



IGU Thematic Conference

TRANSFORMATION OF TRADITIONAL CULTURAL LANDSCAPES

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Abstracts and Guide Book



Matevž Lenarčič



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Welcome

Cultural landscapes are multifunctional landscapes which reflect a complex correlation between natural, historical, political, and cultural factors. Traditional cultural landscapes are shaped by traditional land management practices. The loss of these management practices leads to ecosystem change, which successively is likely to lead to the loss of important biological or cultural values. The extent of integration between environmental (ecological) and socio-economic functions of the landscape depends on the patterns and intensities of land use. Land use is a basic human activity that shapes socio-economic development and modifies structures and processes in the environment. Traditional land use is disappearing due to the intensification of agricultural production on the one hand and the retreat of agriculture from unfavorable areas on the other hand. Sustainable development and the conservation of biodiversity and landscape diversity depend on the continuation of human intervention. In this way the traditional and highly valued landscapes can be maintained whilst also assisting economic and social sustainable development. Unsuitable management practices could be the cause of increased soil erosion and natural disasters. Appropriate policies should be applied to decrease such negative impacts on cultural landscapes. The role of landscape parks, as areas with high conservation value and high development appeal, is also important. They can be promoted as specific development areas while contributing to the maintenance of the cultural landscapes and biodiversity. The study of the links between landscape features and regional development is relevant for the development of policies related to land use and regional development, such as agricultural policies, regional policies and spatial planning policies. Cultural interpretation and significance of landscape can be also of controversial and object of disputes under circumstances of conflicts and political struggles. They can turn out in 'urbicide' like it was in the Balkans or 'archeocide' like in Syria to cancel tracks of cultural elements as it happens in the Mediterranean Basin in recent years. Thus issues of fair perception and valorization of cultural heritage can be of special significance for geographical studies. Due to the location of the conference part of the sessions will be devoted to the Mediterranean cultural landscapes.

The Conference is organized by the following IGU Commissions: Land Use and Land Cover Change, Biogeography and Biodiversity, Local and Regional

Development, Mediterranean Basin and Land Degradation and Desertification. Together there are sixty oral presentations and six poster contributions. In addition you can take part in the half-day excursions around Slovenian Istria and the post-conference excursion to Kočevje and Bela krajina.

With more than 70 participants from a great variety of nations, we hope you will have opportunity to present your research achievements, discuss various topics with the colleagues, build personal contacts and enjoy the excursions.

We wish you a very pleasant and stimulating Conference!

Chairman of the Organization Committee,

Matej Gabrovec

Organizing Committee

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Programme

MONDAY 23.09.2019

18:30-19:30 REGISTRATION

19:00 WELCOME RECEPTION

TUESDAY 24.09.2019

8:30-11:00 REGISTRATION

9:00-9:30 OPENING CEREMONY

9:30-10:30 PLENARY SESSION (room: Tramontana)

- Breg Valjavec et al.
- Mal & Schickhoff

10:30-11:00 COFFEE BREAK

11:00-12:30 PARALLEL SESSIONS

SESSION A (<u>room: Maestral 1</u>): Transformation of traditional cultural landscapes	SESSION B (<u>room: Maestral 2</u>): Mediterranean landscape: transitions, prospects, challenges	SESSION C (<u>room: Maestral 3</u>): The challenges regarding the planning and organization of the cultural landscape
- Bičík & Kupková - Chignier Riboulon - Ciglič et al. - Janko Spreizer & Kolega - Kolega & Koderman	- Alouat - Farguell et al. - Razpotnik Visković - Zuljan Kumar	- Nemethy - Rizzo et al. - Shu'aibu Muhammad - Szemethy - Vázquez-Varela

12:30-14:00 LUNCH

14:00-19:30 HALF-DAY EXCURSION: SEČOVLJE SALTWORKS

WEDNESDAY 25.09.2019

8:30-09:00 REGISTRATION

9:00-09:30 PLENARY SESSION (room: Tramontana)

Hrvatín et al.

09:30-10:00 *POSTER SESSION* (room: Maestral 4) & *COFFEE BREAK*

10:00-11:30 *PARALLEL SESSIONS*

SESSION A (room: <u>Maestral 1</u>): Transformation of traditional cultural landscapes	SESSION B (room: <u>Maestral 2</u>): Land management practices and global changes	SESSION C (room: <u>Maestral 3</u>): Conservation of biodiversity in changing environment
- Blaće - Gosar - Hanusin & Stefunkova - Hardi et al. - Vrínceanu et al.	- Dogaru et al. - Kumer - Lefebvre - Naumov - Stankovics	- Dumitraşcu et al. - Glasnović et al. - Varghese - Zolotov et al. - Zupan et al. Business meeting: Commission on Biogeography and Biodiversity

11:30-12:00 *COFFEE BREAK*

12:00-13:30 *PARALLEL SESSIONS*

SESSION D (room: <u>Maestral 1</u>): Heritage of lost landscapes: identification, reconstruction and presentation	SESSION E (room: <u>Maestral 2</u>): Past and present land degradation in the Mediterranean and other environments	SESSION F (room: <u>Maestral 3</u>): The concepts and tools in landscape transformation
- Grigorescu et al. - Kupková - Latocha Business meeting: Land Use and Land Cover Change Commission	- Gosar et al. - Kovačič & Zorn - Miler et al. - Oguchi Business meeting: Commission on Land Degradation and Desertification	- Goga - Klimanova - Pramukanto - Wang

13:30-14:30 *LUNCH*

14:30-19:00 *HALF-DAY EXCURSION: KOPER HINTERLAND*

19:00- 22:30 *SOCIAL DINNER & WINE TASTING*

THURSDAY 26.09.2019

09:00-10:30 *PARALLEL SESSIONS*

SESSION A (<u>room: Maestral 1</u>): The challenges regarding the planning and organization of the cultural landscape	SESSION B (<u>room: Maestral 2</u>): Land management practices and global change
- Ferrario - Guštin & Potočnik Slavič - Kopecká & Szatmári - Matsuyama - Mitričá et al.	- Francos et al. - Himiyama - Hudson - Úbeda et al. - Lawal Halliru

10:30-11:00 *COFFEE BREAK*

11:00-12:30 *PARALLEL SESSIONS*

SESSION C (<u>room: Maestral 1</u>): Land Use data sources from 19th century	SESSION D (<u>room: Maestral 2</u>): Functions of the cultural landscape in local and regional development
- Gomiršek - Kovačič & Gabrovec - Zwitter	- Gekić & Bidžan-Gekić - Meessen - Sabogal Dunin Borkowski Business meeting (optional): Local and Regional Development Commission

12:30-13:00 *COFFEE BREAK*

13:00-13:30 *PLENARY SESSION* (room: Tramontana)

Bański

13:30-13:45 *CLOSING REMARKS* (room: Tramontana)

13:45-15:00 *LUNCH*

15:00-20:30 *HALF-DAY EXCURSION: COASTAL CITIES*

FRIDAY 27.09.2019

8:00-19:00 *POST-CONFERENCE EXCURSION*

SATURDAY 28.09.2019

8:00-18:00 *POST-CONFERENCE EXCURSION*

PLENARY - Abstracts

THE IMPACT OF AGRICULTURAL SECTOR TRANSFORMATIONS ON RURAL LANDSCAPE IN CENTRAL EUROPE WITH SPECIAL ATTENTION TO CULTURAL LANDSCAPE

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The agricultural function plays a very important role in the development and shaping of rural landscape in the Central Europe. The areas utilized for the agricultural purposes occupy a significant part of the territory in the countries of the region (from more than 20% in Estonia to nearly 60% in Romania). Until recently, in most of the central European countries, agriculture was predominantly collectivized, where individual farming was discriminated against (Turnock 1996). This situation resulted, among others, in the unification of social and cultural life in the rural areas, the disappearance of cultural diversity and the destruction of the spatial structure of the countryside and the agricultural land system (Bański 2017; Bański, Wesołowska 2010).

The collapse of the socialist system brought about large changes in ownership structure in the rural areas (Bański 2019). It was primarily concerned with the privatization of land and the recovery of property confiscated by socialist authorities (Bicik, Jelecek 2009; Rusu et al 2011; Kovacs 2005). At the same time, these developments revived the importance of rural population, restoring its subjectivity and self-governance. As a result of these processes, there have been changes in the contemporary landscape of rural areas, including the cultural landscape. In general, these changes have consisted mainly in the formation of a larger mosaic of crops on arable lands, and in an increase of forest lands especially in the areas characterized by low agroecological quality. The intensity of development in suburban areas has increased significantly and many villages underwent the process of revitalization and reconstruction, with taking into account their specific cultural values and traditional spatial structure. The level of aesthetics of rural landscape and its diversity has increased. All these changes have enhanced the multifunctionality of rural areas and facilitated their tourist and recreational attractiveness. The countryside is now more willingly visited by city dwellers, which improves its development opportunities.

The aim of the presentation is to discuss the main processes and phenomena occurring in the landscape of rural areas due to transformations in the agricultural sector, and resulting from privatization, changes in the structure of production and the differentiation of household incomes. The examples provided in the paper are mainly from Poland, Hungary and Romania.

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BIOINDICATION OF HUMAN-INDUCED LAND DEGRADATION IN POTENTIAL KARSTIC MICROREFUGIA

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Karst landscapes contain important natural features, such as caves and dolines that set them apart from other landscapes. Karst landscapes and their ecosystems are extremely vulnerable and have very low resilience to human impacts and degradation. Medium-sized karst depressions - dolines, the most distinct surface feature of karst landscapes, and their unique biota are particularly sensitive to anthropogenic disturbances (De Waele 2009; Breg Valjavec et al. 2018b; Jian et al. 2018). Due to several characteristics dolines can be considered potential microrefugia for many species (Horvat 1953; Bátor et al. 2017; Dobrowski 2010). They have the capacity to decouple their climate from the climate of the surrounding areas and therefore to support relict climates and habitats (Bárány-Kevei 1999; Whiteman et al. 2004; Su et al. 2017). In addition, dolines may provide steep environmental gradients (e.g., humidity, nutrient content, soil texture and moisture, temperature and water availability) within very short distances enabling them to facilitate the persistence of various taxa (Bátor et al. 2009; Özkan et al. 2010; Bátor et al. 2014; Breg Valjavec et al. 2018a). However, their importance as microrefugia is not widely recognized. Contrary, many dolines are used as dumping sites (Parise and Pascali 2003; Kovačič and Ravbar 2013, Breg Valjavec 2014; Breg Valjavec et al. 2018a).

We present examples of land degradation and conservation challenges in dolines in the karst landscapes of Slovenia and Hungary. We also introduce some ideas on the application of bioindication methods for the study of human-induced disturbances in dolines. Buried waste in dolines represents degradation of landforms and habitats as well as potential to groundwater pollution. Buried waste provides heterogeneous ecological conditions on the surface, and the vegetation developed on the surface of landfills can be used as a bioindicator of waste-filled dolines (Breg Valjavec et al. 2017, 2018a, 2018b). We investigated the conservation value of dolines in three karst areas, where different levels and types of anthropogenic disturbances have been shaping the vegetation for centuries. The number of plant species that are cool-adapted and of high conservation importance (i.e. threatened

species) was used as indicators. We found that anthropogenic disturbances generally have a negative impact, reducing the number of threatened species in dolines. We conclude that anthropogenic disturbances have the potential to alter the capacity of karst dolines to support threatened (e.g., microrefugia) species. In this context, the effects of various disturbances on vegetation need to be carefully considered when looking for the best conservation and/or management strategies. We conclude that plant communities and diagnostic plant species can be used as useful bioindicators for land degradation in karst landscapes (Breg Valjavec et al. 2017; 2018a; 2018b).

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LAND USE CHANGES AND EROSION IN THE LAST TWO CENTURIES IN JULIAN ALPS, SLOVENIA

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The paper presents the impact of land-use changes on erosion in the Koritnica Valley (Julian Alps, Slovenia) during the last two centuries. Erosion is seen as a combined factor, which reflects natural features as well as anthropogenic long-term changes in the environment (Komac and Zorn 2005; Hrvatin et al. 2006; Zorn and Komac 2013). It was determined by a model in which land use was employed as one of the principal factors. We calculated the amount of annual sediment yields using a model in geographical information systems, based on the Gavrilović (1962) equation, which is similar to the well-known USLE equation. The parameters used in the equation were partly modified by Lazarević (1985), and others. In this presentation, the Gavrilović equation modified according to Pintar et al. (1986) was used. On this basis, it was possible to establish changes in erosion and related processes as the consequence of a land-use change in the last two centuries, namely for the years 1814 and 2017. For the years 1814 and 2017 we took into account different data on land use and adapted data on climatic conditions (e.g., lower average annual temperature, a higher amount of average annual precipitation, and higher amount of maximum daily precipitation in 1814). In previous studies (Gabrovec, Komac and Zorn 2012), land use data were available on cadastral municipality level only. Their borders do not correspond entirely with hydrological units, which are the basic units for erosion calculation in the Gavrilović equation. Because of this, the quality of the results was lower in some cases. So, in the frame of this study land-use data have been gathered on a plot level. For the year 1814 Franciscan cadastre has been used. It is one of the most important historical sources for land-use at the beginning of the 19th Century in Central Europe. Its graphic part contains maps in scale 1:2,880 (Gabrovec and Kumer 2019). The 2017 data were taken from Land Use Data Base provided by the Ministry for Agriculture, Forestry and Food. The total annual erosion in 1814 was approximately twice as high as in 2017. The main cause of the decrease in erosion was afforestation caused by abandoning of pastures and meadows on steep slopes. We can say the 19th Century agriculture was not sustainable. Due to deforestation on steep slopes, erosion rates were very high. Thus, the transformation of traditional cultural landscape has been positive from the point of view of erosion and natural disasters risk.

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CLIMATE CHANGE IMPACTS IN HIGH ASIA

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The High Asia (HA) region includes the Hindukush, the Karakorum-Pamir Alay, the Himalayan Mountains, and the Tibetan Plateau (Bolch et al., 2019). The ten major perennial rivers originating from HA support a population of ~1.3 to 1.8 billion (~25% of world's population) in its river basins (Eriksson et al., 2009; Sharma et al., 2019). Thus, with regard to the human-water availability ratio, HA is considered as a climatologically and hydrologically sensitive and hazardous zone (Messerli et al., 2004; Scott et al., 2019).

In HA, higher long-term temperature trends (0.104°C/decade) than in other Asian mountains and in the global mean have been observed during the last century (IPCC, 2013; Ren et al., 2017; Krishnan et al., 2019). Even higher long-term temperature trends (up to 0.6 to 0.8°C/decade) have been observed in the central Himalaya (CH) and in the NE Indian Himalaya in recent decades (Jhajharia and Singh, 2011; Kattel and Yao, 2013), whereas the upper Indus basin showed mixed trends (Ren et al., 2017; Krishnan et al., 2019). The ongoing climate change in HA has particularly led to the early melting of seasonal snow cover, shrinking of glaciers, and significant changes in hydrological regimes.

The annual (−1.25%) and seasonal (−1.04 to −0.01%) snow cover extent (SCE) in HA showed declining trends except for the autumn season (5.6%) between 2000 and 2010 (Gurung et al., 2011). A marginal decline (0.01% a^{−1}) of SCE has also been observed in the Tibet region between 2000 and 2015 (Wang et al., 2017). The declining SCE has serious implications for the glaciers in general and for the local hydrology in particular.

The glacier area shrank at a rate of −0.35% a^{−1} between 1970 and 2000, this rate increased to −0.42% a^{−1} in the following decade in HA, while the NWH glaciers showed a slight area increase (Bolch et al., 2019). The average snout position fluctuations vary from very high recession rates (> −100 m a^{−1}) in the southern slopes of the CH to significant surging behaviours (up to 2.5 km) in the Karakoram and Pamir mountain regions (Hewitt, 2007; Scherler et al., 2011; Azam et al., 2018). In addition, significantly accelerated glacier mass loss has been observed in HA, with the exception of some glaciers in the Karakoram and the Pamir region (Brun et al., 2017; Bolch et al., 2019). The glacier recession has resulted in fragmentation of

valley glaciers and disappearance of smaller glaciers in HA. The significant reduction of the SCE in particular and of glaciers in general has modified the hydrological regimes of the rivers in HA. The river discharge increased in the SEH rivers (Brahmaputra, Salween, and the Mekong), while in the Yellow River and in the rivers in the Ganges basin (Rees and Collins, 2006; Miller et al., 2012) a significant decline has been observed since the 1960s (Xu et al., 2009; Miller et al., 2012; Singh et al., 2016). A mixed pattern of river discharge trends in the NWH rivers has been detected over last a few decades (Bhutiyan et al., 2008; Singh et al., 2016). An overall increase in the river discharge in the regions dominated by seasonal snow is projected for the present century (Immerzeel et al., 2013). However, a high seasonality of the river discharge coupled with rapidly increasing human population will lead to a lower per person water availability and increase the water-related stresses in the dry seasons in HA (e.g. Indus and Ganges basins) (Scott et al., 2019).

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ORAL PRESENTATIONS - Abstracts

EMPOWERING THE ROLE OF WOMEN IN ENVIRONMENTAL JUSTICE STEPS, FOR BRIDGING BETWEEN GRASSROOTS COMMUNITIES AND DECISION MAKERS IN ALGIERS

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Although scientists confirm that women are more dynamic with respect to environmental issues in developed countries, their contribution is still decent in the environmental decision-making, despite the efforts being made by organizations and associations at international and local levels. In the developing countries as Algeria, judging the position of women regarding the environmental justice still unclear or ambivalent.

Even some jobs, like education and health, evidently dominate by women; however, the women's representation in dealing with environmental issues is very modest, in both grassroots level and decision-making, Despite the significant number of laws enacted in the last two decades; whether environmental texts or other laws that promote women's participation. This leads us to think about participatory justice before or in parallel with the Adopt the first steps of environmental justice.

