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''LOESSLAND'' PROJECT – THE DEVELOPMENT PERSPECTIVES OF THE FIRST LOESS GEOSITE IN SERBIA

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ABSTRACT: *Considering the tendency of the increased number of tourists with special interests, the geodiversity based tourism – geotourism has gained an opportunity to present its values. Republic of Serbia is a land with an exceptional geological and geomorfological heritage and great potential towards the development of geotourism. So far, only few destinational projects have been done and these destinations could be called "geotouristic" one day, such as Stari Slankamen (the loess museum). Initiated by professor Slobodan Markovic, the Touristic Organization of the Indjija municipality has started up a project called "Loessland". This project was initiated in 2008 and its goal is to preserve and promote the loess profile Čot in Stari Slankamen. The idea is to make the museum out of glass, on several levels. The European center for loess research should be located in this complex, as well as a souvenir shop and a coffee shop. The Touristic Organization is not able to continue the development of this project due to the sufficient financial resources. If the necessary financial resources could be summoned, "Loessland" museum could develop its offer and its appearance on the market.*

Key words: *Loessland, Stari Slankamen, museum, loess, geotourism*

INTRODUCTION

According to the world's tendencies in tourism, the number of tourists with special interests is rapidly growing. That gives a chance to the geodiversity, or geological or geomorphological formations, siol types, archeological sites to be presented to the tourists. The first association that has recognized the importance of preserving geodiversity was UNESCO. This association has put some areas under its protection because of their great geological values. On the European market, the awareness about the importance of geodiversity is increasing, which resulted in more protected areas, such as geoparks,

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and museums, events, exhibitions and publications which present geotourism as tourism of special interests.

Serbia is a country with outstanding geological and geomorphological values and posses great potential for the development of geotourism, but it has not build a strategy for the development of this type of tourism.

Several projects have been done for the sites that may eventually be declared as geotourism destinations, such as: Stari Slankamen (loess museum), Krupanj – Soko grad, Rudnik mountain. A few destinations (Fruška gora mountain) have already applied to become the status of geoparks, or they are already developed into geotuoursm destinations (Devil's town).

THE IMPORTANCE OF THE LOESS SEDIMENTS ON THE ČOT LOESS PROFILE IN STARI SLANKAMEN

Loess can be classified as a windblown dust which is deposited over areas in mid latitudes. It is an aeolian deposit that consists of silt sized 20-60 μm, primary quartz particles. Loess deposits have a similar grain size distribution, mineral composition, open texture, low degree of saturation and bonding of grains which is not resistent to water. Loess is also highly erodible and unstable when wet, producing serious hazards (Pesci, 1990).

The most complete and thickest loess deposits are found in China, in the provinces of Shanxi, Shaanxi, and Gansu (Liu, Ding, 1998). Dust accumulation in Europe is disseminated from the maritime areas of NW Europe, over Central Europe, to the Ukraine and the Russian planes. Much of the loess cover in Eastern and Central-Eastern Europe has been redeposited by the Danube River. Other areas of loess are associated with rivers such as Po, Rhine and Rhone (Muhs, Bettis, 2003).

Loess has great importance in reconstruction of the climate in the past, because of its continuous deposition. Danube loess is a classic example of the continuous deposition of loess. Therefore, loess sediments in the middle and lower Danube are characterized as the oldest and the most completed loess sediments in Europe (Kukla, Fink, 1977; Jordanova et al., 1999; Marković et al., 2011).

Loess comes from the German Löss or Löß, and ultimately from Alemannic lösch meaning loose as named by peasants and masons along the Rhine Valley (Marković, Romelić, 1995; Marković, 2000; Marković et al., 2004, Jovanović, 2012).

The term "Löß" was first described in Central Europe by Karl Cäsar von Leonhard who reported yellowish brown, silty deposits along the Rhine valley near Heidelberg. Charles Lyell brought this term in 1834 into widespread usage by observing similarities between loess and loess derivatives along the loess bluffs in Rhine and Mississippi in his work "Principles of Geology" (Heller , Evans, 1995; Zöller, Semmel, 2001; Smalley et al., 2001).

The first Serbian geologist who had wrote about loess was Aleksandar Popović, who described the extent of diluvial loess in Srem, which represents the oldest scientific article of loess that is ever written in Serbian language (Jovanović, 2012).

Map 1. Distribution of loess in Vojvodina
(Source: Košćal et al., 2005, modified)

Loess profile Čot in Stari Slankamen is located in the northeastern part of the Srem loess platau, opposite of the Tisa confluence, on the western bank of the Danube River. Geographical coordinates of the loess profile Čot follow: Nφ45°07'58" and Eλ20°18'44" (Map 1). The length of the open part of the profile is 40 m. Total thickness of the profile is over 45 m (Markovic, Kukla, 1999).

The accumulation of loess has been conducted on the loess profile Čot on the uplifted terrain of the neogen parts, which represent the ultimate offshoot of Fruska Gora mountain (Jovanović, Zvizdić, 2009; Jovanović, 2011).

The first scientific description of the loess profile Čot has been given by the austrian officer Luigi Ferdinando Marsigli in his 6-volumes book Danubius Pannonico - Mysicus (Jovanović, 2012). Quaternary sediments in the territory of Vojvodina region attracted the attention of Austrian and Hungarian geologist Wolf, Shvalma, Koh, Halavach and Cholnoky, who had began to research this area. Domestic scientists such as Gorjanović – Kramberger, Laskarev and especially Marković-Marjanović began to research this area in the period between the First and the Second World War. During the 1970's first foreign scientists, Butrum and Bogner started the reserach of the loess profiles in Vojvodina (Jovanović, 2012).

