

# Introduction: Micro-Region and Social Ecology

*Felix Pirson – Brigitta Schütt – Thekla Schulz – Güler Ateş – Daniel Knitter – Ulrich Mania*

In the centre of Berlin, visitors to the current interim of the Pergamon Museum can witness a visit by the Roman Emperor Hadrian to the city hill of the ancient metropolis in the year 129 CE<sup>1</sup>. The highlight of Yadegar Asisi's 360° panorama is not the emperor and his entourage, however, but the events at the Great Altar of Zeus, whose friezes and statues were brought from Bergama to Berlin's Museum Island after their discovery in 1878<sup>2</sup>. Both places are now UNESCO World Heritage Sites and owe this distinction not least to the Great Altar, whose sculptural decoration is considered the pinnacle of Hellenistic art. In consequence, it made sense to focus the Berlin panorama on this monument, where the sacrificial acts are staged as a mass spectacle with lots of blood, smoke and fire. The animation of the altar does not only correspond to the popular image of a full-blown, dirty and violent antiquity. The dying of the sacrificial animals and the smoking fire in front of a scenic landscape, which is shaped to a large extent by human infrastructure and cultivation<sup>3</sup>, point to a subject of recent scholarly interest: the interaction of humans with the natural environment in the ancient world. This includes the use of wood as fuel, animal husbandry and meat-consumption, or the creation of agricultural landscapes which were sufficient to feed major cities such as Pergamon. And it stimulates further questions: Where were the quarries located for all the stone used in the magnificent buildings? Where did the marble come from and how did it reach the top of the steep city-hill? Has the landscape around Pergamon actually changed so little during the last 1.900 years? And can we really imagine the population of Roman Pergamon as such a jolly crowd that conveys modern stereotypes of class, gender and race? Or was the society characterized by quite a different distribution of age-groups and a much more visible social inequality combined with differences in health and nutrition?

The raising of such questions could go on and on and would eventually show how relatively little we know about every-day life and livelihood even in extensively studied places such as Pergamon. The range of topics that arise just from looking at the Pergamon panorama makes clear that the study of human-environment interaction is a complex endeavour.

Given such complexity, a focus on assumed parallels between climatic change and human history bears the risk of being reductionist and environmentally deterministic. This can be illustrated by Kyle Harper's book »The Fate of Rome« from 2017, which became an academic bestseller<sup>4</sup>. It sketches out a scenario in which the rise and fall of the Roman Empire are causally linked to the development of the climate and the emergence and spread of epidemics. But »The Fate of Rome«, which in some passages reads like an apocalyptic thriller, has not gone unchallenged: In several review articles, for instance, a team of researchers around the Byzantinist and environmental-historian John Haldon criticised Harper for distinguishing the environment as the all-dominant factor in his forced narrative and neglecting at the same time the possibilities for action by state and society<sup>5</sup>. There is, however, consensus on the fundamental importance of environmental factors for understanding historical developments. The prerequisite for this is a detailed analysis of the causalities that underlie complex historical processes. The way to achieve this is through regional case studies by interdisciplinary teams including the humanities and natural sciences.

This research-design outlined as an alternative to a big narrative of historical human environment relations has been increasingly adopted by projects studying ancient settlements and their environment in the Mediterranean and beyond. The Sagalassos-project under the direction of Mark Waelkens and

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Jeroen Poblome has exemplarily demonstrated what can be achieved with such an approach<sup>6</sup>, and some of the projects brought together in this volume follow a similar path. Hence we thought that it is the right time to critically reflect upon the study of socio-ecological systems within the heuristic frameworks of micro-regions in the Mediterranean and its neighbouring regions. In this context, the inclusion of textual evidence which can reveal more about the actions by state and society seems to be of particular importance in view of the application of a theoretical concept from sociology by archaeology, geography and the natural sciences<sup>7</sup>. This is one of the questions that are addressed in this volume.