This paper is divided into two parts: the first focus on the evolution of the degree of interest of women about social grassroots movements, and how they are dealing with environmental issues in pre and post-socialist period. The second part highlights the actual situation, that based on analysis of data collected from official reports and the questionnaire that cover series of environmental associations in Algiers, for the purpose to identify the real reasons make women reluctant to engage in environmental activities and decision-making.

Keywords: gender, environmental justice, decision making, grassroots community, Algeria

200 YEARS OF NEW MICRO-REGIONAL LANDSCAPE TYPES CREATION OF THE CZECH REPUBLIC

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More than 30 years, the research team LUCC Czechia deals with the development of the landscape using land use and land cover. The database at the level of the Czech Republic and its evaluation has already been presented several times. To validate the findings, the development of land use between the years 1845-2010 we have carried out also detailed analysis of land cover in more than 70 comparable territorial units (80 % one cadaster). On the basis of the dynamics of land cover in these small areas we were able to identify about 10 types of landscape changes in the years 1845-2010. Significant was the finding that this model of the territory are not alone in the landscape, but form regions similar to the structure of the area and its development as a result of transformation of the landscape features required by nationwide. A fundamental transformation of the landscape, where every eight land use category in traditional society had on its territory was observed. It is currently listed in the formed typological regions where certain categories of land use dominated by significantly, other are not represented or have only a small extent. The different types of landscape transformations will be documented by comparing land cover characteristic of land registers from the years 1845 and 2010.

Keywords: Czechia, transformation of landscape, 1845 - 2010, new functional types of landscape

A CENTURY AND A HALF OF LAND USE CHANGES IN CROATIA – DRIVING FORCES BEHIND VINEYARD ABANDONMENT

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Land use changes are a result of natural and cultural factors within particular spatial and chronological frame. However, different land use categories respond to those factors with different degree. Vineyards are among categories most susceptible to change for several reasons; they are labour-intensive, grapes can be painstaking to cultivate and wine, although usually lucrative product, is not essential in the human diet.

The cultivation of vineyards in Croatia can be traced to the first millennium BC but only during the 19th century the first systematic land survey was performed (Franciscan cadaster) which provided us actual data on vineyard area. Beside the cadaster, data were collected and compared from statistical yearbooks, Corine LC and Croatian Agency for Agriculture.

The results show a decrease of vineyards in the last 150 years, from over 130 000 ha in 1870s to cca 20 000 ha in 2018. During this period, Croatia experienced several land management systems: peasantry/innovations, collectivization and extensification. Other factors such as phylloxera (19th century), industrialization (1950s-1980s) and Homeland war (1991-1995) also caused a decrease of vineyard areas. Nevertheless, since the accession of Croatia to the EU in 2013, there is an increase of newly planted vineyards due to the financial support in agriculture. Simultaneously, the traditional cultivation on small plots for personal use has continued to reduce and is threatened to completely disappear.

Keywords: Croatia, land use changes, vineyard abandonment

THE ACADIAN CULTURAL LANDSCAPE IN NOVA-SCOTIA (CANADA), DEPORTATION MEMORY, CONCRETE AFFIRMATION AND CURRENT WEAKNESS

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The Acadians define themselves as the first colonists in Canada. They came from France, as Quebecers, but their history is different. The settlement of Acadians started at the early 17th. Their relations with the Micmacs, a first nation people living in the Eastern part of Canada, were often good, and some of them have indigenous descents. Nevertheless, frequent wars between England and France involved difficulties, because they were on the frontline. In 1713, the region became English (Utrecht treaty). However, French/English conflicts continued, and they were considered as a domestic risk in time of war, because they were French speaking people and catholic. In 1755, they were deported. Slowly, after the end of North American French colonies (treaty of Paris, 1763), some of them came back home. But their lands were become those of Planters.

Over the 19th and 20th centuries, they underwent a lot of minoration and minorization processes, with a continual and strong assimilation. They fought against domination along decades and centuries, to get recognition and respect of their specific identity and heritage. Nowadays, but lately, their history and culture are better considered, at least officially. Therefore, several places are protected. Some of them are labelled, as National historic sites, and one of them became a UNESCO site. This recognition should involve a cultural renewal, but situation is complex. Concrete affirmation in landscape does not prevent a continual weakness. Reality is rather symbolic, providing a feeling of desperation because situation generates indifference only. Therefore, as other small people or cultural minorities, domination is a constancy phenomenon. The Acadian population is currently evaluated to 4% of the total Nova-Scotian population, but about 20% of this population have Acadian roots. Preserving their culture and their last French speaking villages (in fact bilingual) is a daily work... and, maybe, cultural landscapes will be more touristic ones than a living contemporary identity.

Keywords: Acadian identity, symbolic landscapes, assimilation, deportation

LAND USE CHANGE ANALYSIS IN THE PANNONIAN REGION: THE CASE STUDY OF JARENINA CREEK (JARENINSKI POTOK), SLOVENIA

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The landscape of the Pannonian hilly region in the northeast Slovenia is a gently undulating surface of elongated ridges separated by valleys with wide bottoms. However, the lithological characteristics influence the susceptibility of the region to human impact. The Slovenian part of the Pannonian hilly region is mostly made of less resistant and less permeable rocks, therefore the faster water run-off, intensive erosion, and landslide occurrence are possible, especially at steeper slopes where agricultural land use with sparse vegetation cover (e.g. vineyards) is situated. Therefore, it is important to support sustainable land use cover development and to monitor land use dynamics. The main aim of this study was to analyse how land use has changed between the 19th and 21st century, and to evaluate relationship between land use and some other natural elements (e.g. slope and erosion). The land use structure was analysed, based on the historical Franciscan Cadaster, modern land use data, and lidar digital elevation model. The analysis was carried out for the area of Jarenina Creek (Jareninski potok) in northeast Slovenia. The analysis showed that the forested areas expanded, whereas the fields and vineyard areas diminished. It was also noticed that vineyards at a steeper slope were linked to a higher rate of abandonment. Suitable land cover is an important ecological measure in flood prevention management and can partly help to diminish engineering solutions.

Keywords: geography, geographic information system, land use, land use change, ecology, erosion, water run-off

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RECENT CHANGES IN AGRICULTURAL LAND USE PATTERNS IN THE ROMANIAN PLAIN AND THEIR IMPLICATIONS FOR FARMING DECISIONS

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The topic of this study is the detection of the changes in agricultural land use patterns over the last three decades in the Romanian Plain, a region of high agricultural production potential. Remote sense data allow evaluations on site-specific heterogeneity of land, unlike ancillary datasets which mostly represent uniform agricultural management. Therefore, the objective of this study is to identify the changes in land use patterns in sample areas in the Romanian Plain and to better understand their underlying drivers and consequences for farming decisions. Two main temporal points confining distinct political and socioeconomic periods for Romania were considered for distinguishing the evolution of land use patterns. The changes were derived from Landsat images, while the results were interpreted based the socioeconomic transformations spanning over the two temporal standpoints. The results show the spatio-temporal differences in land use patterns in the studied areas, with excessive land fragmentation in the western part of the Romanian Plain, associated to factors such as, numerous small farms, major destruction of the irrigation systems, etc. Conversely, the eastern part of the plain is characterized by the presence of larger agricultural holdings which are commercially oriented and better agricultural infrastructure. The outcomes contribute to land management, particularly in case of different types of farms, in regions undergoing socioeconomic and environmental change.

Keywords: socioeconomic transformations, land fragmentation, change detection, Romanian Plain

FOREST AREAS IN SOUTHERN ROMANIA. BIOGEOGRAPHICAL SIGNIFICANCE FOR BIODIVERSITY CONSERVATION UNDER ENVIRONMENTAL CHANGE

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Under the increased population, the human impact on forests is progressively increasing, leading to changes in their structure, composition and dynamics, ultimately leading to biodiversity loss and habitat fragmentation. Southern Romania has been exposed to intense human pressure since early time (e.g. extensive/intensive agricultural use, industrialization, urbanisation), visible in the large deforested areas. As a result, the primeval vegetation has been massively transformed and forests have been significantly fragmented and reduced to smaller surfaces. However, they still preserve southern arboreta and xerothermal associations, secular and multi-secular arboreta (even some virgin arboreta), relict, endemic or unique species having their world biological limit. The current study is seeking to focus on two-fold major objectives: (1) to assess the spatial distribution pattern and dynamics of protected forests in relation to the main environmental changes (e.g. land use/cover, urbanisation/suburbanisation) and (2) to assess species significance and distribution (using indicative taxa and witness species, e.g. *Quercus* species) in particular protected forests with specific role in the conservation of forest ecosystems. The current study contributes to the enrichment of biogeographical knowledge about the valuable plant and animal species in southern Romania in order to support sustainable conservation methods under the continuous human impact and landscape transformations.

Keywords: forest areas, biogeographical significance, biodiversity, Romanian Plain

LAND ABANDONMENT AND CHANGES IN THE IONIC CONTENT ON RUNOFF AND GROUNDWATER IN A LOW MEDITERRANEAN MOUNTAIN EXPERIMENTAL CATCHMENT: THE VERNEGÀ RIVER, GAVARRÉS MASSIF, NE SPAIN

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The Vernegà experimental catchment is located in the Gavarres Massif (450 m.a.s.l.), a Mediterranean mountain catchment in NE Spain. It drains an area of 2,5 km² and has two gauging stations: one monitoring a totally forested area (1.6 km²) and the second one monitors a mixture of forest and agriculture land use area. Discharge, sediment transport and groundwater depth and water quality have been monitored and sampled at two-week interval from 2005.

Runoff water quality had a pH of 7.2 and the mean electrical conductivity was 134 µS/cm at the forested catchment, and 168 µS/cm at the outlet. The major cations in runoff waters of the basin were carbonates, chlorine and sodium, which represented 38%, 29% and 9% respectively at both monitoring sites. Additional ions with a small content were also present in fluvial waters such Al³⁺>Fe³⁺>PO₄³⁻>Zn²⁺>Mn²⁺>NO₂⁻.

Groundwater had a pH of 7,8 and mean electrical conductivity was 651 µS/cm. Carbonates was the major ion followed by calcium and chlorine. The content of phosphorus is greater in groundwater resources (0.9 mg/l) than in runoff waters (0.13 mg/l), and it occurred the same with nitrites.

The presence of fertilizers in soil for growing crops was strongly related with the presence of phosphorus and nitrates in groundwater and fluvial runoff. However, land abandonment and the absence of fertilizers after 2010, decreased the organic ions present in groundwater and fluvial waters.

Keywords: dissolved sediment, water pollutants, land abandonment, Mediterranean catchment

PUBLIC POLICIES FOR TRADITIONAL AGRICULTURAL LANDSCAPES IN ITALY. LIGHT AND SHADOW

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In the last few decades, a renewed scientific interest towards traditional agricultural systems goes in line with a process of ‘heritagization’ of traditional agricultural landscapes. In Italy, historical rural landscapes and traditional agricultural practices have been recently interested by a plethora of preservation initiatives and public policies, put in place by different actors both at national and local level. Since 2014, the Ministry of Agriculture established the National Register of historical rural landscapes and traditional agricultural practices; the first agricultural landscape has been classed by the Ministry of Culture; two agriculturally-related sites entered the WHS UNESCO list; two sites entered the FAO-GIAHS list - to mention the most important only. All these initiatives share a general idea of the value of traditional agricultural landscapes as opposed to the disvalue of contemporary conventional agriculture practices.

Is this new multi-faceted framework consistent? What implicit theories are behind these choices? How do these policies work in practice? How do they influence the transformation of landscapes?

With the help of examples taken among some of the officially recognized traditional landscapes, this paper will provide a critical analysis of the new wave of interest about this topic in Italy, under the lens of the mutual relationship among landscape preservation policies, the interpretation of landscape change, and the landscape itself.

Keywords: traditional agricultural landscape, heritage, preservation policies, “*coltura promiscua*”, Italy

EFFECT OF FOREST MANAGEMENT PRACTICES ON SOILS AFFECTED BY WILDFIRES

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Fire is a natural event in Mediterranean ecosystem. Wildfire affected areas often have been managed and these practices may have important impacts on soil properties. The aim of this study is to summarize the impacts of forest practices on soil properties. To achieve this objective, different forest managed areas have been analysed in wildfire-affected areas. In this case, we compare 1) areas managed 10 years before a wildfire; 2) areas managed 2 months before fire; 3) unmanaged areas; 4) manual salvage logging areas; 5) manual cut and leave areas, and all of them compared with 6) unburned area. The properties analyzed were: aggregate stability (AS), total nitrogen (TN), soil organic matter (SOM), inorganic carbon (IC), C/N ratio, pH, electrical conductivity (EC), extractable calcium (Ca), magnesium (Mg), sodium (Na), potassium (K) and available phosphorous (P). In each forest treatment, we collected nine samples (0-5 cm depth) in each sampling campaign. In total, we sampled 27 samples in each area. Sampling campaigns were carried out: a) two; b) ten and c) eighteen months after the wildfire. Results underline the necessity to carry out a sustainable forest management to prevent dramatically consequences after wildfire. After fire, the forest management should be postpone to medium- and long-term and only in cases of extreme need can be carried out avoiding the use of heavy machinery.

Keywords: Sustainable forest practices, soil chemical properties, post-wildfire management, soil nutrients

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TRADITIONAL AGRICULTURAL LANDSCAPES IN USKOPALJSKA VALLEY

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This article discusses changing trends in agricultural land use in Uskopaljska valley. Quite a large number of agricultural land exploitation directions indicate that the geographical benefits for the development of certain types of agricultural production are very different. Detailed analysis of the exploitation directions of land use leads to the opinion that they are determined mainly by social movements. The depopulation areas are numerous in the outskirts of Uskopaljska valley resulting in abandonment of agricultural land and an increase in unused areas. Large extensive production areas were abandoned after 1991 leaving uncultivated arable land and grass cover used by herders who occasionally encounter. In 2018, there were only 7.4 acres of arable areas, I-IV class quality, per person that were mainly being cultivated, which was not enough to ensure the sufficient food production. According to the analysis of available data and based on the practices, and among others a special survey among the management staff of farms, the general perception of basic conditions and main problems of agricultural land use and development is revealed.

Keywords: land use, depopulation, agricultural development, perception, agricultural geography

UNDERSTANDING BIOGEOGRAPHICAL PATTERNS IN THE BALKAN PENINSULA USING GIS AND ENVIRONMENTAL NICHE MODELLING IN THE PLANT GENUS EDRAIANTHUS (CAMPANULACEAE)

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The Balkan Peninsula has been recognized as one of the European Pleistocene refugia and a biodiversity hotspot. The genus *Edraianthus* (Campanulaceae) has its centre of distribution in the western Balkans with disjunctions in the Apennines, Sicily and the Carpathians. In order to determine their distribution, we collected data of occurrence of 18 taxa during fieldwork and from different sources. Using GIS tools, we represented and analysed the distribution of all studied taxa. Further, we performed environmental niche modelling (ENM) to obtain the potential present and past (Last glacial maximum - LGM) using MaxEnt, an algorithm for identifying species' suitable environmental space from incomplete information of occurrence. ENMs were based on WorldClim bioclimatic variables. The current ENM fits adequately the data of occurrence of the species, while LGM models showed different scenarios of environmental suitability. Our results showed congruence with biogeographical patterns in *Edraianthus* and other Balkan plant taxa obtained using diverse, especially molecular methods. In details, *Edraianthus tenuifolius* LGM ENM indicates two distinct areas of environmental suitability, indicating putative refugia on the north-western (The Kvarner Bay) and south-eastern parts of present days' distribution on the eastern Adriatic coast. This data may indicate a latitudinal range shift as a response to climatic oscillations, which corresponds to the known phylogeographical patterns.

Keywords: area of distribution, Balkan Peninsula, *Edraianthus*, ice-age refugia, GIS, modelling

USING VEGETATION INDICES FOR ABANDONED AGRICULTURAL LAND IDENTIFICATION

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As part of our contribution, we analyse the distinctiveness of predefined abandoned agricultural land (AAL) classes using multiple calculated vegetation indices. The inputs for the process are (1) multi-temporal Sentinel-2 images from the vegetation season of 1st April to 30th September 2018, (2) the physiognomic characteristics of the individual AAL classes, (3) the calculated vegetation indices and (4) the Pearson correlation coefficient values. Implementation of the project takes place at selected localities within the Podunajská nížina Lowland and the Malé Karpaty Mts. complemented by selected locations Zvolenská kotlina Basin and the Javorie Mts.

Keywords: vegetation, indices, phenology, sentinel-2, abandoned agricultural land

CULTURAL LANDSCAPE OF THE GORIŠKA BRDA IN THE 19TH CENTURY: FRANCISCAN LAND CADASTRE ELABORATES AS THE SOURCE FOR CLARIFICATION OF THE CLASSIFICATION OF CULTIVABLE LAND TYPES

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The Goriška Brda is a part of the hilly cultural landscapes of the northern Mediterranean consisted by the soft flysch. Since the Middle Ages the Brda region was the synonym of cultivated landscape. In the past and also today mixed culture of vineyards, fruit trees and crops has been typical for the terraces as well as the fields. The belief that the cultivation mode and the types of cultures through the centuries, except of the introduction of maize and potatoes, has not changed, was modified by the new researches. In the cadastres, the cultivated land on the hill is classified as in the period after the Second World War, as gardens and, in particular, as mixed culture in terraces called *brajde*, and as fields or fields with vines in the flat areas. Detailed descriptions of the cultivable methods and types of prevalent cultures in the elaborates show that during the 19th century, and especially in the period after the First World War, the method of cultivation of the vine and the types of crops, significantly changed. At this point, the 19th century can be seen as a period of final introduction of maize and potatoes. Thus, the cultural landscape of the Goriška Brda is reflected as a result of the responses to inside and outside economic and cultural pulses. The paper will point out the advantages of elaborates use in the reconstruction of the cultural landscape and the opened questions that it leaves for further research.

