displacement of the context of use of media archives: from informational (in the documentary) to edutainment purposes (in the game).

In the Dolomites example, they consist of:

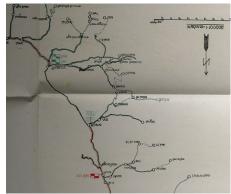
- substitution of the geographical area of the Dolomites for that of the Balkans and the Caucasus: the content of the *Connessioni montane/Bergverbindungen* section is reused and re-promoted on the website of the Osservatorio Balcani e Caucaso Transeuropa.
- expansion of the initial intention of transmission to the younger generation: the *Connessioni montane/Bergverbindungen* section is aimed at a tourist audience, while the university webinars are aimed at a student audience.
- displacement of the context of use of media archives, from the act of informing the general public (via digital exhibitions) to the act of educating the academic public (via webinars).

The adaptations of the scenario vary according to the geographical area (Italy-Austria, Maghreb-France), the intention of the communicators (to inform, exhibit, explain or entertain), the target audience (museum visitors, tourists or students), the use (cultural, educational or entertainment), the output device (exhibition, webinar, documentary, conference or game), which aspects of memory are highlighted (life story, object or act) and scientific communication practices. By scientific communication practices, I mean the various rewriting operations conducted on archives that enable the circulation and evolution of the scientific communication discourses specific to mountain regions. More specifically, I identified the typical practices of demonstration, rewording, illustrated explanation, commentary and translation. To provide two examples:

- explanations illustrated by diagrams or maps show the shift from the linguistic to the visual, which is designed 'to fix, condense and interpret' (Jacobi, 1999: 183-184) the communication discourse (Image 3);



1. Drawn diagram (Maghreb context, taken from the *Bergers sculpteurs d'arbres* documentary).



2. Hand-drawn map (Dolomites context, taken from the *Connessioni montane/Bergverbindungen* section).

Image 3. Examples of illustrated explanations, here using a diagram and a map.

- translation from one language to another, which enables a wider audience to access the information, here in the form of subtitling or multilingual text. Subtitling, a linguistic practice that consists of providing written text so that viewers can understand what individuals are saying, marks the shift from the oral code to the written (Perego, 2005), as in the case of the Moroccan shepherd, whose words are subtitled into French (Image 4, left). The practice of multilingual text can be seen in posters, with the order of the languages varying according to the communication context – Austrian or Italian (Image 4, right).





1. Subtitled translation at the bottom of the screen (North African example, *Bergers sculpteurs d'arbres* documentary).



2. Multilingual text (Dolomites example, *Connessioni montane/Bergverbindungen* section).

Image 4. Examples of translation practices using subtitling or simultaneous language versions.

Figure 3 below provides a summary of the variations thus observed in the semiotic scenario.

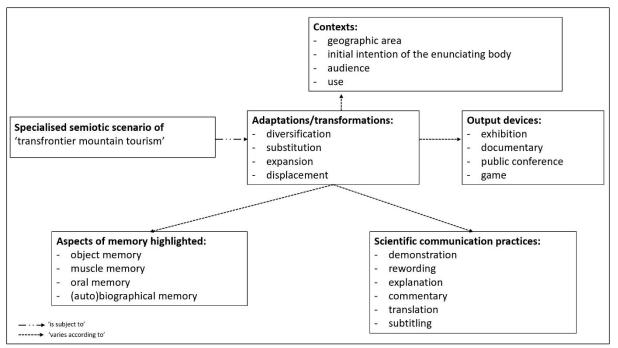


Figure 3. Variations of the 'transfrontier mountain tourism' scenario.

Step 3: arguments for and against the 'transfrontier mountain tourism' scenario

In the Dolomites example, the form of tourism being promoted is described in terms of 'sustainable transport' (mobilità sostenibile/nachhaltige Mobilität). In the North African example, the term 'tourism' only occurs once, when the expression 'tourism and local development' is used in the voice-over. The recurring procedures by which arguments are provided for a form of tourism that is centred on sustainable transport and respects local development include:

 the appeal to reason, which requires the mountain's nourishing function to be preserved in order to ensure human survival in the High Atlas and economic survival in the Dolomites.