The volume itself is the outcome of the first of three workshops scheduled as milestones within the course of the project »The Transformation of the Pergamon Micro-Region between the Hellenistic and the Roman Imperial Period« (TransPergMicro), which is planned to run for twelve years at most<sup>8</sup>. The project is generously funded by the Deutsche Forschungsgemeinschaft, which evaluates the progress each three years. Hence the workshop »Micro-regions as spaces of socio-ecological interaction« held in March 2022 marked the end of the first funding phase 2019–2022. The workshop offered an opportunity to discuss the questions, methods and first results of TransPergMicro with an international group of colleagues from various disciplines, and we are most grateful to all the participants, many of whom contributed to this publication. In order to go beyond the evident limitations of any micro-regional project, it is mandatory to create interfaces that lead beyond individual micro-regions and enable the integration of such case studies into a broader archaeological, historical, and geographical discourse. We hope that the present volume is a first step in this direction.

In the following, a brief introduction into the structure and aims of the TransPergMicro-project

will be provided, together with some remarks on our definition of »micro-region« and the socio-ecological concept applied by the TransPergMicro-project. This can also serve as a – though abbreviated and selected – theoretical and methodological introduction to the subject of this volume, and as a prolegomena to various papers from the TransPergMicro-project.

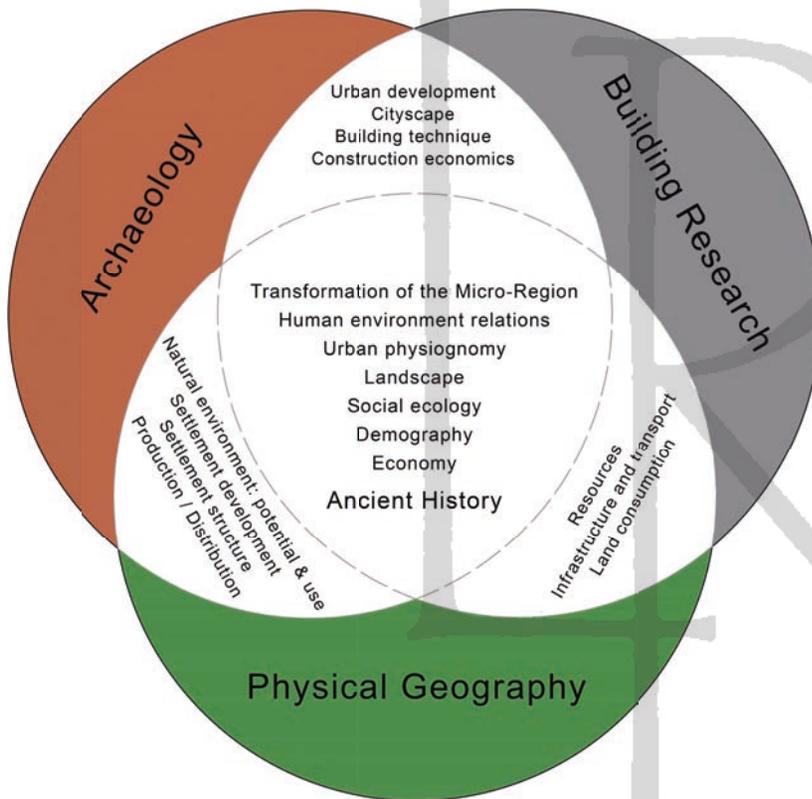
The aim of the TransPergMicro-project is a multi-layered, diachronic analysis of the transformation of a micro-region at the fringes between the Aegean and Anatolia. The focus is on the particularly well-documented period from approximately the 3<sup>rd</sup> century BCE to the 3<sup>rd</sup> century CE, but the current chronological frame of the project is flexible and covers a time-span from the Epipaleolithic (ca. 12,000 BCE) until the Ottoman period. Pergamon and the surrounding landscape are particularly suitable for such an approach thanks to a multi-faceted spectrum of natural settings, a long and varied history of settlement and usage of the terrain, rich archaeological legacies and, last but not least, a history of research spanning more than 140 years that created an extensive data base. Building on this, the dynamic interactions between cities, rural settlements and the natural environment are studied systematically and diachronically for the first time at the levels of resource use, construction, production and consumption, demography, and the design and perception of living spaces. Given the range and diversity of topics, the collaboration of Classical Archaeology, Building Archaeology (*Bauforschung*), and Physical Geography has started already with the conceptualization of the project (fig. 1). In addition to these three disciplines, several others contribute in crucial ways – such as Ancient History, Palaeoanthropology, Geophysics or Architectural Visualization. Further cooperation includes, among others, Archaeozoology, Archaeobotany, Materials Science, and – most recently – the study of ancient DNA.