Keywords: cadastres, Goriška Brda, cultivable methods, cultivable land types, terraces

PRIMORSKA, SLOVENIA: THE METAMORPHOSIS OF A HISTORICAL REGION

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This paper is going to confront the contemporary region of Primorska, in nowadays Slovenia, with the geographically comparable administrative area of the early 20th century Austrian Littoral (the Duchy of Gorizia - Gradisca and Trieste w. hinterland). Post-WW I and WW 2 peace resolutions and the disintegration of Yugoslavia have affected the territory. The historical Venetian/Austrian layers are changed through policies of countries and time-related ideologies: fascist Kingdom of Italy, communistic multinational Yugoslavia, and democratic nation-state of Slovenia. The contemporary cultural landscape is therefore characterised by imprints of country's geopolitical and socio-economic decision-making, nationalism/chauvinism and socialism/communism. Demographic policies - in particular migrations, economic and legislative acts - in particular urbanisation and industrialisation, have produced the spatial reality of today. Comparison of selected Austro-Hungarian and Slovenian statistical data, literature and fieldwork, three key questions are to be answered:

1. How have demographics changed and has urbanisation impacted the traditional cultural landscape;
2. What are the outstanding imprints of the time-space related political and nation-state policies and how/why they were introduced;
3. Has the regional identity of the resident population strengthened or weakened (and through what means).

The EU enlargement has strengthen and re-introduced rural-urban exchange of goods and labour and opened real estate and investment markets. The growing economy, inclined with non-national and intra-regional migration, manufacturing and leisure oriented businesses deliver opportunities for a new multicultural "Istrian regional identity" in the once southern part of the Austrian Littoral (Primorska) region of 1918.

Keywords: Primorska/Slovenia, political/social geography, imprints of ideology/nation-state policies, transformation of a historical landscape

SLOVENIAN SOIL: DETERMINATION OF GEOCHEMICAL BACKGROUND AND THRESHOLD VALUES AND COMPARISON WITH EUROPEAN SOIL

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Geological survey of Slovenia collected 817 topsoil (0-10 cm) samples on a national territory using a sampling grid of 5 x 5 km. After modified aqua regia (HNO₃/HCl/H₂O) sample (< 0.075 mm, 15 g) digestion, concentrations of 53 elements were determined using inductively coupled plasma (ICP) mass spectroscopy (MS) and emission spectroscopy (ES). Results were used to establish the geochemical background variation and threshold values, derived statistically from the data set. Geochemical threshold values were calculated for (1) the whole Slovenian territory and (2) eight spatial units of the Slovenian territory, which were determined based on geological structure, lithology, relief, climate and vegetation. Medians and geochemical thresholds were compared to national legislative guideline values for soil contamination and GEMAS agricultural soil data for whole Europe and for southern Europe separately as large differences in the spatial distribution of many elements were observed between northern and southern Europe. Potentially toxic elements As, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb and Zn were of special interest. The study contributes background element contents for Slovenian soil and highlights unusually high element values in soil samples, which may be caused by natural or anthropogenic factors. The results of this study represent the basis for identifying geochemical land degradation and are particularly useful for application in national soil quality assessment studies.

Keywords: soil, background, threshold, geochemistry, Slovenia

RESHAPING AND ADAPTIVE REUSE OF POST-COMMUNIST INDUSTRIAL SITES. THE SHOWCASE OF BUCHAREST

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During the post-communist period (after 1990), urban sprawl (through built-up areas dynamics) and changing the patterns of industry had been the main causes of spatial and structural changes in Romania. Recently, these changes have resulted in the reuse of post-industrial sites, mainly for residential or commercial uses. Bucharest is one of the best examples in Romania in terms of surface and number of industrial sites to be transformed or replaced. Thus, the aim of the present paper is to: (1) identify the post-communist industrial sites and their current functions/use, (2) spot the current patterns of industrial reuse under the urban growth/sprawl trends and (3) identify potential sites and means for preserving industrial heritage. The current analysis integrates spatial and statistical data to perform quantitative and qualitative interpretations of the structural and functional changes: significant spatial shrinkage, intensive fragmentation, functional diversification, tertiarization and change of patterns (from compact to mosaic-like outline). Between 1990 and 2018, over 50% loss of industrial sites have been recorded. Also, five main types of reshaping post-communist industrial sites have been identified (maintenance, conversion, replacement, abandonment and demolition). The study results will help identify areas prone to potential development through the adaptive reuse of former industrial lands in order to predict future growth trends and patterns.

Keywords: industrial heritage, adaptive reuse, landscape transformation, Bucharest

GAMIFICATION OF LAND USE CONFLICTS: JOINT-LEARNING FOR COLLABORATIVE PLANNING

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As the range of functions in rural areas increases, spatial planners are faced with the enlarged number of different users of rural areas. Where multiple functions overlap (e.g. agricultural, environmental protection and nature conservation, residential, recreational), more or less attractive junctions emerge: in spatial planning they are recognizable as areas, points, and lines. The most attractive ones are where the interests and activities of several stakeholders converge, which can lead to changes in land use and to the conflicts of interests. In rural parts of the Municipality of Izola (SW Slovenia) there are many such junctions, where the interests and activities of stakeholders (farmers, owners of holiday homes, natural and cultural environmentalists, and the local administration) overlap. Since numerous activities occur in a small area, in Mediterranean cultural landscape close to the sea, conflicts of interests over land use are very common and are placed on every day's agenda of spatial planners. The paper presents a simple computer game which simulates how different stakeholders' interests influence land use changes. Decision-making process in such highly contested landscape is highly complex since interests are often incompatible, every decision has a price, and the stakeholders are not always happy with the final solution. The game could be used either in planning practise or in the school curriculum as an example of learning for collaborative planning.

Keywords: conflicts of interest, rural areas, computer game, stakeholders, Municipality of Izola, Slovenia

STONE HEAPS AS AN ELEMENT OF HISTORICAL VINICULTURE CULTURAL LANDSCAPE IN THE LITTLE CARPATHIANS (SLOVAK REPUBLIC) AND THEIR TRANSFORMATION DUE TO THE COLLECTIVIZATION OF AGRICULTURE

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The paper deals with the stone heaps extension changes in two model areas in viniculture landscape on the foot of the Little Carpathians Mountains in western Slovakia. Stone heaps are the result of the removal of the stones from the soil and its deposition at the edges, respectively on the barren parts of the land. Unlike dry stone walls, stone heaps usually do not have a supporting function. We compare the changes that occurred in the stone heaps system between the late 19th century and the present. The position of stone heaps was obtained from maps, aerial photographs and field research. For each of the stone heap we determined the area, the maximum, minimum and average altitudes, the difference of the altitudes, the average slope and the average orientation. Based on the shape of the ground plan, we have set out 5 types of stone heaps. The main reason of the changes in the stone heaps system is the collectivization of the vineyard landscape associated especially with building of modern terraces. The size and number of stone heaps in the period defined by the reference years decreased. The average altitude and the slope of the stone heaps has statistically increased as a result of the stone heaps removal in lower, less dissected sites at the expense of modern terraced vineyards. The best preserved stone heaps systems remained in higher and more dissected locations, where the vineyards were gradually abandoned and afforested in the first half of the 20th century.

Keywords: stone mounds, viniculture landscape, modern vineyard terraces, Little Carpathians, Slovak Republic

LANDSCAPE AND VILLAGE-SCAPE FORMING BY URBAN SPRAWL – A COMPARATIVE ANALYSIS OF FOUR CENTRAL EUROPEAN REGIONAL CENTRES’ AGGLOMERATION

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Residential suburbanisation and urban sprawl are currently the most important urbanisation processes in European post-socialist countries, especially in Central Europe. Over the past decade and a half, peri-urban development has enormously changed the traditional landscape, land use, and village-scape of settlements around urban centres. The European, especially Central European researchers have primarily focused on the suburban zones of the capital cities, and paid little attention to the processes of the regional centres, where the extent of spatial growth often exceeds the rate of population growth; it is taking place even in the lack of population growth. Our research examines the urban sprawl and its impacts in three Central European countries (in Hungary, Slovakia and Romania) in the cases of four economic growing regional centres’ agglomerations. Desktop and field empirical researches were conducted, with a GIS analysis of land cover change, using the Corine Land Cover databases and the datasets of the Urban Atlas; with analysis of aerial and landscape photos. This paper introduces some results of these comparative examinations, summarises the demographic changes of these peri-urban settlements, the changes in the structures of settlement and village-scape, landscape. We try to define some specialities of the Central European urbanization process on the beginning of the 21th century.

Keywords: urban sprawl, Central Europe, landscape, GIS analysis

EIGHT YEARS FROM THE GREAT EAST JAPAN DISASTER – LESSONS TO BE LEARNED ABOUT LAND USE CHANGES

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The gigantic earthquake and tsunami of 11th March 2011 devastated huge coastal areas in East Japan facing the Pacific Ocean. The damages on land and its use caused by the tsunami and the consequent destruction of TEPCO Fukushima Daiichi Nuclear Power Plant followed by radioactive contamination were particularly serious, and full recovery or re-vitalization of the stricken areas is still far beyond scope in much of those areas. There are a number of important lessons to be learned about land use changes in those areas in local, regional and global contexts, which the paper intends to discuss.

Keywords: Great East Japan Disaster, land use change, earthquake, tsunami, radioactive contamination

AGGRADATION AS DEGRADATION: THE GROWTH AND EVOLUTION OF NATURAL LEVEES ALONG NEW ISLANDS IN THE LOWER MISSISSIPPI RIVER

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Rapid development of islands in the lower Mississippi over the past five decades provides an excellent opportunity to examine the co-evolution of natural levee morphology. This study examines the morphology of natural levees on 113 islands (> 20 ha) along the Lower Mississippi River utilizing lidar DEMs, historic air photos, and hydrologic data. Additionally, a comparison is made with natural levees along the main-stem channel. Natural levees formed atop islands differ considerably from natural levees formed along the main-stem channel banks. The width of natural levees are about an order of magnitude greater along the main-stem channel (3,650 m) than along islands (279 m). Natural levee slope is an order of magnitude steeper along islands than the main-stem channel, being 0.014 m/m and 0.002 m/m, respectively. This is attributed to islands being younger and being comprised primarily of sand. For individual islands, natural levees are higher on the upstream side than the downstream side by an average of 1.3 m, which results in an overall downstream slope of 0.0025 m/m. That this phenomenon has occurred during a period in which sediment supply has dramatically decreased is of interest because it implies coarse sediment supply remains sufficient to drive fluvial landform evolution along the lower Mississippi.

Keywords: natural levees, islands, lower Mississippi River

CANAL OF SV. JERNEJ IN SEČA: TEXAS, ECOLOGICAL DISGRACE, OR CEMETERY OF THE BOATS: SOCIAL CONSTRUCTION OF THE SEASCAPE

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This paper is based on anthropological and geographic approach to the seascape as an aspect of the (cultural) landscape. With the anthropological and geographical approach we will contribute to the understanding to the relations of human and the sea. Following the Ingold's and Arnason's usage of the term, we understand the seascape as a »holistic term to describe the depth and complexity of human relations with the sea, the modes of human habitation of the sea, the importance of the sea to maintaining livelihoods, and the connections between land and sea«. We will analyse cartographic material from Franziscan cadastre to present days and determine how the land use has changed in and around Canal St. Jernej through time. Cartographic work will be complemented with the anthropological fieldwork based on participant observation, interviews, theoretical analysis of the visual images and discourses of several actors which will give us a reflection of contemporary and historical constructions of the Canal of Sv. Jernej seascape. Once a part of Salt pans, the use of this Canal was changed over time. Now as a part of Landscape Park of Salt pans Sečovlje, this seascape is at the same time represented as Texas, ecological disgrace, cemetery of the boats. Our contribution will be contextualised with public concern on ecology and sustainability of the sea and will explain how people understand their relationship with the environment."

Keywords: salt pans, degradation, seascape, land use change, Sv. Jernej (Seča)

SLOVENIAN ISTRIA AND ITS CULTURAL LANDSCAPE IN THE CONTEXT OF WINE TOURISM DEVELOPMENT

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The main purpose of the research was to identify the elements that shape the identity of a selected wine region, and consequently determine the development of wine tourism in the studied area. This has been investigated on the case of the Slovenian Istria wine-growing district, a wine region with a recognizable identity and more or less marked *winescape* and *terroir*. Vitivincultural terroir operates according to the belief that each wine contains the characteristics of a particular environment in which the grapes ripen, from physical factors to cultural aspects. It is at the heart of geography, which gives the wine *a sense of place* and makes it special or different from wines produced elsewhere. Slovenian Istria, especially its coastal part, is a typical Mediterranean tourist area. To some extent it has also developed as a wine-tourist destination. However, development of wine tourism - even if it takes place in urban areas - is in any case directly linked to the regional rural development.

Key elements that define the identity of the wine region and its tourism development potentials have been identified by using the Delphi method. Among experts in the wine and tourism and hospitality sector a high degree of consensus has been achieved, which was checked with an online survey of the perception of the studied region among the inhabitants of Slovenia. Their perception of the Slovenian Istria is framed by three elements of the cultural landscape: a) *Istrian villages and coastal towns*, b) *the sea and the Mediterranean climate*, and c) *olive groves and vineyards*. All three are most often mentioned as the first associations when the geographical name of the Slovenian Istria is brought up. Additionally, both typical (indigenous) grape varieties, *Refošk* and *Istrian Malvasia*, are also relatively strongly positioned in the imaginary of the respondents when compared to other recognizable landscape symbols of the Slovenian Istria.

Keywords: geography of wine regions, terroir, wine tourism development, Slovenian Istria

MEDITERRANEAN CULTURAL LANDSCAPE: MAIN APPROACHES TO MAPPING AND CLASSIFICATION AT REGIONAL LEVEL

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The approach developed for mapping of areas of Mediterranean cultural landscapes at a preindustrial stage includes three stages: 1) inventory of historical and archaeological data and systems of environmental management and allocation of typical cultural landscapes of different civilizations; 2) mapping of areas of distribution of civilizations; 3) identification of areas of cultural and landscape palimpsests and drawing up historical profile at regional level. The hierarchy of regions has two-level. The first one consists on nine regions that are similar by natural landscape structure. The second includes areas of the similar type of landscape palimpsest. On the basis of the historical data connected with development of the Mediterranean it is revealed that by the time of emergence of the Roman Empire within the region there were already 8 types of two-layer and 7 types of three-layer cultural and landscape palimpsests which in certain areas, for example, on the Aegean coast of Asia Minor, in Egypt are inherited also in modern structure of land use. The role of later civilization shifts consisted or in maintenance of traditional cultural landscapes, for example, in Andalusia, or in their elimination, for example, in the north of Africa. The last, as a rule, took place in peripheral parts of the region and it fell on the period of adverse climatic changes.

Keywords: cultural landscape, regional level, palimpsest, Mediterranean

(SUB-)URBANIZATION PROCESSES IN THE BROADER AREA OF PIRAN

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In Slovenia, the urbanization and suburbanization processes became one of the most important drivers of land use change in the last two decades. The authors will present a case study of the broader area of the town of Piran, which is situated on the northwestern part of the Istrian Peninsula and characterized by its location by the Adriatic Sea and border with Croatia. The study will focus on settlements Lucija and Sveti Peter, which are part of the municipality of Piran, as well as Kaštel, Plovanija and Kaldanija, which lay the municipality of Buje in Croatia. The mentioned settlements gravitated historically to the town of Piran and were administratively separated by the disintegration of Socialist Federal Republic of Yugoslavia in 1991. However, the establishment of the international border did not stop migration from the town of Piran and other urban littoral population centers to the rural hinterland in both countries. Consequently, some of the once traditionally agriculturally oriented areas became intensely urbanized over the last few decades. The authors will analyze the changes in the land use of the aforementioned settlements with aerial images from 1954 until today, and examine their demographical data, provided by statistical censuses.

Keywords: urbanization, suburbanization, land use, aerial images, demographical characteristics, Istria, Piran

AGRICULTURAL LANDSCAPE CHANGES BASED ON LPIS DATA IN THE DISTRICTS PEZINOK AND SENEC, SLOVAKIA

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Agricultural land losses are one of the most serious environmental problems. Land Parcel Identification System (LPIS), which was originally established as an administrative and control mechanism under the Common Agricultural Policy provides a rich source of information for landscape studies at a very high spatial resolution. In Slovakia, LPIS data have now been available for 15 years. The aim of the paper is to present the changes in the utilization of agricultural land in the years 2004-2018, identified by the LPIS database in the territory of the districts of Pezinok and Senec, Slovakia. The districts are characterized by high dynamics of landscape changes, both in connection with intensive suburbanization and abandonment of agricultural land, especially in the sub-mountain areas. The agricultural land loss has been classified into four main classes: Built-up, Abandonment, Gravel mining, Methodical and technical changes in the database. To highlight the effect of agricultural land use changes, loss of agricultural soil was evaluated using pedologic-ecological units. They are input data for agricultural soil value calculation. Agricultural land losses have been recorded not only on low-quality soils but also on high-quality soils or terraces which should be subject of increased protection as valuable features of historical landscape structure.