- the appeal to emotion, supported by sympathetic figures such as the shepherd attached to his home in the High Atlas, or the groups of people previously displaced by war and poverty in the Dolomites.
- identifying the threat to life, namely to subsistence in the High Atlas and biodiversity in the Dolomites.

Counter-arguments can also be identified in the lexicon. In the Dolomites, 'sustainable transport' clashes with the 'ecological damage' (*Umweltbelastung*) and 'environmental pollution' (*ambientale inquinamento*) that are rife in the region. In the High Atlas, the scientific communication discourse very explicitly identifies four counter-arguments – the 'limited interest of the younger generation', 'market development', the 'availability of other construction materials' and 'opposition from the educational system' – that hinder the transmission of endogenous knowledge with a strong cultural dimension and its role in global environmental change. Here we see the opposition, more or less direct depending on the context of communication, between a discursive formation in favour of a shared mountain seen as a living heritage and a counter-discourse in favour of its speculative exploitation or even for it to simply abandoned. This opposition confirms that the main challenge for the scientific communication discourse consists of (re)framing the representations circulating in the public space.

Conclusion

After explaining the motivation behind associating the ideas 'mountain + frontier' within a transfrontier semantic universe under construction, I have demonstrated the existence of the 'transfrontier mountain tourism' semiotic scenario in a scientific communication corpus. Drawing on the concepts of topos, scenario and argument has proven useful in beginning to structure the transfrontier universe of discourse (whose domain of reference here is the mountain area as an object of tourism with varying degrees of intensity) and to describe its transformations in two different contexts: the Dolomites and the High Atlas. The transfrontier component is understood here at the level of immediately neighbouring populations (between Austria and Italy, and between Morocco and countries neighbouring the Maghreb region) or as a long-range connection (between Morocco and France, and between the Maghreb and Asia).

The study corpus, focusing on the question of the consideration of a shared mountain area, has been examined through the prism of media transformation of archives. In the Dolomites context, the tourism scenario is made very explicit and is served by archives organised around the theme of connecting transfrontier mountain populations: the idea of ensuring mobility while respecting the natural obstacle is to the forefront of the communicators' intentions. In the Maghreb context, the tourism scenario is a by-product: it is not a central concern but arises from discussing the fundamental question of preserving a nourishing landscape in the context of a subsistence economy.

The common feature of these scenarios is that they attribute a pedagogical value to 'transfrontier mountain tourism' that is systematically backed by history (war infrastructure, traditional agricultural practices, the cultural practices of mountain peoples and ancestral acts). The archives on which they draw provide evidence of practices, knowledge and policies applied to a shared mountain area, whether it is under significant pressure or is being neglected. They play a crucial role in explaining, illustrating and projecting the natural and cultural heritage of the mountain in relation to decision-makers, contributors and citizens.

The complex process of their use in scenario building, which as I have shown provides fertile ground for adaptation, remains a semiotic question to be explored in greater depth.

More broadly, the approach has made it possible to supply my semio-pragmatic model for describing and interpreting the emerging transfrontier semantic universe and to situate the mountain topos within it (Figure 4).

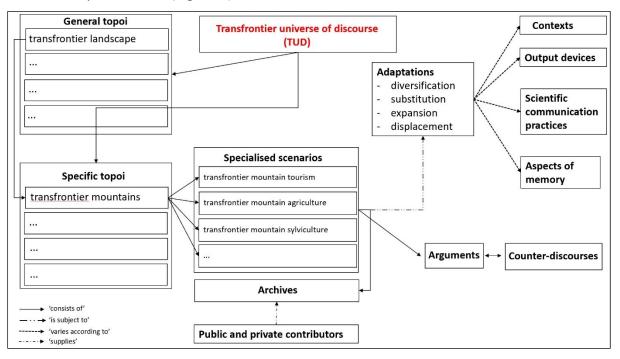


Figure 4. Results of the modelling approach applied to the transfrontier mountain topos.

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