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1 Scheme of interdisciplinary cooperation within TransPergMicro

## The Pergamon Micro-Region

As a working hypothesis of TransPergMicro, the lower basin of the Bakır Çay (ancient Kaikos) including its estuary and the adjacent mountains have been defined as the Pergamon Micro-Region (fig. 2). This, however, shall not be misunderstood as a geographical unit with clearly defined borders, but as a space of closely connected and dynamic interactions between humans and the natural environment. The range of a micro-region can change over time or vary depending on the level of observation – e. g. political-administrative and military, cultural and social, economic, symbolic-religious, etc. In this respect, a micro-region is both an epistemological and an empirical category.

This definition is less specific and more flexible than the ›micro-ecology‹ of Peregrine Horden and Nicholas Purcell, which is »a locality (a ›definite place‹) with a distinctive identity derived from the set of available productive opportunities and the particular responses to them found in a given period«<sup>9</sup>. The definition of the micro-ecology emphasizes economic

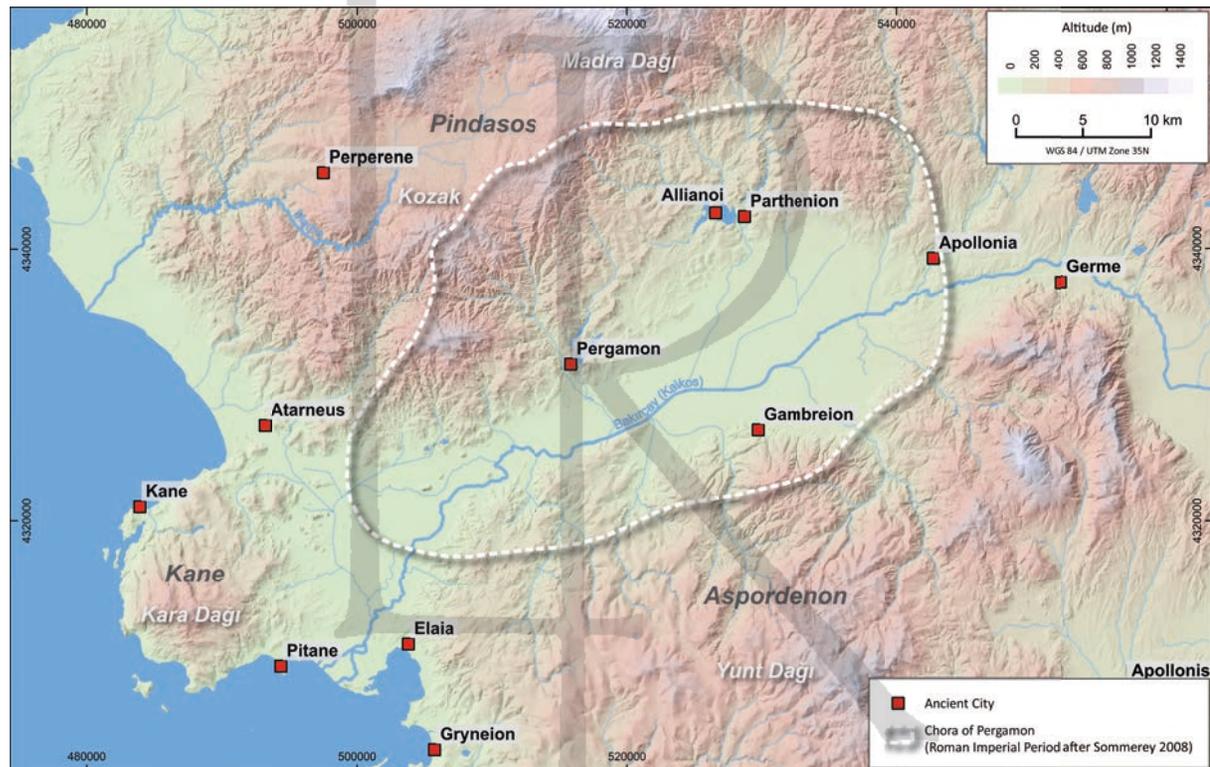
›opportunities‹ for animal husbandry, intensive agriculture, forest management, horticulture etc. and for ›engagements in larger networks of redistribution«. While ecology and connectivity are formative categories in case of the Pergamon Micro-Region, too, both alone would not be sufficient for defining the area of human-environment interaction in the spatial context of a complex and dynamic city such as Pergamon, which saw several transformations in its urban functions and physiognomies over time.