Keywords: agricultural land loss, LPIS data, Slovakia

THE IMPACT OF LAND OWNERSHIP ON LAND USE IN THE KOPER HINTERLAND

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In Slovenia and other central-European countries numerous case studies were made in the past few years for individual villages, in which changes in land use during the past 200 years were analysed. In analysing the causes of changes preference was given to natural-geographical factors, in some studies also to historical and political factors. However, neglected was the role of the ownership of individual land plots and the decision taking by individual owners about the use of their land. In the case of the owners of farming lands it is important to know whether farming is their basic occupation or just a supplementary activity, whether they produce mainly for the market or just for their own needs. Individual owners have different attitudes towards the landscape hence their decisions about land use are also different. From the aspect of profitability the owners' decisions are not always rational but rather depend on their value system, attachment to the land and the like. Quite different is the attitude of the owners who do not live in the settlement concerned but in other municipalities of the country or even abroad. The process of changes in land use was analysed on the case of individual villages in the Mediterranean part of Slovenia.

Keywords: Franciscan cadastre, land-use changes, land ownership, Slovenia

SEDIMENT PRODUCTION IN FLYSCH BADLANDS IN SLOVENE ISTRIA

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Eocene flysch rocks of Slovene Istria are rather susceptible for weathering and other geomorphic processes. Most intensive processes are present in flysch badlands. Their extend was significantly larger in the past due to greater agriculture activity. Land abandonment and afforestation in the last decades reduced their extend, but their sediment production is still the major contributor to the overlay sediment yield. The article discusses seven-year-long monitoring (2008–2015) of sediment production in a flysch badland in the Rokava River catchment. Monitoring of sediment production was carried out via erosion plots and pins. To understand the influence of the atmospheric factors on sediment production data from the nearby meteorological station were included in the analysis. In the monitoring period, the average intensity of flysch sediment production was 36 kg/m² per year and the average rockwall retreat was up to 21 mm per year (cumulatively 147 mm). Correlations with the meteorological data show a moderately positive correlation between the sediment production and days with the transition of air temperature over and below 0 °C ($r = 0.56$) and slightly weaker correlation to the precipitation amount ($r = 0.45$). On the other hand, the sediment production shows a low negative correlation with the mean air temperature ($r = -0.29$) as well as the mean minimum air temperature ($r = -0.30$). Regarding mean wind speed, no statistically significant correlation was found.

Keywords: geomorphic processes, sediment production, rockwall retreat, erosion plots, erosion pins, flysch

FRAGMENTED FOREST PROPERTIES AS A HINDERING FACTOR FOR EFFECTIVE FOREST MANAGEMENT

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The small sizes of forest properties and their parcelization and fragmentation is a result of structural changes in society that have occurred in decades after the Second World War. The owners have started to migrate from rural areas to towns and lost interest in their landed property. Planned inheritance practices (eg. by favouring one heir among daughters and sons) changed into unplanned. Inherited forest properties were divided among children, spouses and siblings, each receiving equal but small share. Consequently, the share of female property owners now almost reached the proportion of women in the general population, which brings Slovenia to first place in Europe. Besides, traditional inheritance practices in the past were different among regions. For example, due to Hungarian inheritance law (and despite planned inheritance) the land was dissected into small parcels in the eastern part of the country long before post-war societal changes. This has led into situation in which forest properties in eastern Slovenia are even more fragmented than elsewhere. Fragmented land, shift in gender composition and almost 500,000 owners in a country of 2 million inhabitants resulted in new challenges currently facing forestry sector in Slovenia: mistrust, lack of cooperation, loss of tradition, globalised individualism. They proved to be important managerial factor and have created a new group of absentee owners.

Keywords: forest management, private forest owners, genderization, land fragmentation

HERITAGE OF LOST CZECH CULTURAL LANDSCAPES

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Based on historical data source (stable cadastre, old photos and aerial photos, etc.) we reconstructed history and heritage of 8 sites representing Czech lost cultural landscapes (montane landscape of Kutná Hora, composed feudal landscape of Kačina castle, lost landscape of Vltava valley, post-industrial landscape of Rosicko-Oslavansko, lost mountain agricultural landscape of the Krkonoše Mts., lost rural landscape of military area Boletice, lost landscape of hop-growing area Podbořansko, lost agricultural landscape of suburban Prague area) . Using digital cartographic methods 3D models of lost landscape, 3D photorealistic models of destroyed villages and buildings, maps of land use change and special maps of changed and lost landscape sites have been prepared. The development of the lost landscapes was described and discussed in relation to landscape diversity, cultural heritage and loss of valuable landscape and cultural features. The output can serve for landscape heritage systematic presentation and can be used for future landscape protection and for regional development and education.

Keywords: lost landscape heritage, Czech cultural landscape, old maps, models of lost landscape

HERITAGE OF LOST LANDSCAPES – NEGLECTION OR REAPPRAISAL? SUDETY MTS CASE STUDY, SW POLAND

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The intense depopulation of the Sudety Mountains started at the end of the 19th century and intensified after the World War II, due to the shifts in the state borders and large scale migrations. Most villages were highly depopulated and some of them were completely abandoned. However, numerous relicts of former human activities are still well preserved in the landscape. They form a complex and valuable palimpsest of relict cultural landscapes. However, their historic, educative and touristic values have been appreciated only recently. For several decades the pre-war cultural landscape was depreciated and neglected, and it was treated as a 'foreign', or even 'enemy's' heritage as it was created by Germans. Only recently the pre-war cultural landscape starts to be appreciated and included into the concepts for local development plans. However, these strategies are very local and only very few projects, such as educative paths, have been completed so far. Many valuable examples of "the history preserved in the landscape" are still forgotten and there are many threats towards them, including the development of secondary succession of vegetation, the increased pressure on land due to new constructions and developments, or even the intentional destruction or theft. The aim of the paper is to present the current state of the preservation, promotion and conservation of the abandoned cultural landscapes, and to discuss the diverse attitudes towards these heritage.

Keywords: depopulation, abandonment, relict landscape, dissonant heritage

POTENTIAL IMPACTS OF CLIMATE CHANGE ON COMMERCIAL FISHERIES OF KANO STATE

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Commercial fisheries contribute to sustainable livelihoods of people in several ways accounting for more than 80% of total fish production in Kano state Nigeria. Climate change arising from global warming, increasing temperature, stratification and changes in ecosystem processes brings flooding, precipitation, evaporation, run-off and flow with potential serious negative impacts on fish assemblages and productions, fishing activities, fishers catch per unit effort, fish breeding, morphology, resistance to species invasion, wild fish seed supply, fish meal and oil and likelihood of spread of vector-borne diseases. Climate change could also extirpate fish population in lakes. Understanding climate change and its impacts on the ecosystem will provide accurate decision, capacity building and adaptive management in tackling the problems as it will provide practical, scientific, technical and socio-economic actions to mitigate the challenges currently and in the future. Study of vulnerability of commercial fisheries to climate change in the likelihood of episodic events of risk exposure, sensitivity and adaptive capacity should be the focus of scientific research in this decade. Thus, high confidence predictions models of climate change perturbations on fish response in terms of feedbacks, critical thresholds, adaptations, migrations, breeding, and recruitment and so on could mitigate the impacts and ensure sustainability of commercial fisheries in Kano state Nigeria.

Keywords: commercial fisheries, climate change, impacts, adaptive management, ecosystem

THE "CHANGING ACTOR" AS AN EXPLANATION: EXAMPLES IN THE MEDITERRANEAN REGION (AND ELSEWHERE)

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The changing actor is not a theme often dealt with in social sciences, even if there are exceptions: Van Gennep (rites of passage), Festinger (cognitive dissonance), Hannah Arendt ("nativity"), Bauman, the sociology of the actor-network... In our opinion the change of the actor allows clear analysis.

We give three examples:

- Criticism of "obduracy" concerning spaces which can be protected or upset. Either the entrant will change after having entered (choosing the protection of the space) and the blame of being "obdurate" does not hold. Either the entrant will not change because he is indifferent to the conservation of the characteristics of the space (an ecosystem, a quarter in a city...) and the incumbents are rightly distrustful (not "obdurate"). The blame of obduracy serves a discourse which is presented as "indisputable", to use the words of the sociologist Bruno Latour.

- Debt. The borrower and the lender are partners, but in case of over indebtedness they are in conflict. So, the amount of the debt should be carefully controlled.

- Migrants: The refugee is a future migrant and the migrant is no more a refugee. Therefore, one should help the refugees using all the means which are at disposal. Concerning the migrants, one can deal with their case in accordance with the Law (an exception being made for those searching asylum). In other words, one should never refuse help to a refugee, but it is possible to say no to a migrant.

Keywords: actor's behavior, ecosystem, protection of environment, protection of sites

PLANNING PROCESSES OF THE CONVERSION PROJECT OF A FORMER U.S. MILITARY BASE IN THE BUILT-UP AREA OF TOKYO, JAPAN: A CASE STUDY OF TACHIKAWA AIR BASE

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With the end of the Second World War, a large number of military facilities all over Japan had to end their operations. While most of them were released for public use, others were taken over by the U.S. military. In the 1970s, some of those bases that were located in Tokyo and its surrounding areas were returned to the Japanese government by the Kanto Plain Consolidation Plan (KPCP). Because most of them were in the built-up areas, city planning for conversion became a very controversial matter. In this research, I analyze the process of the conversion plan of Tachikawa Air Base in the western suburbs of Tokyo. Although both the national government and the local municipalities regarded the return of the bases as a chance to redevelop the area for the public purposes, such as by developing offices, houses, cultural facilities, parks, and traffic facilities, they intensely opposed each other over the national government's plan to relocate the Self-Defense Forces of Japan to a portion of the land. The neighbor communities had suffered from the existence of the base for many years, and the municipal governments took objection to the continuing military function. However the local governments were gradually forced to compromise about the plan since the national government had the land ownership. The analysis of the minutes of administrative organization and updated drawings of the plan reveals the typical problems that pertain to large-scale military land conversions.

Keywords: military land, conversion, public facilities, redevelopment, Tachikawa Air Base

PARTICIPATORY MANAGEMENT OF CULTURAL LANDSCAPES IN PROTECTED AREAS: RECONCILING NATURE AND LANDSCAPE CONSERVATION WITH LOCAL DEVELOPMENT

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Authors will present “action research” approach integrating stakeholder participation, local development, and management of traditional cultural landscape under protection in Slovakia. The research was carried out in the context of efforts by the State Nature Conservancy of the Slovak Republic to develop and improve its methodology for participatory management of protected landscapes in the Carpathians. As part of the research, a joint team of Slovak and Swiss researchers carried out baseline assessments of selected protected areas concerning their ecology, society, and economy. The specific research approach adapted to the transition context of Slovakia also included facilitation of participatory processes with stakeholders in selected large protected areas to negotiate ways of linking nature and landscape conservation with economic development. Moreover, a joint financing mechanism enabled to implement small innovative projects related to cultural landscapes proposed by local stakeholders – so-called Seed Money Actions (SMAs). They are expected to bring tangible and lasting benefits to local stakeholders, mostly farmers, within and around protected areas. SMAs included landscape conservation efforts such as mowing of pastures, as well as projects to improve tourism infrastructure or other actions proposed by local mayors or stakeholder groups.

Keywords: transdisciplinary research, participatory management of cultural landscapes, parks and people

CLOSED MINE WASTE DEPOSITS IN SLOVENIA AND THEIR IMPACT ON LAND DEGRADATION

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Slovenia has a rich mining and ore processing history, which consequently resulted in significant amounts of mine waste material being deposited in the environment. There are more than 170 closed or abandoned metal and coal mine waste deposits in Slovenia that could cause degradation of the environment due to their chemical and physical state. In order to assess negative environmental impacts of mine wastes, the contents of potentially toxic elements (PTEs: As, Ba, Cd, Co, Cr, Cu, Hg, Mo, Ni, Pb and Zn) and their solid forms in sediments of streams that are draining mine waste deposits, as well as geomechanical stability of mine waste deposits, were studied. The study showed that 37 metal mine waste deposits in 4 former mining areas (Mežica, Idrija, Litija, Pleše) have significant impact on stream sediment chemical composition. Contents of PTEs are significantly increased and they exceed guideline values by more than 2 times. Solid forms of PTEs are mostly ore minerals and secondary weathering products, which are partly unstable in stream water. The field engineering geological survey showed that according to erosion and stability issues, 20 metal mine waste deposits in 3 former mining areas (Mežica, Litija, Pleše) represent potential risk to the environment due to instability and material washout.

Keywords: closed mine waste deposits, chemical composition, stability, environmental impact

THE URBAN NETWORK OF THE ROMANIA'S BORDER AREAS. COMPETITIVENESS, COHESION AND SUSTAINABILITY

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The border areas of Romania include 898 Local Administrative Units (LAU), of which 88 are urban. Romania has border line (2956.4 km) with Bulgaria, Republic of Moldova, Serbia, Ukraine, Hungary, of which 63.5% is Non-European Union border. According to the population structure 51.6% of the total population is urban. The current paper is seeking to identify the territorial disparities in the urban development of the Romanian border grouping 18 relevant indicators by 3 secondary indexes in order to reflect the main territorial development aspects: competitiveness, cohesion and sustainability. Finally, the authors were able to compute secondary indexes and territorial development index (ITD), revealing the levels of territorial development. In the towns of Romania's border areas, the high development is linked with competitiveness indicators, mainly to those related to demographic size, to the big dependency of tertiary sector employment, and to the high levels of investments, the Western and Central regions of Romania having the advantage of the proximity of the Western European markets. The underdevelopment is linked with unemployment, with low level of technical-urbanistic endowment and with health care services, the less developed areas being concentrated in the Eastern and Southern part of the country. Generally, the outcomes of the current study are in line with entire Romania's territorial disparities, embedded in the historic background of the country.

Keywords: urban network, competitiveness, cohesion, sustainability, border areas, Romania

FARMING AND LAND USE CHANGES ON THE ARCTIC MARGINS: GLOBAL TRENDS AND CASE STUDY OF TWO RUSSIAN REGIONS

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Despite of the harsh climate and insufficient logistics, farming was historically developed on the territories of the Extreme North, and remains a significant economic activity in many Nordic regions of the world. Agricultural practices on the Arctic margins can be classified as: aboriginal (1), traditional farming expanded during spontaneous colonization before the XX century (2), intensive farming established for food supply of workers during the period of massive development of mining industries (3), innovative forms of farming as urban agriculture (4). Combination of these types of agriculture determines the character of land use, and their superposition becomes more and more frequent, which increases pressure on the environment and often generates social and economic conflicts. Farming on the Arctic margins in different countries faces similar social, economic and environmental challenges, but the impact of each of them on land use properties can be specific depending on national level of economic development, size and regional diversity of the country, regional policy, etc. In this paper we compare modern development of farming as a driving force of land use changes in different countries owing territories in the Arctic, and focus on results of detailed study of two northern subdivisions of Russia: Republic of Karelia and Republic of Sakha (Yakutia).

Keywords: land use, farming on the margins, traditional and innovative agricultural practices, Arctic, Russia

MANAGEMENT OF CULTURAL LANDSCAPES THROUGH ECOMUSEUMS AND LANDSCAPE OBSERVATORIES – AN EVOLUTIONARY PERSPECTIVE, ILLUSTRATED BY THE NEW CONCEPT OF BALATON ECOMUSEUM

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Cultural landscapes are continuously changing due to both natural and anthropogenic factors, which require a holistic and interdisciplinary approach to conservation and a new definition of the concept of cultural landscape. This interdisciplinary approach is realized through linking ecomuseums and landscape observatories in one holistic system. An ecomuseum is an area within a cultural landscape developed as an open-air museum, linking the natural environment and its ecosystem services, the cultural heritage components of the landscape into one holistic unit, focused on the identity of a place, largely based on local participation and aiming to enhance the welfare and development of local communities. The Balaton Ecomuseum will be unique, since the whole cultural landscape of the Lake Balaton area with all its components will constitute the touristic product structure of the ecomuseum. Management of cultural landscapes requires continuous monitoring and decision support systems in order to maintain the sustainability of regional development plans and the development of touristic strategies. For this purpose, landscape observatories are the most suitable constructions, which are meeting points between governmental bodies, local/regional authorities, formal organizations, university research and education, education system, the civil society organizations, and trade organizations to increase knowledge and stimulate cooperation.

Keywords: cultural landscape, ecomuseums, landscape observatories, ecosystem services

TREELESS MOUNTAINS IN WESTERN JAPAN DURING THE MID-20TH CENTURY AND THEIR RELATIONS WITH CONTEMPORARY NATURAL HAZARDS AND LAST GLACIAL ENVIRONMENTS

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Japan is located in a humid temperate region and its climax vegetation is forest. Therefore, most mountains in Japan are covered with trees. However, in some mountains adjacent to residential areas of western Japan, treeless bare slopes widely occurred in the 1940s to 1960s. During World War II, Japanese people intensively used wood from forests for fuel because availability of coal and oil decreased, causing treeless areas in various places. Vegetation in most of these areas recovered quickly after the war because wood usage reduced. However, in granitic and rhyolitic areas in western Japan, vegetation did not recover until extensive erosion-control work was performed. These areas are characterized by highly erodible regolith on slopes provided by bedrock weathering and occasional drought, leading to lower slope stability and reduced tree healthiness. Therefore, these areas have high susceptibility to contemporary landslides and debris flows even if slope angles are relatively low. The serious rainfall-induced sediment disasters in and around Hiroshima in July 2018 may be related to this condition. In addition, these areas tended to be naturally treeless in the Last Glacial Maximum when aridity increased, and hence some types of periglacial landforms and deposits formed although the areas were far below the tree line determined by temperature. This indicates that the areas have both modern and historical uniqueness in terms of land cover and related geomorphic processes.

Keywords: treeless areas, World War II, natural hazards, last glacial, Japan

BIOREGIONAL APPROACH IN LANDSCAPE PLANNING FOR CULTURAL LANDSCAPE PRESERVATION

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Increasing human population need more land. It caused enviromental change within the region, as well as the structure of space and natural process behind. The environment control have been done to the region was not succeeded in solving those problems. The reason behind those failure is lack of consideration both natural boundaries and cultural domain, simultaneously, and ignored the fundamental relationship between people and nature, especially in term of processes in shaping the landscape.