The city-hill of Pergamon is situated approximately in the centre of the assumed micro-region, controlling a narrow section between the western and eastern halves of the upper Bakır Çay plain. The central area of the micro-region corresponds to the *chora* of Pergamon in the Roman imperial period, whose boundaries and size of approximately 1.000 km<sup>2</sup> can only be reconstructed hypothetically<sup>10</sup>. For the Hellenistic period, we have even less information about the extension of Pergamon's *chora*, but it must have been considerably smaller.

<sup>9</sup> Horden – Purcell 2000, p. 80. For further discussion of the category "micro-region" see also Zimmermann 2015, p. 403–405, and Schuler 2016, p. 303–319, both of whose considerations have

found their way into the definition of the category in the context of the TransPergMicro project.

<sup>10</sup> Sommerey 2011.



2 Pergamon Micro-Region. Map. The dotted line marks the chora of the Roman Imperial period as reconstructed by Sommerey (2008)

Beside Pergamon's *chora*, i. e. the rural territory of the *polis* Pergamon, the territory of the Attalid dynasty is another spatial and legal entity which deserves our attention. Since the mid of the 3<sup>rd</sup> century BCE it had seen various phases of growth and reduction before the kingdom was eventually inherited to Rome 133 BCE<sup>11</sup>. The only area which always remained under Attalid control is the micro-region as defined above (fig. 2), which seemingly served as a kind of core or minimum territory the Attalids had to hold at all costs in order to secure communication, supply and defence for their capital<sup>12</sup>. Its existence has also been corroborated by recent studies on the visual region of Pergamon and a network of communication and surveillance existing within the micro-region<sup>13</sup>.

Since the micro-region is also an epistemological category, it can be related to various assumptions (fig. 3). It is remarkable to observe, for instance, that the micro-region approximately corresponds to a 16 hrs walking territory of 2.660 km<sup>2</sup> based on the idea that a two-day journey with eight walking hours per day would capture a

reasonable distance for farmers to transport their goods via ox-cart to the Pergamon market<sup>14</sup>.

From a geographical perspective, the catchment area of the rivers Bakır Çay and Madra Çay of 4.124 km<sup>2</sup> is a suitable study-area for the relations between past geomorphodynamics and human activities<sup>15</sup>. The micro-region lies entirely in the catchment area of both rivers, which is characterized by a heterogeneous natural sphere. Nature, though, remained manageable for humans, as the dynamics were limited to active (soil-)erosion, tectonics, regular flooding and probably fire.

The catchment area also serves as one of several heuristics of the micro-region in socio-ecological modelling. Julian Laabs and Daniel Knitter have estimated the carrying capacity of *chora*, 16 hrs walking territory and catchment area in relation to an assumed population-number of the Pergamon Micro-Region during Roman Imperial times taking into account different scenarios of agricultural cultivation<sup>16</sup>. This has shown that high population numbers would have demanded

11 Wittke – Olshausen – Szydłak 2007, p. 124–125. For the most recent summary of the development of the Attalid's territory see Laufer 2021, p. 11–15; Kaye 2022, pp. 14–30.

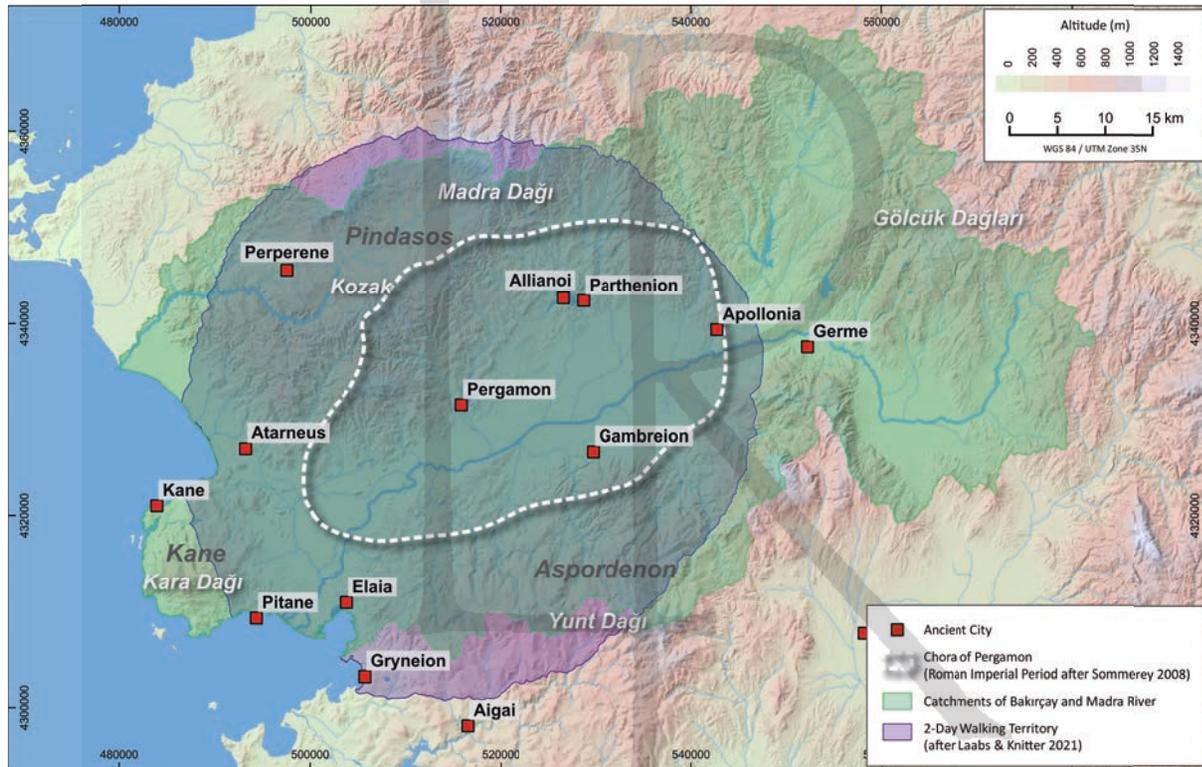
12 Pirson 2008b; 2012, p. 219–229.

13 Pirson – Ludwig in print; Ludwig et al. 2022.

14 See Laabs – Knitter 2021.

15 See note 14.

16 See note 14.



3 Pergamon Micro-Region. Map compiling the different heuristics of chora, 16h-walking territory, and Bakır Çay and Madra Çay catchments

the import of grain from outside the micro-region, which is a probable scenario within the framework of a stable network of exchange under Roman rule.

Hence our project aims to approach the Pergamon Micro-Region and its transformation on the basis of an increasingly dense and diverse dataset, whose el-

ements are related to each other in a socio-ecological model that is continuously being developed. This model also helps to structure the interdisciplinary exchange and the integration of the heterogeneous data with the aim of joint syntheses. Both are major challenges for TransPergMicro.