Facing those reasons of failure, the consideration both of the boundaries of natural and domain of culture has strong influence to solve the problem. Bioregion is one concept that consider, both nature and culture, simultaneously in determine region. Base on bioregional approach, the landscape planning was implemented for cultural landscape preservation. The bioregion characteristics were classified into bioregional unit, landscape unit and place unit. The assessment was done by matching those the bioregion class with planning criteria for cultural landscape preservation. The result proceed to be developed into landscape planning for cultural landscape preservation.

Keywords: bioregional approach, bioregional unit, landscape planning, landscape unit, place unit

CULINARY TOURISM EXPERIENCE AS DRIVER OF MEDITERRANEAN LANDSCAPE CHANGE

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Landscape can be essential element of the culinary tourism experience since it provides biotic and abiotic setting for growing local agricultural products. It can also be important (but not essential) element of experience's improvement by providing special atmosphere, rich historical and architectural context, peace and closeness of the nature to the visitors.

Inversely, culinary experience tourism can induce relevant changes in the landscape by enhancing biodiversity and stimulating environmentally friendly behavior of visitors, sustaining existing cultural landscape, promoting sustainable food production, raising awareness about specific territories and encouraging visitor's sensitization about the natural resources.

This paper discusses ways in which culinary heritage tourism is transforming, reviving and preserving (predominantly) agricultural landscape in Mediterranean. The data for this study came from in-depth qualitative analyze of 18 culinary tourism experiences, originating from 8 Mediterranean countries. Different types of experiences have been considered (e.g. events, festivals, fairs, guided tours, workshops, tastings, museums) and all of them exhibited close link to local agricultural production and landscape features of the area.

Keywords: culinary tourism experience, landscape change, local food products, biodiversity, Mediterranean

LAND USE IN KARST LANDSCAPES: A CASE STUDY OF BELA KRAJINA

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The main goal of this research was to analyse the spatial processes and patterns across temporal and spatial scales to unveil the landscape changes in Bela krajina. Bela krajina is located in the south-eastern part of Slovenia, along the Slovenian-Croatian border, covering 595 km². Spatial and temporal analyses were undertaken on two case studies which were selected for an in-depth study of landscape changes over the last 200 years based on historical sources. The case studies were selected to represent the settlements of Adlešiči and Bojanci. These case studies show ecologically and historically distinctive cultural landscapes, formed by a long-term interaction between natural conditions and human influence. Even though these sites have different management regimes they are both affected by difficult karst terrain and isolation. The results confirmed the land abandonment and overgrowth of agricultural land in both case studies, however at different rates. Agriculture in Bela krajina faces challenges. It is not competitive due to soil and relief conditions, poor economic and financial power of farms as well as the unfavourable age and education structure of the local population. As a result, abandonment of farming and reduction of farms is taking place. Even though the economic significance of farming is low and has decreased in the last decades in favour of other activities, it is of vital importance for landscape stability and the sustainable development of the region.

Keywords: land use changes, karst terrain, karst features, Bela krajina, Slovenia

DISPUTES OVER LAND USE AROUND CULTURAL HERITAGE OF RELIGIOUS INTEREST: CASE STUDIES IN URBAN AND RURAL TERRITORIES IN NORTHERN ITALY

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Religious heritage sites are an important cultural patrimony in the Veneto region, varied for age, architectural style and quality. It includes individual buildings as well as building complexes, and constitutes a testimony spread in the region shaping landscapes and identities. Such sites are often popular destinations. Many, though, are less known and visited, whilst having a tourist potential (largely unexpressed) on which a sustainable and territorially rooted local development project could be based. These assets have suffered due to unsustainable territorial planning determining sprawl and disputes over land use, inducing landscape transformation. More efforts are required to study the exploitation of such heritage as tourist resources according to an integrated perspective, territorial, tourism as well as landscape-related.

We report here on case studies at micro level carried out using a mix of qualitative, quantitative and GIS-based research. The aim is to reflect on the need to promote – in particular via participatory Destination Management mechanisms - models of development that rest on the scenic quality of areas rich in (religious) heritage, to be leveraged as a distinguishing factor of attractiveness. Recent national and regional strategic plans as well as of LAGs have been geared towards giving it a more important role. Even so, there emerges the need to set up or strengthen policies adequately integrating a territorial and landscape perspective.

Keywords: religious heritage, sustainable tourism, landscape and land use change, integrated policies, Venetian region (Northern Italy), GIS

SMALL AGRICULTURE IN THE VON HUMBOLDT AMAZONIAN FOREST, PERÚ

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This research analyzed the agriculture expansion in the buffer zone of the national forest Alexander von Humboldt, situated in the Amazonas basin in north of Perú. This landscape transformation from a forest to an agricultural landscape, is consequence of the different political and local development. The study area was for the wood industry in Perú, that is the reason because the forest area received the denomination as National Forest with the propose of development the wood industry. The road construction, terrorism and the subsequent migration from the sierra, the illegal coca agriculture, and the coca substitution program have transformed this area in a small agriculture landscape. How can this area contribute to the ODS development goal and contribute to the sustainable development that's contribute to a better economic and social development for the small farmer? To answer this question survey and interview with the local people, industry and Government to define the principal change that linked the landscape transformation. To the analyzed satellite photo, soil fertility compares forest and agriculture parcels and the political change will be discussed and analyzed.

Keywords: landscape, Amazon forest, small agriculture, deforestation

DETERMINATION OF ACCESSIBILITY AND POTENTIALS OF CULTURAL TOURISM RESOURCES IN KANO STATE-NIGERIA

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This study examines the determination of accessibility and Potentials of Cultural tourism resources in Kano State-Nigeria. The data for the study were obtained from primary and secondary sources. Twenty-two major cultural tourism resources were used in the study. The data were collected using checklist, interview and observations techniques. ArcGis 10.3 version and SPSS version 17.0 were used for the analysis. The study revealed that, Seized warfare Instruments has the longest distance of 77.84 km while the shortest distance is 4.60km at Sabuwar Kofa (Municipal City gate and walls). Gidan Dan Hausa was found to have great potentials to meet market demand. The study recommends that Government, private sector and individuals should gear up towards developing cultural tourism resources in order to diversify the economy of Kano. Good and qualitative road network that would link cultural tourism destinations should be given consideration in the state. Provision of adequate facilities through public-private partnership at each destination should be encouraged. There is need to provide measures that would protect the cultural tourism resources for future use.

Keywords: cultural tourism, accessibility, facilities, tourist transit camp and GIS

LEGISLATIVE TOOLS OF SOIL PROTECTION AND LAND POLICY IN THE EU WITH SPECIAL FOCUS ON HUNGARY

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Soils are one of the most important natural resources on the planet, but their ecological importance is often greatly underestimated. The regulations on soils are not sufficient in all cases to ensure an adequate level of protection in the European Union. Despite the existing protective legal requirements soil degradation is continuous. The persistence of population growth spells the need for more arable land, but as a result of the stressful impacts caused by people we are running out of useable topsoil. In the presentation the EU land policy with special focus on Hungary will be summarized in three highlighted aspects: (1) soil-protection, (2) land use, (3) land tenure, and (4) land administration.

Keywords: soil protection, land policy, regulations on soils, land tenure, land management, administration

CONSEQUENCES OF LARGE SCALE AFFORESTATION ON HUNGARIAN LOWLANDS

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Forest cover increases continuously, due to afforestation campaigns in Hungary. The new afforestation alters agricultural management, landscape, settlement and road structure especially on lowlands. Moreover the new forest blocks are mixed with arable lands and grasslands form forest-agricultural complex habitats on landscape level. These man-shaped landscapes provide new and suitable habitats for many species, especially big games and cause permanent expansion and population increase of red deer (*Cervus elaphus*), wild boar (*Sus scrofa*) and golden jackal (*Canis aureus*). The increasing density and expanded habitat use cause series of human wildlife conflicts, eg. game damages and risks for traffic, that seems to be more emphasised, than the possibilities of sustainable use of new natural resources. Recent sectoral and isolated management measures do not provide satisfactory solutions for these problems. Successful management on ecosystem level, based on holistic impact assessment and integration of diverse conservation and socio-economic interests are still missing.

Keywords: afforestation, game, human-wildlife conflicts, landscape management, holistic impact assessment

PRESCRIBED FIRES IN CATALONIA: MANAGEMENT AND RESEARCH

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Prescribed fires have been used in Catalonia (Spain) since 1999 in order to achieve different objectives, such as managing fuel accumulations, regenerating certain plant species, improving habitats for mammals, facilitating animal grazing of shrub lands or improving soil fertility. The prescribed fires are implemented by the GRAF (Forest Action Support Group) of the Firefighters service of the Generalitat de Catalunya. The effects of these prescribed fires on soil properties have been studied by researchers of the University of Barcelona since they start to be executed. Four research projects, one of them starting in 2017, will be focused on the short- and long term impacts, mainly, in the effects on soil physical and chemical properties after these prescribed fires. It is also important to know, first: how often could be made a prescribed burning in a same area without negative effects and if there are land uses that can be more resilient to fire than others. Second: the temporal effects of prescribed fires and the impacts of cattle on soil and the vegetation regrowth. Presently, six plots, burned for different proposes and located in different areas of Catalonia are being monitoring for this research. Each plot has a different land use, and burned periods. The results are different in each plot, depending of the land use, but it is determinant the periodicity of the prescribed fires. The effects of grazing in some plots also must be taken into account.

Keywords: forest management, soil, fire recurrence, livestock

IMPORTANCE OF TRADITIONAL METHODS OF BIODIVERSITY CONSERVATION AND LAND MANAGEMENT AMIDST CHANGING ENVIRONMENT IN THE THAR DESERT REGION OF RAJASTHAN, INDIA

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Rajasthan, occupying around 10 percent of the geographical area of India, lies in the Arid Zone of the country and houses the Great Indian Desert, the Thar Desert. This ecologically sensitive desert ecosystem is currently subjected to increasing human and livestock pressure. Increased development in this region has led to increased population growth which in turn has led to agricultural intensification to feed the growing human and livestock population. In this paper, the author has used Markov Chain analysis to see the direction of change in the land use pattern in the districts covered under the Thar Desert Region. The results show that there has been a diversion away from various land uses in favour of cultivation. Shift away from forests and permanent pastures could have serious implications in terms of desertification. This can also have serious implications on sustainability of the livelihoods and extent of poverty of the people in these districts. Against this backdrop, the author has tried to analyze the relevance of sacred groves as a promising traditional method for forest conservation. The Sacred Groves are managed by village communities and these communities establish their own rules to protect the groves. They play an important role in biodiversity conservation by preserving the endemic, endangered and economically important plant species. However, most of them are being destroyed due to modernisation and mismanagement.

Keywords: biodiversity conservation, sacred groves, land use

DEPOPULATION AND ABANDONMENT OF AGRO-LIVESTOCK ACTIVITIES: LAND USE AND LAND COVER CHANGE AND THE EFFECTS ON VULNERABILITY TO FOREST FIRES IN THE MOUNTAINS OF THE SOUTHERN IBERIAN SYSTEM (SPAIN)

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In the Iberian system as a whole there has been a serious depopulation of the rural world which, among other things, is causing the abandonment of the land, leading to the closure of much of the agricultural and livestock activities, and the accumulation of vegetable fuel in the environment, either because of the lack of grazing, or because of the recovery of the wild vegetation in the abandoned agricultural lands.

On the other hand, in the southern Iberian system, fire has been one of the oldest and most efficient tools in the history for land use management and has contributed to shaping a landscape of notable cultural and ecological diversity.

However, the combined impacts of depopulation and abandonment processes on land cover have introduced certain changes that affect the role and our perception of fires, so that forest fires are no longer just another process in the natural system but a serious threat to ecosystems and society.

Using GIS techniques and statistical analysis, we conducted a quantitative assessment of land cover changes and their relationship with the High Fire Risk Zones in this mountain territory, during the period 1991-2018, according to seasonality and some characteristics of the territory such as altitude, slope and orientation.

This study addresses the question: what specific changes in the southern Iberian system's traditional cultural landscapes have led to the current perception of forest fire as a risk or threat?

Keywords: depopulation, land use and land cover, forest transition, High Fire Risk Zones, Iberian system

PHOTOVOLTAIC FARMS IN THE ROMANIAN PLAIN. LAND USE CHANGES AND ENVIRONMENTAL CONSEQUENCES

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Under the EU energy efficiency targets Romania has assumed, the use of renewable energy (i.e. solar) has been progressively increasing. The most important solar energy resources are found in the lowlands in southern and south-eastern parts of the country mainly in relation to the high values of the radiation and sunshine duration. The paper is focused on Romanian Plain which has the best environmental conditions (climate, topography) to support the development of photovoltaic (PV) farms. Although it provides a clean and sustainable energy source, solar energy proved to have direct and indirect environmental impacts. Thus, the aim of this study is to assess the impacts of PV farms on land use/cover and related environmental consequences (e.g. soil degradation, habitat fragmentation). The authors have mapped 110 PV farms covering 1,393 hectares, mainly on arable land (79%). The authors selected some general categories of impacts (e.g. land use&landscape, ecosystems, climate change) for which the main consequences have been identified and analysed. In addition, several indicators have been computed (e.g. share of PV farms from land use/cover categories or main soil types; distance of PV farms to protected areas). The overall results of the study help understand the interactions between the use of renewable energy sources and environment to support sustainable development.

Keywords: land use/cover change, photovoltaic farms, Romanian Plain

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MONITORING AND PREDICTING THE SPATIOTEMPORAL LAND USE/COVER CHANGES IN THE TOKYO METROPOLITAN AREA

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Land use/cover (LUC) change has attracted extensive interest as one of the expressions of urban development, which has affected urban planning, environment, economic, etc. Simulating future LUC changes is of great importance for urban planners and decision-makers to maintain a sustainable environment, especially in metropolitan areas. Although some previous studies simulated future LUC composition with high capacity, these are less successful and still require further investigations. In this study, the Tokyo metropolitan area is selected as the study area. The purpose of this study is to examine the spatiotemporal pattern of LUC changes in the Tokyo metropolitan area across 2001, 2007, and 2018. We consequently predict the changes in LUC in 2030 and 2050 by considering government policies, decreasing population, and environmental protection. We attempt to monitor the LUC changes from 2001 to 2018 as a first step by employing maximum likelihood supervised classification. Second, the total of nine modelling variables and LUC maps are prepared to simulate LUC maps in 2030 and 2050 by using the model of the conversion of LUC and its effects (CLUE-S). Finally, the scenario analysis is conducted to simulate three aspects: spontaneous, green space improvement, sub-region development. Our analysis does not only contribute to urban healthy and sustainable development but also provide significant insights into the promotion of city competence.

Keywords: scenario simulation, land use changes, Tokyo metropolitan area, sustainable development

GEOSYSTEMS-INDICATORS OF CLIMATE CHANGE AND CULTURAL LANDSCAPE RECOVERY IN TIGIREKSKY RESERVE AND ITS PROTECTIVE ZONE (ALTAI KRAI, RUSSIA)

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The Tigireksky Reserve was established in 1999 that contributed to recovery processes there. Economic development of the territory began in the XVIII century and led to a significant decrease in forest areas due to logging, fire and plowing. The northern part of the reserve is more anthropogenically transformed; for instance, 22 alien plant species are noted here, and 2 – in the southern part. In the northern part, the forest-steppe belt is expressed; its geosystems are climatic change indicators by the forest/treeless area ratio. Since 1838, a positive trend in surface air temperatures of 2.86°C/167 years in Barnaul was revealed (Kharlamova, 2013). According to ECMWF ERAI in 1979–2017, an increase in average temperatures of the year by 0.22°C/39 years (16.1%) and warm period by 0.57°C (5.8%) for the reserve was registered. The analysis of the landscape map (Chernykh, Zolotov, 2015) of the reserve northern part allowed us to rank the geosystems by Transformation (slightly – Ts, medium – Tm, heavily – Th), Recovery potential (high – Rh, medium – Rm, low – Rl), Indicativeness (Ih, Im, Il). To monitor solely climate changes, it is advisable to consider the geosystems Ts-Rh-Ih (0.2 km², 0.1%) and Ts-Rh-Im (18.9 km², 9.0%). For complex monitoring of climatic changes and recovery processes, the most promising geosystems are Tm-Rh-Ih (12.0 km², 5.7%), Tm-Rm-Ih (0.7 km², 0.3%), and Th-Rm-Ih (5.7 km², 2.7%). The research was supported by RFBR grant 18-05-00007-a.

Keywords: landscape mapping, anthropogenic transformation, indicativeness, forest/treeless area ratio

THE AGRICULTURAL LEXIS IN THE WESTERN AND EASTERN PARTS OF THE GORIŠKA BRDA TERRITORY FROM THE POINT OF VIEW OF THE SLAVIC-ROMANCE LANGUAGE CONTACT

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Each language, whether national or local, has a strong symbolic value for its speakers, as it represents a bond with the community's history, its ancestors and its cultural values. Furthermore, there is a tight relationship between language and the territory where it is spoken, as geographical features have a great influence on the way of life of the group and consequently, its language.

In this frame, the paper presents the comparison of the lexis of the semantic fields "a field" and "an orchard" as used in the western part of the Goriška Brda territory compared to the lexis for the same domain used in the eastern part of the Goriška Brda territory from the point of view of word borrowing. My research into the topic up to now has shown that the agricultural lexis between different parts of the Brda territory differs especially in the proportion of the loanwords (from or through the neighboring Friulian dialects) compared to the originally Slavic words.

The lexis will be gathered with the help of a specialized questionnaire and presented as dictionary entries with a section on the origin of the lexemes, and – with loanwords – the source of borrowing. My research in this field has also shown that the Briško dialect contains older loanwords, borrowed from the Middle High German, e.g. šubla (mhg. Schûvel) 'shovel', which indicates that at a certain period of time, the innovations in agriculture came predominantly from or through the German language.