## The concept of social ecology and its application in archaeology

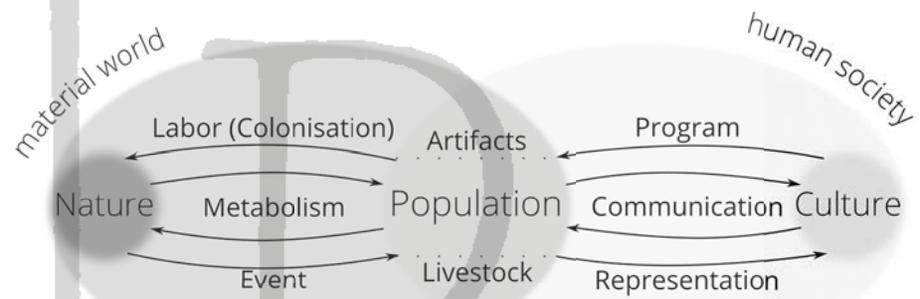
We follow a theoretical standpoint of social ecology that considers human groups and the environment as (a) two entities that act according to their own rules and (b) as one complex whose existence is the result of the interaction and interrelation between people and their environment.

Our starting point was the social ecology model by Marina Fischer-Kowalski (Klagenfurt University)

(fig. 4)<sup>17</sup>. In this socio-ecological concept, society is defined as communicatively closed, but materially and energetically as an open system. Society is understood as a structural coupling between a cultural system and biophysical structures.

The continuous material exchange of people with nature in order to reproduce and sustain the material requirements of a population is called *metabolism*.

<sup>17</sup> Fischer-Kowalski et al. 2011.



4 Klagenfurt socio-ecological model (after Fischer-Kowalski et al. 2011)

The same continuous exchange prevails between human populations and culture, where it is realized via *communication*.

*Colonization or labour* is an intentional process that leads to physical changes in nature. It is defined as a process that aims to advance the level of metabolism, i. e. via the erection of agricultural terraces, the domestication of animals or other specific subsistence technologies. *Events* refer to changes in nature that are perceived by human populations. Via *representation* perceived natural events are translated to the ‘immaterial side’ of the model. Culture constitutes normative and analytical schemes that function as action guiding programs leading to changes in the material world.

Based on earlier attempts to integrate humanities and science in landscape archaeological approaches<sup>18</sup>, we continued to modify some terms of the original model in order to better represent the research problems regarding the ecological and socio-cultural spheres appearing in archaeology and ancient studies (fig. 5). *Spheres* refer to the different forms of connections, i. e. the *ecological sphere* follows the laws of physics, while the *socio-cultural sphere* is characterized by multiple rationalities of action that co-exist all at the same time. The overlap of these spheres constitutes the centre of our model, where natural and

social cause-effect relationships prevail and are realized as *population* and its *material remains*, i. e. material culture.

*Population* refers not only to the demographics of past societies but also to its culturally produced needs, such as the kind and amount of specific dietary elements. *Material culture* denotes the remains of these societies that are the result of processes occurring in both the ecological and the socio-cultural spheres. The structural coupling between these elements manifests itself in and creates the *landscape*.

Since the cognition of natural events as precondition for their representation is influenced by culturally defined patterns of perception and interpretation, *perception* has been added to *representation* as coupling between the ecological and the socio-cultural sphere.

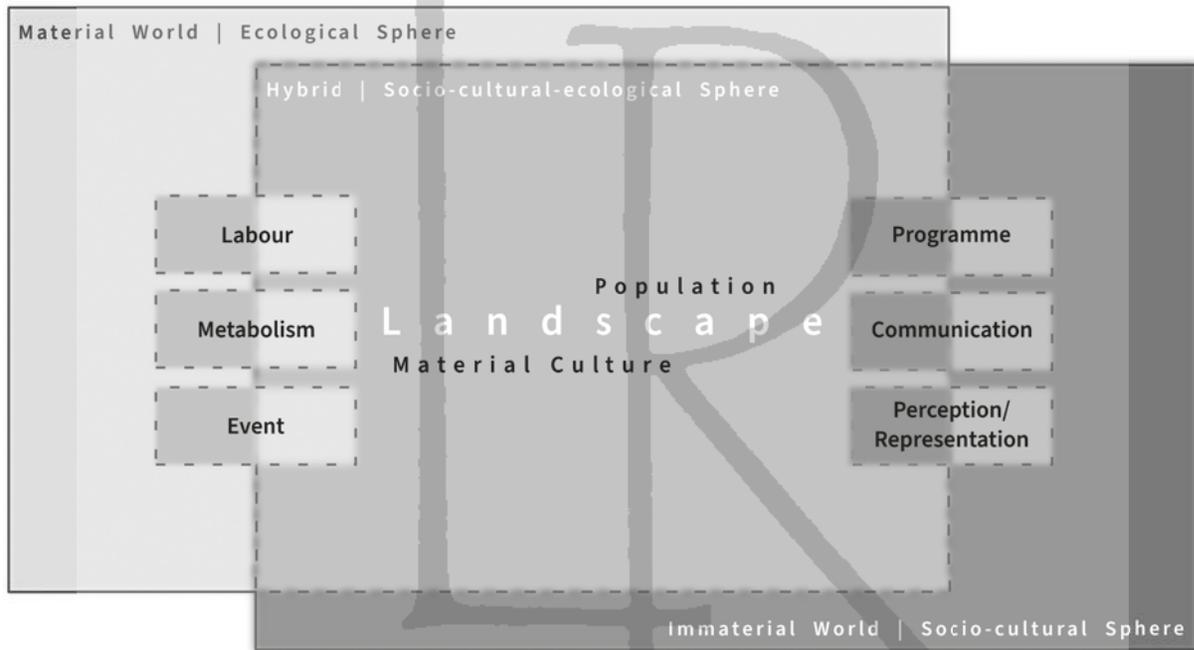
We want to emphasize that we formulate hypotheses about potential structural couplings and thus about landscape creation based on our modern understanding and interpretation of the landscape. Hence, via landscapes we start the hermeneutic process of disentangling the flows within the socio-ecological system. Accordingly, we can fill our socio-ecological model with terms and elements from our different disciplines and link them via the adjusted conceptual terms of the social-ecological model (fig. 6).

## Structure and content of the present volume

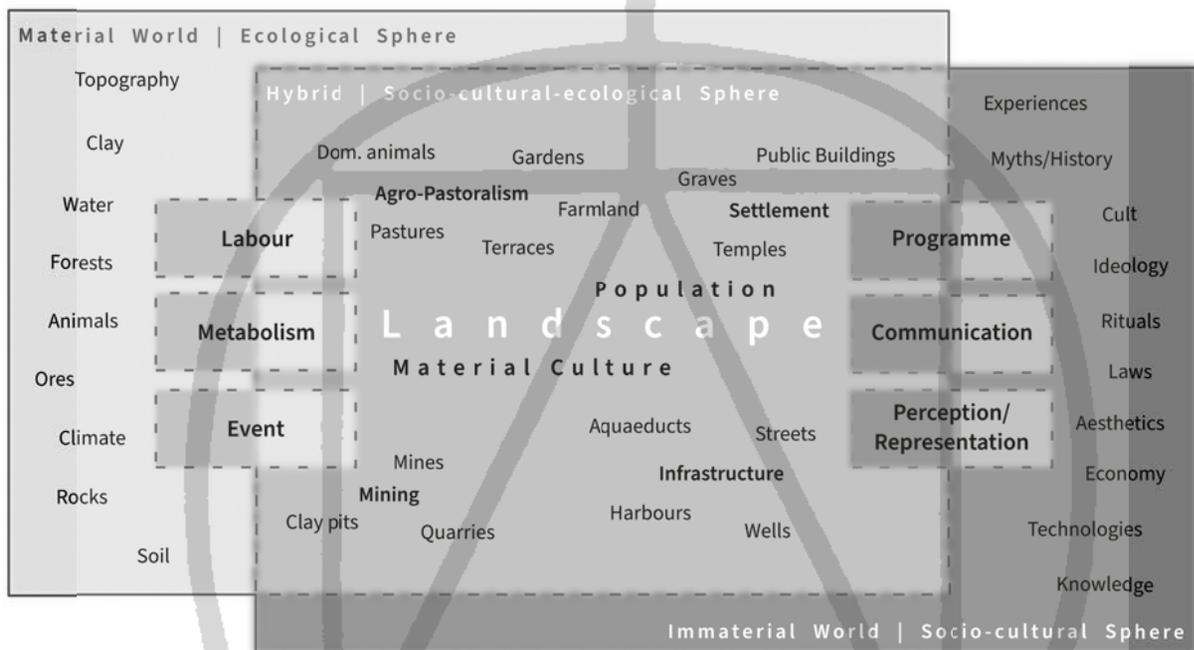
The combination of the category ›micro-region‹ with the adapted socio-ecological model forms the theoretical backbone of the TransPergMicro project. The papers presented in part 5 of this volume refer to this