Keywords: Goriška Brda territory, agricultural lexis, Slavic-Romance language contact

MAINTAINING OF TRADITIONAL LANDSCAPES AND CONSERVATION OF ENDANGERED BUTTERFLY FALSE RINGLET COENONYMPHA OEDIPPUS (LEPIDOPTERA: NYMPHALIDAE: SATYRINAE) – IS THERE A POSSIBLE AGREEMENT?

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False Ringlet is one of the twelve highly endangered species of European butterflies which population density continues to decline severely. In Slovenia, species occupies two rather different habitats. First, it inhabits wet habitats such as wet meadows in Ljubljansko barje and secondly occupies also other, radically different habitats, overgrown dry grasslands in different successional stages in western part of Slovenia (Slovenian Istria, Karst and Goriška Brda). In the last decade, a major decline in the distribution, habitat area and population size of the species has been detected due to destruction, fragmentation and/or a reduction of habitat quality caused by agricultural intensification and on the other hand abandonment of use. With comparison of all available map records of locations where False Ringlet exists now and where it was present until recently we will show how changes in landscape affects its populations. False Ringlet is an indicator species and it reacts very quickly to changes in the environment and as a consequence of its short lifespan. We believe that maintaining of traditional landscapes (traditional or at least extensive agriculture) could be a good conservation practice for this endangered species. Also in this stage it is crucial to establish a successful management for this unique butterfly with very uncertain future if no conservation acts will soon take place.

Keywords: endangered butterfly, habitat destruction, management, conservation

STUDYING HISTORICAL ARCHIVES TO SUPPORT ECO-FARMERS' GRASSLAND MANAGEMENT IN BOHINJ, JULIAN ALPS: PRELIMINARY RESULTS OF AN HISTORICAL INVESTIGATION FOR A TRANSDISCIPLINARY ENDEAVOUR

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Some parts of the cultural landscape in Bohinj, eastern Julian Alps, are still managed in a way, to a certain degree resembling historical agriculture. However, practices of grassland management have changed since mid-19th century (abolishment of profits à prendre, advances in agronomy, decreased economic importance of animal husbandry in the region etc.). Many of these discontinuities have made agriculture less labour-intensive and they have raised yields. However, they have also had strong impacts on agroecosystems and in some cases more attention should have been paid to local traditional ecological knowledge during the implementation of novelties, in order to make farming more sustainable. An example is the practice of spring grazing in meadows, which not even the eldest people in the studied area can recall – but, recently, it was introduced (re-introduced!) to a couple of farms. It depended very much on local environmental conditions in connection with timing and duration of spring grazing, if ecological impacts of spring grazing in meadow ecosystems were predominately positive or negative from an agricultural point of view. By analysing 17th-century, 19th-century archival records and oral-history-interviews we have been identifying historical evidence-based best practices. After the conclusion of the historical investigation, a workshop with local eco-farmers will be organized and they will be asked to provide their feed-back, what they can learn from historical data.

Keywords: environmental history, traditional ecological knowledge, long-term evidence-based best practices, ecological animal husbandry, Julian Alps

POSTER PRESENTATIONS - Abstracts

SPATIO-TEMPORAL CHANGE OF LAND USE FOR DECEASED IN URBAN AREAS OF CHINA SINCE THE MIDDLE OF THE 20TH CENTURY

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Land use after death, generally expressed in the form of a grave, is a universal land use for humankind. In urban areas where mass deaths occur, land use after death has been formed according to the culture and values of the region and the times. The Communist Party of China started to eliminate the traditional values and customs of citizens and society in the mid-20th century based on its socialism. It also removed the graves and cemeteries located surrounding the built-up area at the time, and basic urban facilities such as hospital and education used those land. After the introduction of the reform and open policy in 1978, city official newly developed a large number of the large-scale cemetery in suburban areas of urban China that are continuing rapid economic development and population growth. In modern times, in response to the rapid increase in the number of deceased people, cremation promotion and small area tombs are being developed to save land resources. Furthermore, as a means for keeping the ultimate land resources, maritime ash scattering is being promoted. This report focuses on the relationship between the actors involved in land use after death and the institutional constraints such as the land system and discusses the change in time and space over land use for deceased in urban areas of China.

Keywords: policy, values, land resources

THE TRANSFORMATION OF CULTURAL LANDSCAPES UNDER LAND USE/COVER CHANGES IN THE MEHEDIŢI PLATEAU GEOPARK, ROMANIA

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The socio-economic context that have affected the Romanian territory over the past decades resulted in spatial and structural transformations (e.g. land use/cover changes, habitat expansion) with significant impacts on the traditional cultural landscapes, especially in the protected areas located in hilly and mountain regions. The study area, MehediŃi Plateau Geopark (Category V IUCN: Protected Landscape/Seascape) is located in the south-western part of Romania and covers 106,000 ha. It preserves natural habitats, spectacular karst relief, thermophilous plant and animal species and several sites of historical and cultural interest. The paper aims at relating land use/cover changes with the transformation of the specific traditional cultural landscapes in relation to the key underlying factors: deforestation, tourism, grazing, but also afforestation or management (e.g. IUCN, Natura 2000). The spatial and statistical analyses rely on LANDSAT satellite images (1990, 2000, 2018) aimed at assessing land use/cover changes using some relevant landscape metrics (binary change index and trend index). The main outcome (landscape transformation matrix) will be useful for understanding the spatial dimension of landscape dynamics and the resulted environmental consequences in order to provide opportunities for the sustainable valorisation of cultural heritage through recreation, tourism and wellbeing.

Keywords: cultural landscapes, land use/cover changes, landscape metrics, MehediŃi Plateau Geopark, Romania

WINE CULTURAL LANDSCAPE MANAGEMENT IN A TRADITIONAL WINE REGION OF HUNGARY

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Agricultural landscapes with historical hillside cultivation methods of vineyards, has a touristic, economic and environmental value on the Balaton uplands, however it is becoming increasingly important to apply sustainable cultivation methods to today's adaptation to climate change impacts on this erosion exposed lands. The long-term field experiment we examined has compared the effects of different soil covering methods on field exposed to soil physical (soil moisture), chemical (absorbable nitrogen content), biological (enzyme activity: Fluorescein Diacetate Hydrolysis (FDA) and Dehydrogenase (DH), Most Probable Number (MPN) of bacteria and fungi) and economic (yield) parameters. According to our results, the mulching and covering with organic plant wastes (CAPHRAG) achieved the most positive effect on the studied parameters and effectively reduced its exposure to erosion to the plantation.

Keywords: landscape management, viticulture, soil covering, cover crop

TOPOGRAPHIC WETNESS INDEX USABILITY FOR THE IDENTIFICATION OF SOIL MOISTURE CONTENTS IN SW HUNGARY

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Runoff coefficients in hilly areas are often profoundly influenced by antecedent soil moisture contents at agricultural catchments. However, data availability on the spatial distribution of soil moisture contents is often limited. Therefore, the estimation of soil moisture spatial distribution based on topographic position may help to overcome issues caused by data shortage. The topographic wetness index (TWI) may serve as an important indicator for the identification of sites of high and low soil moisture contents in areas of high relief. The aims of the current study included the determination of (i) the influencing factors on field soil moisture contents, (ii) the differences of soil moisture budgets at three study sites and (iii) the applicability of TWI in soils of clay loam texture in the loess plateaus of SW Hungary. TWI was determined using SAGAGIS and a 1 x 1 meter DEM model obtained by LIDAR survey. Our findings revealed significant differences in soil moisture budgets among the three studied places. Our results indicated that the location of areas of high soil moisture contents are not only controlled by texture and slope positions above the valley floors, but also by distances from lakes or streams, elevation differences between the highest and lowest points of the studied sites and aspect.

Keywords: Topographic Wetness Index, soil moisture, spatial analysis

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CREATING HAZARD MAPS OF GRASSLAND DEGRADATION UNDER THE IMPACT OF OVER-GRAZING IN THE HEIHE RIVER BASIN, CHINA

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Inland river basins in arid to semi-arid regions are subject to shortage of water resources. How to balance economic development and ecosystem conservation for sustainability is vitally important in such basins. In the upstream area of the Heihe River, the second largest inland river in northwestern China, nomadic national minorities keep animal husbandry as the primary production activity, and over-grazing threatens grassland resources. Therefore, understanding hazards and risks related to grassland degradation is essential for the area. This research aims to investigate the impact of over-grazing on grassland degradation in the Heihe River Basin. Geographic Information Systems (GIS) were applied to data processing and spatial analysis using land use and DEM data. An agent-based model (ABM) was employed to simulate the grazing processes and the Dyna-CLUE (Dynamic Conversion of Land-Use and its Effects) model was adopted to examine the spatial distribution of grassland degradation. The results show that over-grazing capacity and grazing patterns simultaneously result in different levels of grassland degradation. The degradation tends to occur in the junction areas of the seasonal meadows and areas near the basin divide. The results have been presented as hazard maps of grassland degradation. Recommendations regarding sustainable development have also been suggested to support the decision-making for grassland reservation and grazing management in a spatial context.

Keywords: grassland, overgrazing, land degradation, hazard maps, Northwestern China

VILLAGE OF BREGINJ - IMAGE-BASED DIGITAL RECONSTRUCTION AND LANDSCAPE CHANGE ANALYSIS

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The village of Breginj in Slovenia was an important national monument, which was severely damaged by earthquakes in 1976 and subsequently demolished. This paper presents the generation of a 3D model of the village from historic aerial photographs and an object-based landscape change analysis. The model is based on Structure-from-Motion (SfM) processing of six aerial photographs taken shortly after the first earthquake in May 1976. We managed to obtain a digital approximation of the village and its surroundings with an overall positional accuracy of better than 2 meters. However, this is merely the first step toward creating a 3D settlement and reconstructing its landscape.

Post-earthquake actions and events thoroughly changed life in the village and the direct effects of this can be observed through a landscape change analysis. We used object-based classification of aerial imagery from several periods in order to obtain sequences of land cover during the last four decades. This adds a quantitative dimension to the visually observable complete landscape transformation. In the last four decades, cultivated land and pastures have been colonised by forest, which covers 21 % of former arable land and 66 % of former pastures.

Keywords: aerial photographs, 3D model, Breginj, earthquake, digital reconstruction, cultural heritage

FIELDTRIPS

SLOVENIAN MEDITERRANEAN LANDSCAPES

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Miha Koderman

Sečovlje Saltworks (24.09.2019)

The Sečovlje salt pans are the largest on Slovenian coast with the surface of 593 hectares. The river Drnica (old riverbed of Dragonja river) divides them on northern part *Lera* - in operation, and southern part *Fontaniggie*, where salt production ceased in 1967. The salt pans of Sečovlje, Strunjan and the former salt pans of Lucija were historically forming The Piran Salinas. The saltmaking in Piran area dates back to antiquity. Written sources date back to 13th century.

The Sečovlje salt pans is a man made cultural landscape created on former wetland. In the past the salt was of outstanding strategical importance since it was the main ingredient for conserving the food. Due to close dependency of salt production from microclimatic conditions, the creation and the design of salters' surfaces aimed to correct, rectangular geometrical design. The surface is composed by three geometrical elements: plane surface (salt field with the evaporation and crystallization pools), lines (canals with dykes) and points (salters' houses, bridges,

water gates and wind pumps).

The most important technological milestone in the salt production process happened in 1377. Inspired by the Dalmatian salters from the Croatian island of Pag, they started to make *petola* – a few millimetres/centimetres thick layer from gypsum, algae and minerals on the bottom of the crystallization pools or *cavedini*. *Petola* differentiates the crystallization pools from the evaporation pools since the layer protects the salt crystals contacting of sea mud on the bottom of the pools. From then on the salt from Sečovlje Saltpans is crystal clear, white and has good flavour without admixtures of sand and other impurities.

The economic development of Piran was for centuries based on the production and trade with the »white gold«. The Sečovlje salt pans were significant for the Republic of Venice since it provided the majority of the salt of The Piran Salinas, which provided one third of salt production of eastern Adriatic shore - alongside the saltworks in Trieste, Muggia, Koper, Rab, Pag, Ston and Ulcinj.



1. Fontaniggie

At the southern part of the Sečovlje salt pans called Fontaniggie, the salt was always harvested by medieval method. After abandoning of the salt production in 1967, the area started to transform into the wetland. This enabled permanent or provisionary shelter to numerous halophytic plants, birds and other animals. The Sečovlje salt pans became known as the largest coastal wetland and the most

important bird and fauna locality in Slovenia. It is the residence of 45 endangered plant species. 291 bird species were spotted in the area of which more than 80 species are permanently or periodically nesting. The Sečovlje salt pans is home of smallest known mammal by mass on the world, Etruscan shrew (*Suncus etruscus*). Due to the outstanding landscape and ecological values, a part of the Fontaniggie area of the Sečovlje salt pans was proclaimed the first wetland in Slovenia protected by the Ramsar Convention on Wetlands. The tradition of medieval salt production was revived at the part of the Fontaniggie area near the canal Giassi. In 1991 The »Sergej Mašera« Maritime Museum of Piran established The Museum of Salt-making at Fontaniggie. The salt-making skansen or open air museum successfully incorporated international voluntary work. For the efforts of preservation the cultural heritage the museum received The European Union Prize for Cultural Heritage - Europa Nostra Award for year 2003 in the category cultural landscape. This was the first Europa Nostra Award in Slovenia.

2. Lera

At the northern part of the Sečovlje salt pans called Lera, the salt was harvested by medieval method until 1904. The fundamental salt production unit was the salt field. This working unit was divided with more rectangular evaporation and crystallization pools, connected with the system of the canals, dykes and water gates. In each salt field one salters' family was responsible for the salt production. During the salt season the salters' family lived in the salters' house at the salt field. In 1904 at the era of Austro-Hungary the Lera area of the Sečovlje salt pans all smaller family production units were transformed into the one single large salt production unit. The salt production specialised on the three professions: water managers, salters and maintenance (masons, joiners, carpenters, electricians, mechanics).

Today the commercial salt extraction is carried out by the company Salt pans - Salt Production Ltd. (Soline pridelava soline d.o.o.), owned by a Slovenian national telecommunications operator Telekom Slovenia (Telekom Slovenije). In 2003 the company acquired the managing concession for The Sečovlje Salina Nature Park. The seat of the nature park is at Lera area together with the visitors' centre with multimedia presentation and the lookout tower.

Mediterranean Terraced Landscape in the Koper Hinterland (25.09.2019)

Typical of the Mediterranean world in general, and of Koper Hinterland as well, are terraced slopes. Land cultivation on flysch slopes becomes feasible only after terracing has been done. Land use was significantly influenced by political changes, since after the collapse of Austria-Hungary, the area was, in turn, part of three

different states. In contrast to self-sufficient farming that prevailed in the greater part of continental Slovenia in the 19th century, Istrian farming depended on the European wine- and oil markets, and, resultantly, land use changing was a very dynamic process. Wine-selling was the principal source of income for the population; wines from Istria rated high on the markets of the Austrian countries. The second half of the 19th century was affected by the decay of vineyards due to phylloxera plague. In France, the decay began already in 1868, and within a decade or a few years more, most of French vineyards were destroyed. Hence, the demand for the wines from other European regions increased. Since wine yields were low in mixed plantations, olive trees were cut down in Istrian areas and vineyards were enlarged. In addition, a great percentage of pasturing areas was then transformed to vineyards. At that time, the growing of olives declined as a result of reduced demand, so that Istrian oil was to a great extent sold as machine oil or oil for lamps. In 1880, phylloxera plague emerged in Istria as well and in a short time destroyed most of the vineyards which had reached the greatest extent only a few years earlier. Austrian authorities alleviated taxes for vineyards and thus intensely stimulated their restoration; restored vineyards were exempt from taxes for ten years. Consequently, the production of wine increased, which eventually led to wine crises. As a result, an ever greater number of owners began to abandon their recently revitalized vineyards or they transformed them into mixed plantations in combination with fruit trees. After the First World War, Istria belonged to Italy which is mainly a Mediterranean country and, consequently, competition in the sale of wine and oil increased significantly. Therefore, the inhabitants abandoned ever larger areas of vineyards and olive groves, and expanded the areas of fields. After the Second World War, political change occurred again when Istria came under Yugoslavia. Yugoslav policy was then hostile to agriculture because the stress was on industrialization. The newly built industry in Koper attracted younger labour from the surrounding rural areas, therefore the deficit of labour in agriculture was increasing. To make things worse, most of the terraces on steep flysch slopes were unsuitable for machine cultivation and there was shortage of people to be engaged in manual cultivation, which was also too expensive. Vineyard terraces were therefore increasingly abandoned, only those in the direct vicinity of settlements remained. The decrease in olive-grove areas was also related to frosts which affect olive trees in the Koper region every 20 to 25 years. After the severe cold in February 1929, the number of olive trees in this region drastically declined from about 300,000 to 120,000. In the past 20 years, cultivation of olive trees has been in constant increase. The demand for the quality Slovenian olive oil has been steadily increasing and its price is high; a large percentage of producers sell all their oil at home. The number of olive trees thus reached again the situation prior to the frost

of 1929. In the past two decades, in certain areas, reconstruction of cultural terraces has been started, which is mainly related to olive groves expansion.



3. Koštabona

The core of the village lies on a flysch ridge in Slovenian Istria, at the altitude of 257 m, about 15 km east of Koper. In the Census of 1869, 377 inhabitants were living in the village, the number declined in the 2nd half of the 20th century to 185, but the number has been slowly increasing since then. The population decline in the 20th century was related to the abandoning of agricultural areas. The place has been settled since prehistoric times, there was also a roman fort and shrine here. In Koštabona, there are three churches which reflect the historical importance of the village. Characteristic for Istrian villages is the connection of farmsteads one to another. The village grew inwards. When there was a need for a new dwelling or farm building, it was simply attached to the existing building. Because of this manner of formation and inheritance, the residential and farm functions, and above all ownership, of these clusters is quite interwoven. The main village street runs through the village, with the interior streets intersecting it at right angles. In contrast to central-European wine growing areas, the so-called mixed cultures (*cultura mista*) were typical of the Mediterranean area. It means that vine grew on the same field as other cultures, or fruit trees were planted in vineyards, and the combination of olive trees and vines was also frequent. There are still some cultura

mista plots preserved in Koštabona. Mixed cultures are shown in detail in the 19th Franciscan Cadastre, with essentially more numerous land-use categories in the Mediterranean part of the former monarchy than elsewhere.

4. Pomjan

Pomjan is situated at the top of a hill at the altitude of 360 m. There are 180 inhabitants living in the village. The first written source mentioning Pomjan is from the year 1028. There are beautiful views towards Adriatic coast, the historical town of Koper, its port and nearby Škocjanski zatok Nature reserve. The area around Škocjanski zatok was in the past a shallow bay around the Koper island. The formation of Škocjanski zatok is connected with urbanistic development of the town of Koper and its surroundings. It started with construction of salt pans. After 1279 in the era of Republic of Venice, saltworks around the bay expanded significantly. Before 1911, the production of salt has been totally abandoned due to salt price decrease. In the 1930s, the salt pans were drained, area filled up with soil and fields (bonifikas) formed. That's how Koper Island became connected with mainland. In the 1960s, the Port of Koper was started to be built in the immediate surroundings of the old town of Koper, spreading towards Ankaran. Škocjan Bay became more and more closed until it finally got lagoon character. The lagoon of today's Škocjanski zatok remains the very last witness, proving that Koper originally used to be an island. From 1998 Škocjanski zatok has the status of Nature Reserve with the surface of 122 hectares.

5. Erosion in flysch

Slovene Istria is predominantly composed of Eocene flysch and the soil is mostly carbonate rendzina. For studying soil erosion and sediment production erosion plots were installed. One-year measurements of soil erosion made on one-meter-square closed erosion plots revealed that the greater part of the annual erosion was caused by only a few major erosive precipitation events. Yearly interrill erosion was measured up to 9,013 g/m² (90 t/ha) on bare soil in an olive grove (inclination: 5.5°; average specific runoff: 23%), 168g/m² (1.68 t/ha) on an overgrown meadow (inclination: 9.4°; average specific runoff: 8%), and between 391 g/m² (3.91 t/ha) (inclination: 7.8°) and 415 g/m² (4.15 t/ha) (inclination: 21.4°) in a forest (average specific runoff: 6%). The amount of precipitation during measurements was slightly below the long-term average.

Eocene flysch rocks are highly susceptible to weathering, thus sediment production was measured in flysch badlands. Sediment production in the period 2005–2006 was up to 80 kg/m² and in the period 2008–2015 up to 40 kg/m², meaning that rockwalls in flysch badlands retreat from 20 mm up to 50 mm per year. Badlands

not only contain flysch walls but also slopes already eroded by erosion rills and gullies. A dam in one of the erosion gullies with the catchment area of 0.1 ha captured 20 tons of debris in fourteen months.

6. Truške: Organic winery Rodica

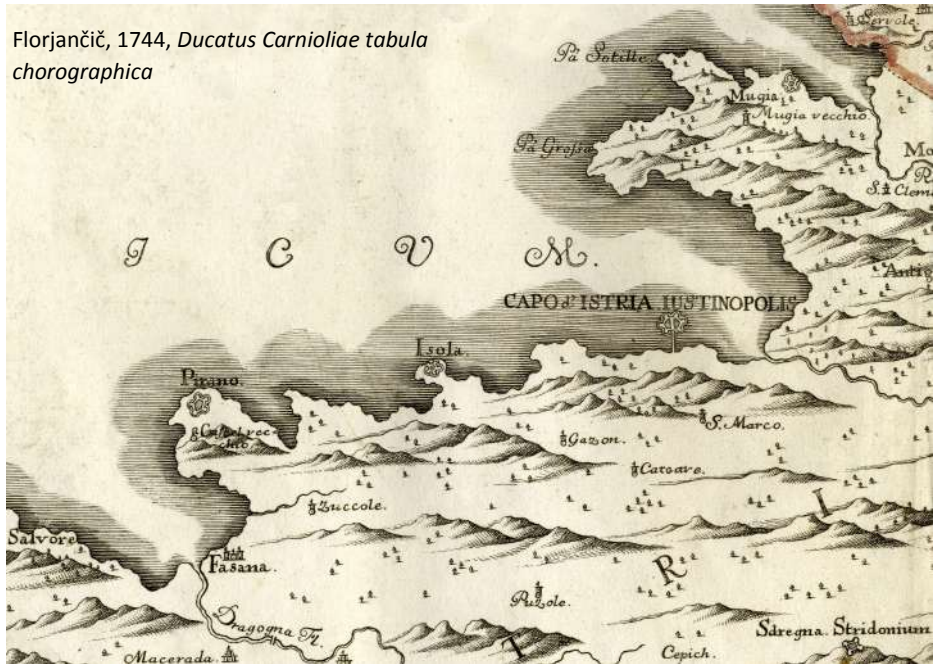
The Rodica organic farm and winery is a family estate located in the hinterland of Slovenian Istria, in the village of Truške, which is just above Marezige and 12 km from the town of Koper. The vineyards predominantly stretch on the terraces on the southern slopes of the Šavrini hills, with the altitude ranging from 250 to 350 m above sea level. Covering the area of 15 hectares, the farm grows 60,000 vines of mostly indigenous grape varieties, such as refošk (Refosco), malvazija (Istrian Malvasia) and rumeni muškati (Yellow Muscat), as well as international ones (Merlot, Cabernet Sauvignon, Syrah and Pinot Gris). The exposition and microclimate are ideal for the organic viticulture. The Rodica family gain the official certification for the organic production of grapes in 2009. Consequently, they have adopted the organic principles in the process of winemaking, with a combination of traditional techniques, modern technology, special individual knowledge and a personal touch of a winemaker. The wine offer includes four quality lines: the Classic, the Reservé, the Prestige and the Nature. The wines mature in a modern wine cellar, built in a traditional Istrian style. Its location on the top of the hill offers magnificent views over the Gulf of Trieste and the well-preserved nature of the Dragonja valley. With the hard and dedicated work of the whole family, the Organic winery Rodica has become one of the main wine-tourist attractions of Slovenian Istria.



Matija Zorn

Coastal Towns (26.09.2019)

Florjančič, 1744, *Ducatus Carnioliae tabula chorographica*



Coastal towns Ankeran, Koper, Izola, Piran, Portorož and Lucija represent the largest population centres in the region of Slovenian Istria. There are approximately 85,000 inhabitants living in this area, which is administratively distributed in four municipalities (Ankeran, Koper, Izola and Piran). Slovenian Istria is geographically part of the Istrian peninsula, the largest peninsula in the Adriatic Sea. Today, the peninsula is politically divided between Croatia, which occupies almost 90% of the territory, and Slovenia, with about 10% of the area, while a small section of the territory (less than 1%) belongs to Italy. Historically, the towns in Istria developed strong ties with the Republic of Venice (697–1797), who gradually annexed parts of Istria since the second half of 13th century on, and ruled this territory until the end of the 18th century. The area has traditionally been ethnically mixed, with Croatian, Italian and Slovenian speaking inhabitants. In the Slovenian Istria, Italians represent only a small proportion of the residents (less than 4,000), however they are recognized by the constitution of the Republic of Slovenia as a national minority, and have therefore several constitutional rights (among other the right to bilingual topography and use of the Italian language in all public institutions). Throughout the centuries, each larger town in the Slovenian Istria developed its specific economic activities. Piran prospered with the trade and production of salt in the salt ponds of Sečovlje since the 14th century, Portorož became officially classified as

a tourist destination in the Austro-Hungarian monarchy in the end of the 19th century, while Izola remained the centre of fishing industry until the recent decades, when this traditional activity was faced with low fish stocks. Fishing and salt production was also developed around Koper, which has been an administrative centre of the region with the seat of a diocese. Recently, tourism has become the leading economic activity in most of the coastal towns in the Slovenian Istria, which yearly attracts over 900,000 tourists with its impressive landscape diversity, favourable climatic conditions, preserved cultural heritage, as well as renowned culinary products.

7. Koper-Capodistria

Koper (Italian: Capodistria) is a town in the northeastern part of the Adriatic Sea with a history dating back to Roman times. The Latin name of the town is Capris (goat). Since the 8th century, Koper has the seat of a diocese. It was long under Venetian rule, which can be observed in every step you make through old medieval part of the town. When Trieste became a free port in Austro-Hungarian monarchy in 1719, Koper lost its monopoly on trade, and its importance diminished. It was assigned to the Austro-Hungarian monarchy (together with other towns in the present Slovenian Istria) after Napoleon's defeat and to the Kingdom of Italy after the First World War. After the Second World War, Koper was a part of Zone B of the Free Territory of Trieste, controlled by Socialist Federal republic of Yugoslavia. Most of the Italian inhabitants left the town by 1954, when the Free Territory of Trieste formally ceased to exist, and Zone B became part of the Socialist Federal Republic of Yugoslavia. With Slovenian independence in 1991, Koper became the only commercial port in Slovenia. Today, the municipality of Koper is home to over 50,000 inhabitants, who mostly work in logistics and trade, as well as in the field of education and research.

8. Fiesa

Fiesa (Italian: Fiesso) is a small settlement, located in the Municipality of Piran. Its main function is nowadays closely connected with tourism, as there are two hotels, camping site, apartments and several second homes found in the area. Fiesa is known for two artificial lakes, which were created in the first half of the 20th century as a result of clay excavation for the needs of the former brick factory. In 1989, this former industrial zone was proclaimed a protected area of nature, as Fiesa lakes and its surroundings represent an important living space of various animal and plant species, including about twenty endangered and rare species of dragonflies. The larger lake has a depth of up to 9 metres and is connected with the sea by a shallow canal. It is the only brackish lake in Slovenia. The smaller lake is located southwest of the main access road and is around 6.5 metres deep. Fiesa lakes nature protected area covers 2.1 hectares.

9. Piran cliffs

The most distinctive natural feature of Slovenian coast are flysch cliffs up to 80 meters high. The bottom part of the cliffs is exposed to constant erosion (abrasion) by the sea, while the upper parts are decomposed mostly by the changing weather conditions. At the foot of the cliffs, a characteristic shingle terrace has formed between the steep slope and the sea, which in places is up to seven meters wide. Under the cliffs is a constant stone-fall hazard.

Till now there were no direct measurements of coastal rockwall retreat but there were several attempts to estimate it:

- In the area of Valdoltra near Ankaran it was estimated that in the last 900 years the rockwall has been retreating at a rate of 6 mm/year.
- In the town of Piran at the western end beside the buttresses below the Piran church the rockwall retreat rate was estimated to 2 cm/year in the last 300 years, and at the eastern end beside the buttresses at 1 cm/year in the last 200 years. Also in Piran the edge of the cliff near the rectory of the Piran church rockwall supposedly retreated by 2 m between 1901 and 1990, which is more than 2.2 cm/year.
- With the help of archaeological finds it was estimated that since Roman times the eastern coast of Simonov Zaliv Bay has retreated 60 m or by around 3 cm/year.
- Using topographical analyses in the same bay the rockwall retreat was established to be 15 to 20 m between 1922 and 1958, or 0.42 to 0.56 m/year.
- In some places the root network of the trees hangs up to one meter over the upper edge of the cliff, indicating the distance the cliff retreated during the period of the growth of the tree.

10. Piran

The coastal town of Piran (Italian: Pirano) is situated on the Piran peninsula and located near the Gulf of Piran. The municipality of Piran borders with the municipalities of Izola and Koper to the east and north, while it also shares an international border with Croatia to the south and a maritime international border with Italy in the Gulf of Trieste. The municipality has just over 17,000 inhabitants; about 4,000 of them live in the town of Piran. Historical town is renowned for its medieval architecture with narrow streets, defence walls, numerous palaces and is therefore protected as a cultural monument. Preserved cultural heritage, originating mainly from the period of the Republic of Venice, and the town's geographical setting on the hilly peninsula, surrounded by the sea, transformed the town of Piran into one of the country's main tourist destination. Financial income, generated by tourism, has brought many benefits to the economy of local companies and residents, however there are also several negative effects, that can be attributed to the recent development of tourism. Apart from the higher prices of the real estate and general goods, problems with traffic and parking, as well as seasonal working hours of shops and services, the town of Piran is faced with

continued decrease in permanent residents, who seem to find a higher quality of life within other places of the region.



Miha Koderman

11. Portorož and Lucija

The town of Portorož (Italian: Portorose) is located in the municipality of Piran and lies on the northern part of the Gulf of Piran. This seaside resort has long tradition of tourism as tourists began to visit the town on regular bases in the first half of the 19th century, when this area witnessed an expansion of what was initially spa and wellness tourism and later on coastal tourism as well. With the construction of the Palace Hotel in the early 20th century, Portorož attracted a growing number of visitors and became one of the most important seaside resorts in the Austro-Hungarian monarchy, along with Opatija (Croatia) and Grado (Italy). The thriving community was halted by the First World War, after which the area came under the Kingdom of Italy. During the interwar period, the town of Portorož strived to regain its former glory, when the Second World War stopped tourist flows again. The crisis lasted until the 1960s, when renovations and new constructions under the new entity of Socialist Federal Republic of Yugoslavia began to take place along the whole region. In the 1970s, new hotel complexes were constructed on the Bernardin peninsula and a marina was inaugurated.

The tourism-based development of Portorož has had a substantial impact on the nearby settlement of Lucija, which has evolved from a dispersed agricultural and salt-producing village into a tourist destination, popular also among the second home owners.

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KOČEVJE: ABANDONED CULTURAL LANDSCAPE DUE TO GERMAN EMIGRATION DURING WWII

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Germans from around the town of Kočevje (Kočevars) were the descendants of German colonists from Tyrol and Charintia, which settled there during the times of the Ortenburgs lords in the fourteenth century in order to cultivate the region. Their colonisation lasted until the end of the fourteenth century; however, afterwards also Slovenes were settled there until the twentieth century. Kočevars were clearing the forests in order to gain new land for agricultural production which would enable the survival of an increasing amount of population. The main economic activities were cattle breeding and forestry. Agriculture was less developed due to the less favourable natural conditions (hilly and dry karst area). In the second half of the sixteenth century, there were already 9,000 inhabitants living in 137 German hamlets around the Kočevje region. Because of harsh social and economic conditions there, the Austrian Emperor Friderik III (1492) granted the Kočevars the right for free trade with wooden ware, cattle and canvas. Peddlers made a positive contribution for economic development of the Kočevje region. On the other hand this was also the reason for increasing emigration and diminishing

agriculture. Because of the agrarian crisis with its peak at the end of the nineteenth century, more and more Kočevars were employed as seasonal workers outside of the area which is nowadays Slovenia. Moreover, between 1857 and 1941, more than half of all the 23,000 Kočevars emigrated to USA. During the era of Habsburg monarchy, Kočevars enjoyed a high degree of linguistic, cultural and political autonomy in predominantly Slovene population inhabited Carniola. After the dissolution of the monarchy in 1918, the Kočevje region became part of the new Kingdom of Serbs, Croats and Slovenians, where Germans were not any more the favoured nation. Great changes such as the abolition of German schools, the use of Slovene language in public and Slovenisation of local geographical as also personal names caused a great deal of dissatisfaction among them. This was the fruitful ground for Nazi ideas in the 1930s. At the beginning of WW II in Yugoslavia in 1941, the Germans in the Kočevje region organised themselves politically and militarily. Their expectations for the incorporation in the German occupation zone or even annexation to the German Reich like in the case of eastern part of Slovenia (The lower Styria region), were not realized. Instead, the situation there was similar to that of Germans in South Tyrol administered by Italy. The leadership of Kočevars made a contract with Germany and Italy in 1942, which enabled them to relocate to the new lands in the Reich under the condition of signing the option announcement. According to the contract, 12,147 (95 %) of Kočevars signed the option announcement). Kočevars from 176 hamlets were moved to eastern Slovenia in the area near rivers Sava and Sotla from where approximately 35,000 Slovenes were expelled to Germany and Serbia by the Nazi authorities. During WW II the majority of the abandoned Kočevjar hamlets were destroyed by the Italian army in military operations. After the war, Kočevars stayed without their former homes and homeland. Most of them either fled to Austria, others were expelled there by Yugoslav authorities; some died in Yugoslav prison camps. Most of Kočevars and their descendents today live in Austria where they publish a magazine called *Neue Gottscheer Zeitung*.

After the war, the destroyed and burned villages of Kočevars were not renewed. In fact the new political regime deliberately destroyed most of the German cultural heritage in the Kočevje region. Out of 123 churches, just 28 remain today. After 1945 the Kočevje region was mystified and people were discouraged from going there due to various reasons. In the second half of 1945 many karstic chasms in Kočevje region were used as unmarked graves for numerous war prisoners which had been killed by the communist authorities. Due to its remoteness, the region was used for punishment camps. In 1951, there were 20 camps on 5,000 ha where the convicts/prisoners sentenced to forced labour were either working as forest workers or providing help by haymaking and building of the forest roads. As in the case of Czech borderland, also some areas south of Kočevje were restricted for public due to newly built secret underground installations of military importance during the era of the Socialist Republic of Slovenia. They were planned to provide a

safe place for the leaders of the regime in case of a possible armed conflict. The security was so strict, that not even the Yugoslav federal security authorities had access to those areas. Due to this, these areas were a key factor in preparation for the Slovenian 10 day war of independence of Yugoslavia in 1991. Some smaller areas of former Kočevars hamlets south of Kočevje as Gotenica (Gottenitz) and Škrilj (Skrill) have even today restricted access as they are used as a training ground for the Slovene army and police force.