model and at the same time attempt to develop further its terminology and relationality. However, the major aim of the workshop was to discuss the conceptual settings of the TransPergMicro project and its

18 Knitter et al. 2021.



5 Klagenfurt socio-ecological model (after Fischer-Kowalski et al. 2011) with modified terms related to its application in (landscape) archaeology



6 Klagenfurt socio-ecological model (after Fischer-Kowalski et al. 2011) with modified terms related to its application in the TransPergMicro-project (current status under constant revision)

first results with colleagues who work in a similar direction or whose research challenges our assumptions on micro-regions as spaces of socio-ecological interaction. Part 1 includes the papers with a theoret-

ical and methodological focus, while part 2 critically reflects and exemplifies the contribution of written sources to micro-regional studies. Parts 3 and 4 combine case-studies from the western and the eastern

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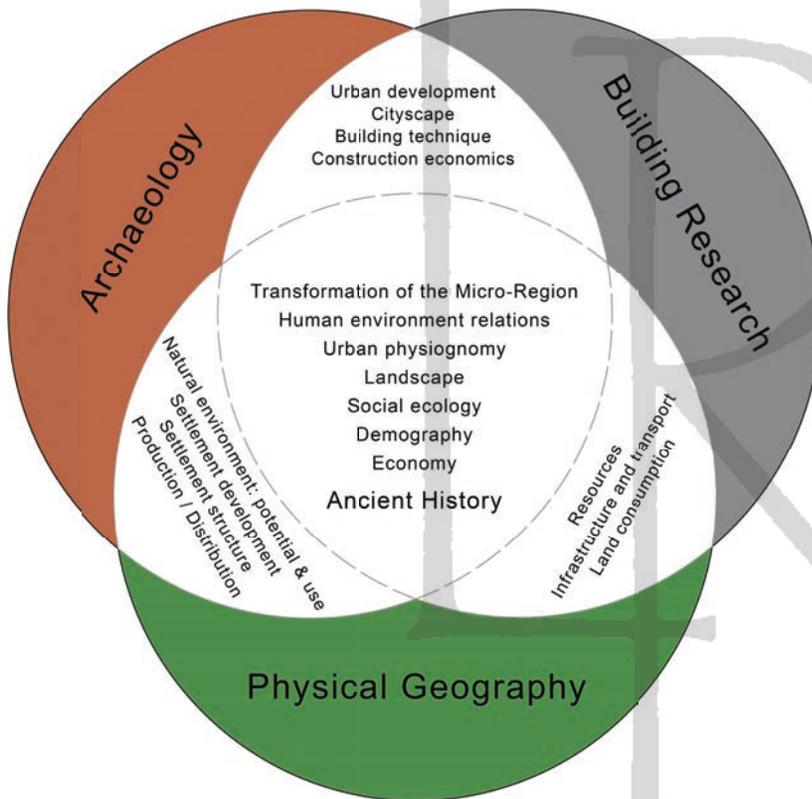
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