1. Velike Bloke

The village of Velike Bloke is situated on Bloke karst plateau at the altitude of 730 m in central Slovenia, about 60 km south of Ljubljana. There are around 200 people living in the village what is about 20 % less than in the 19th century. The plateau is mainly composed by dolomite and partly by limestone. In spite of karst terrain there are several brooks flowing on the plateau, the ponor of the Bloščica River is close to the village of Velike Bloke. Like in other villages in the region there is an open-field system. Village fields are divided into many narrow strips of land. Local farmers typically have several tens of small and narrow plots, most of them are smaller than 1 ha. Most of the people daily commute to Ljubljana and Cerknica, they are working on their farms in the afternoons and during the weekends. Due to unfavourable natural conditions livestock production is the only important agricultural activity. Grassland is the prevailing land use in the village. Most of the former fields have been converted into meadows, on the other hand, a lot of former pastures have been overgrown by forest.

2. Gotenica

After the dispute between Yugoslavia and Soviet Union an area of western Kočevska (including Gotenica, Kočevska Reka and some other settlements) was closed for public access in order to establish safety underground bunkers and also penal camps. The region was chosen because of a possibility to move to central Yugoslavia or to the sea in case of an emergency and also because the area was sparsely populated. The area covered approximately 200 km² and was divided into two restriction zones – highly restricted zone with a center in Gotenica, and restricted zone with a center in Kočevska Reka. A bunker for military leadership in Gotenica was built in 1958. The bunker had a capacity of 100 people and was equipped with different rooms (including, x-ray room and surgery room). Today, the bunker in Gotenica serves as an archive and the village is mainly used as a training facility for Ministry of the interior. The village has two inhabitants. The place can be used as a starting point for a hike to Goteniški Snežnik (1290 m) – the highest point of the Municipality of Kočevje.

3. Kočevska Reka

Kočevska Reka is a central settlement in Kočevska Reka karst plain. After the establishment of the restricted area there were headquarters of a big company for forestry, agriculture, and manufacturing (Državno posestvo Snežnik). The company possessed a lot of forests and agriculture areas. There were many jobs for local people and the settlement had many services (e.g., grocery stores, restaurants, clinic, bank office). In year 1990 the restricted area was abolished. Afterwards, the decline in offer of jobs and services was noticed. Today, the settlement has 257 inhabitants. Visitors in Kočevska Reka can see a church of Saint John the Baptist, which was built in 1999 (the old one was destroyed after the WWII), and a 170 years old nut tree. The tree is regarded as the widest nut tree in Slovenia. At chest height its circumference measures 434 cm and it is 18 m high. Near Kočevska Reka there is an artificial lake (approximately 18 ha), which is registered as a natural value. It is important habitat of white-tailed eagle.

4. Kočevje

Kočevje gained city rights in 1471. In 19th century strong industrial development begun (e.g., mining of coal, glassmaking, wood industry), when also a railroad connection with Ljubljana was established. Kočevje was also the first settlement with public lighting system in Slovenia. During the WWII, the city was heavily bombed and destroyed. After the exodus of German speaking population, people from different parts of Slovenia came. Today, Kočevje has more than 8,000 inhabitants and it is an administrative, economic (wood industry, chemical industry, robotics), educational and service centre for the area between Ribnica and river Kolpa. The city is surrounded by forests, thus it is used as a starting point for many hiking and bicycle trails. In the city centre there are old villas, build a century ago in a secession style.

Intensive coal production in Kočevje was established in late 19. century. After the WWII the mine was one of the biggest in the country, but in 1978 it was closed down due to the low levels of coal. Afterwards the area was filled with water and today there is a lake.

5. Pugled pri Starem Logu

Pugled (*Hochenberg* in German) is an abandoned German village 18 km northeast from Kočevje at the altitude of 630 m. The village was established in 16th century when forest has been cleared. There were 4 farms and 13 to 17 inhabitants at that time. The living conditions were very harsh due to unfavourable natural conditions – karst terrain and high elevation. According to the population census in 1931 there were 72 inhabitants. They moved out in 1941, in 1942 the village was destroyed by

Italian army. Today, only ruins of farm buildings and former church can be observed. Most of the area is overgrown by forest, different stages of natural succession can be observed. Part of the former agricultural area is still used as meadows by local hunters who cut grass to feed wild animals. During the 2nd world war the area was – due to its remoteness – very important for the liberation movement, the leadership of the Communist party and partisan printing house were in the area.

6. Shaft Jama pod Macesnovo Gorico

The extra-judicial killings during and after the Second World War (mass murders) have created mass graves in Slovenia. The majority of members of the anti-partisan units (12,900) and civilians (6,000) that fled to Austria in May and June 1945 were returned to the Yugoslav partisans. These hostages were transferred by trains and trucks to the camps in Šentvid near Ljubljana and in Teharje near Celje. Hostages were then divided into three groups (A, B and C) after short examination. Group A consisted by adolescents that were released. Hostages in the groups B and C were executed without formal charges or trial by special units of the Yugoslav Partisans. The communist regime used abandoned mine shafts and tank trenches to bury the dead bodies. Hostages from camp in Šentvid near Ljubljana were transported to Kočevje region by train. Kočevje region is a karstic area with low population density, covered by forests. For over two decades, the region and especially Kočevski Rog has been synonymous of post-war mass murders. Hostages had to take off the clothes, and to step on the edge of the shaft. One of the most well-known mass graves in this area is Trnovec (Jama pod Macesnovo Gorico). There are more than 2,000 bodies buried in this cave. After the mass killing, they blasted the area around with TNT and covered the corpses with rocks. Just few of the victims survived this massacre and left the cave. After the fall of communism and collapse of Yugoslavia, researchers in Slovenia started to write and investigate about the killings. Members of a special research group will start to excavate the human remains from Jama pod Macesnovo Gorico next year.

7. Rajhenav

Formerly the largest and the most populous Gotschee village lies in a Karstic depression in the middle of the Kočevski Rog forests. The settlement name was probably derived from the German term. The name also partially reminiscent of the arrival of colonists from (Austrian) Carinthia, where there are several similar place and field names. Rajhenav developed into the roadside settlement. It was created in the period after the ending of the outer colonization, around 1400 when the deforestation gradually gained the cultivation area and the villages were

established. In 1574, the settlement had c. 140 inhabitants and c. 280 in 1869. The vast majority of the population spoke German. From 1880 to 1931, the number of inhabitants declined steadily, mainly due to emigration to larger cities and abroad. Residents made living with woodenware, farming and livestock production. The rich livestock tradition dates back to the time of Emperor Maria Theresa (1740-1780) when Rajhenav cattle were bred here.

On the orders of Nazi Germany, the Gotschee Germans moved to Posavje (east part of Slovenia) in December 1941. In August 1942, during the so-called Roška offensive, the Italian soldiers burned the village.

After the Second World War, the settlement was not populated or renovated. Only a small state-owned farm for the cattle breeding was operating in this area. In 1996 the agronomist Alojz Brdnik settled in Rajhenav and breeds the best meat cattle as well as horses and sheeps.



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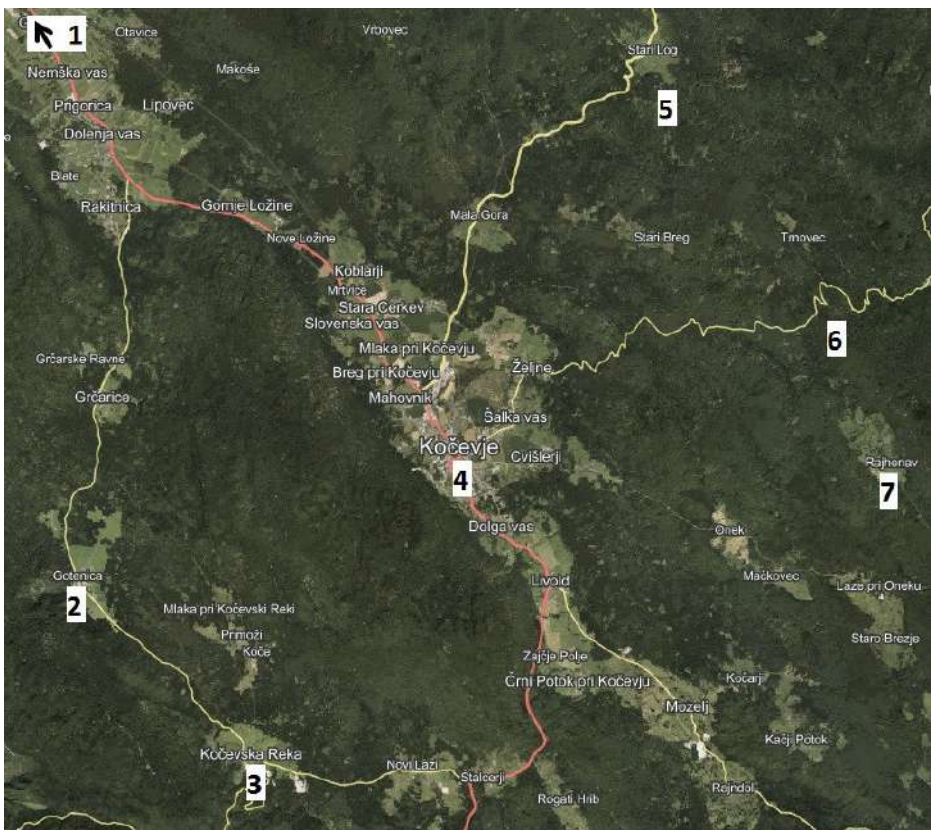
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BELA KRAJINA: CULTURAL LANDSCAPE IN PERIPHERAL KARST AREA

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Karst landscapes in Slovenia cover approximately 8,800 km² or over 44% of the country's surface. The Dinaric karst is the largest karst area in Slovenia, representing around two thirds of the whole karst area; with Bela krajina being part of it. Bela krajina is located in the south-eastern part of Slovenia, along the Slovenian-Croatian border, covering 595 km².

Due to its degree of karstification, Bela krajina was considered among the Slovenian areas with the poorest natural conditions for agriculture. Agriculture in the region is conditioned by the fragmentation of the karst areas due to the relief and the fragmentation of land property. Nevertheless, the main obstacle for intensive agriculture is the stony surface. As a result, cultivation in Bela krajina is connected to great investments in land improvement, commonly by clearing the loose stones. The natural conditions do not enable the development of intensive agriculture and the most favourable natural conditions for agriculture are limited to a narrow belt along the Kolpa River. Besides this belt, and as a result of the karst terrain, cultivated fields are commonly located in the bottom of dolines.

The region presents a balance between the traditional farming methods and the

care towards the natural environment. Its mosaic landscape is a mix of cultivated fields, vineyards, pastures, orchards, meadows and birch forests. Traditional farming activities have created a rich biodiversity and a diverse cultural landscape, which is recognized through protected areas with importance at a national level as well as a European level, such as the Natura 2000 sites.

1. Črnomelj

Črnomelj is a town in Bela krajina region. It has been settled since Bronze age. The settlement was in time of ancient Romans an important connection point between east and west part of Roman empire – here the Roman culture met also cultural and religious ideas, which came from east (i.e. Mitrej cult, which archaeological remains were founded near Črnomelj). In Middle ages, Slavic settlement upgraded the ancient town. In the time of Ottoman wars from 16th to 18th century, Črnomelj was an important centre, where food and army supply were delivered to Military Frontier, which was organized by Habsburg monarchy against Ottomans.

In 20th century the railway connected Črnomelj with central Slovenia. During the Second World War the town was the centre of partisan resistance against German and Italian occupation. After the war, the town has become the cultural, economic and administrative capital of Bela krajina. In the time of socialist Yugoslavia, some heavy and textile industry was developed here, but after the collapse of socialist economy were mostly closed.

Today approximately 15,000 inhabitants live in Črnomelj. They mostly work in mechanical engineering industry, but agriculture and viticulture are also important. The town and its surroundings have due to beautiful nature and traditional people's hospitality good opportunities to develop tourism: the old town centre, castle of Stonič ("Stoničev grad"), wine cellars and peaceful Lahinja River.

2. Settlement of Bojanci

In 1548 the area around the present villages of Bojanci, Marindol, Miliči and Paunoviči were colonized by Uskoks, refugees from the Turks. They were a population that fled from conquered or even unconquered areas of Croatia and Bosnia and Herzegovina to the territory of the Republic of Venice (Dalmatia), Croatia and Slovene territory along the Croatian border. In return for military service in the new environment, land was given to Uskoks as inherited property. With colonization by the Uskok population, the use of land changed. Uskoks were involved in animal husbandry, especially of sheep, and trade. Ethnic and cultural changes in Bela krajina for the last half millennium resulted from Uskoks immigrants, who still maintain their traditions to the present day. Regarding religion, some of the Uskoks preserved the Orthodox faith, whilst others have been converted to Greek Catholic. People from Bojanci maintain their cultural traditions; old traditions are kept for example in folklore groups.

For a variety of reasons, emigration was common, and the population continued to decline, with a consequent increase in land abandonment. Major land use changes have occurred in Bojanci during the past 200 years. The total area of fields decreased by 9.0%, whilst the total area of forests increased by 56.7%. This phenomenon can be explained primarily as the result of the retreat of agriculture from unfavorable areas (karst) and rural depopulation.

3. Šokčev house (*Šokčev dvor*)

The Šokčev house in Žuniči represents a typical farmhouse for the area along Kolpa River and is one of the protected cultural monuments in the Kolpa Landscape Park. The Kolpa Landscape Park extends along the River Kolpa, between Stari trg and Dragoši, entirely within the municipality of Črnomelj. The Park was established in 1998 to preserve natural values, biodiversity and landscape diversity and to implement measures to ensure the conservation of Natura 2000 sites and ecologically important areas. The purpose of the Park's operation is to integrate economic and social development in the Park's territory and cross-border cooperation.

The main attraction of the Kolpa Landscape Park is the Kolpa River with its valley. Apart from the Kolpa River and other important natural values, an important element of the Park is also the cultural landscape, intertwined with the litter-raking forests, dolines and commons, which has been made and maintained by man with his diligent work to the present-day.

An important element of the Park is also its rich cultural heritage, among which the courts stand out - four-sided closed houses, consisting of a dwelling house, a barn, a stable and a courtyard in the middle, castles and numerous mills as well as saws along the Kolpa River.

4. Litter-raking forests in Marindol (*Marindolski Steljniki*)

Litter-raking forests (*Pteridio-Betuletum pedulae*) associations are unique and traditionally important features in the landscapes of Bela krajina. This association is characteristically composed of bracken (*Pteridium aquilinum*) and birch trees (*Betula pendula*). Tree thinning, raking of leaves and mowing of ferns have created the picturesque litter-raking stands. In the past the wood was used mainly for fuel and for building purposes, and the litter was collected from these forests as bedding material for livestock. Litter gathering, mowing and grazing has been maintained by the people of Bela krajina through history until the present day. This unique anthropogenic land use and its constant exploration changed the appearance of the landscape and strongly decreased the influx of organic matter and nutrients to the soil and therefore greatly impoverished the soil. Apart from this, these stands hide a true biodiversity treasury, being home to more than 300 plant species, 100 butterfly species, 38 bird species and more than 100 fungi. However due to the abandonment of traditional practices, the stands of this association are becoming

less common in the region. Due to the specific values of this cultural landscape feature and owing to the testimony and tradition of agricultural land use, certain litter-raking stands hold the status of valuable natural features or are even protected as natural and cultural monuments.

5. Karst dolines in Vrhovci (*Vrhovske vrtače*)

Vrhovske vrtače located on the highly karstified karst plain south of the village of Vrhovci, along the road between Preloka and Adlešiči villages, represent a typical karst terrain surrounded by numerous dolines. About 100 dolines occur over a kilometer in length and half a kilometer in width. This largely complex area comprises almost 55 ha of distinctly fragmented ownership structure. Despite of the very difficult conditions for agriculture, the dolines are still being cultivated. The average diameter of their bottom is only about 20 m, and the depth varies from 5 to 10 meters. The slopes of the dolines are steep, but still gentle enough enabling their access with machinery. To provide enough space and fertile soil for land cultivation in the region many of these dolines were manually or mechanically cleared of stones. Dolines are thus an oasis of fertility, where the soil is accumulated and favorable conditions enable the successful cultivation. The most common land uses encountered in the cultural dolines are fields, vegetable gardens (when dolines are close to settlements) and meadows. In general the areas between dolines are mowed, only a few areas have shrubs or groups of trees. *Vrhovske vrtače* are an exceptional cultural landscape of this shallow karst region, and due to their geomorphological importance and uniqueness, they are proclaimed a natural monument.

6. Spring of Krupa River (*Izvir Krupe*)

The Krupa River flows through the central part of the Črnomelj Plain and has formed a characteristic canyon. The spring of the Krupa River is located close to the town Semič, and it is the biologically most important karst spring in Bela krajina. According to many traveller's books about Slovenia, spring of Krupa is one of the most beautiful and picturesque springs in Slovenia. The river come to the surface under the 30 meters high stone wall. The spring itself is an important habitat for proteus and cave mussel. The whole area is protected and included to Natura 2000 network. There is a sawmill next to the spring – it demonstrates human skills to exploit the power of water. For many years in time of socialist economy, Krupa River was heavily polluted with polychlorinated biphenyl (PCBs) due to the wastewater and improperly disposed waste products by the nearby manufacturing company of electronic devices.

Krupa is also one of the shortest rivers in Slovenia; after 2.5 kilometres at village of Gradac Krupa River joins to Lahinja River.

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