In the late 1990's, professor Slobodan Marković, associated with professor George Kukla began systematic research of loess-paleosoils sequences on the loess profile Čot. This loess profile has been used for the development of the chronostratigraphic model of the loess-paleosoil sequences in Vojvodina introduced by Marković and Kukla (1999) (table 1).

Table 1: Corelation of loess-paleosoil sequences stratigraphic sheme during the last glacial-interglacial ciklus with SPECMAP

STRATIGRAPHIC UNIT		MIS	DESCRIPTION	
V-S0		1	Holocene	
V-L1	V-L1L1	2	Last glacial phase	Stadial
	V-L1S1	3		Interstadial
	V-L1S1L1			
	V-L1S2			
	V-L1L2	4		Stadial
V-S1		5	Last Interglacial phase	

Source: Marković et al., 2008; Imbrie et al, 1984

In 1987, new chronostratigraphic model of the loess-paleosoil sequences in Vojvodina was established and it was based on the scheme defined by George Kukla. According to this model (Markovic et al., 2004, 2008, 2009) L stands for loess and S stands for soil. Layers of loess and paleosoils are numbered from the top of the profile to its bottom. V indicates the loess-paleosequences in Vojvodina region.

Starting from Holocene, warmer periods are marked with odd numbers, and glacial phases with even numbers.

During its long geological history, it can be concluded that the Earth changed the direction of the magnetic field, which is best documented in the volcanic outburst of oceanic crust (Vine, Matthews, 1963). At a depth of 36 m, in the pedocomplex V-S7, there is a boundary between Brunhes and Matuyama magnetic epochs. The age of this epochs is estimated to be 780.000 years old, according to generally accepted paleomagnetic time scales (Candle and Kent, 1992). This boundary is also the border between Middle and Late Pleistocene, which emphasizes the chronostratigraphic value of this profile in global terms.

Based on paleomagnetic researches, formation of this pedocomplex has been initiated during the paleomagnetic epoch Jaramillo about a million years ago (Jovanović, 2012).

Loess profile Čot represents a very pertinent pattern in the reconstruction of paleoclimatic conditions in this region during the last million years, which emphasizes its scientific value even more.

The loess profiles in Stari Slankamen represents a natural resource, which has a great tourism potential and has the need for a proper protection, conservation and presentation.

Instead of the former grass vegetation in the base of the profile, the trees were planted. Over the time, this space has turned into a thicket which covers the lower part of the profile. The lower part of the profile is aslo masked by the fallen material. Construction works on the exploitation of loess-paleosoils sediments represent a potential danger for preservation of the profile (Jovanović, 2011).

Having showed its great scienteific importance, in 1975, for the first time in Serbia, one loess profile (in Stari Slankamen) was protected and pronounced as a Monument of Nature. In 2007, loess profiles in Stari Slankamen was categorized as the first category of Natural goods of Serbia (Paško et al., 2010).

PROJECT "LOESSLAND"

Discovering the secrets of the Pleistocene Ice Ages, which were recorded at the loess profile in Stari Slankamen, is not important only to the scientists, but to the "special interest's" tourists as well.

The first attempt to create a loess geoturism destination is a project called „Loessland" at the Čot loess profile. In 2008, the Tourist Organization of Municipality of Inđija began the development of the project „Loessland", with the purpose to conserve and promote loess profile. The entire project will be completed in phases, which will be finished by the end of 2015.

Detailed Regulation plan, Preliminary Design and Detailed Design of the museum complex have been made.

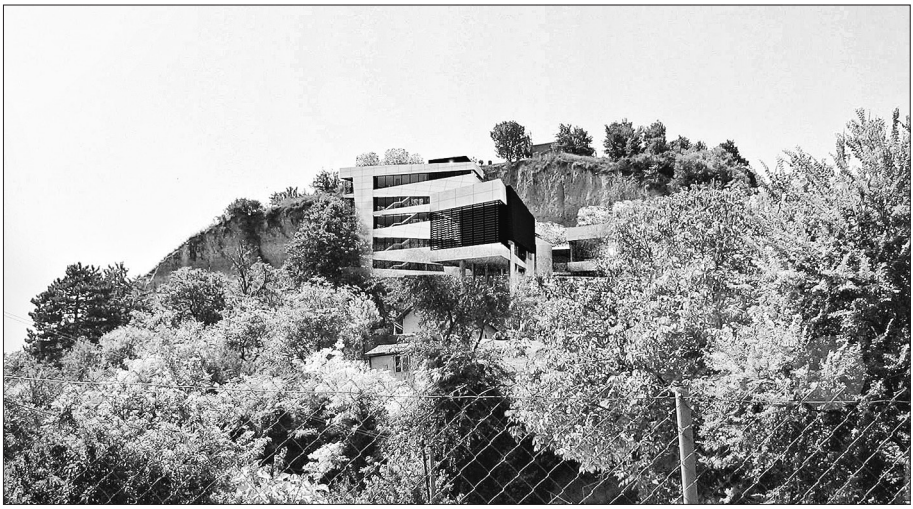
Experts from the fields of science, environmental protection, architecture, tourism and marketing should be included during the implementation of the project, in order to improve the presentation of geological values.

Further researches in the field of science will be facilitated.

The main goal of the project is the creation of a competitive tourism product that would provide the economic prosperity of Stari Slankamen region.

The museum will be made of glass, built in several levels leaning on the loess profiles (Paško et al., 2010). Museum will be built on an area of 1 ha, and it will cost about 5 million euros.

The interior of the museum will be divided into thematic sections, that will represent basics of physichal geography (geology and geomorphology), the story about origin of the ice ages, results of the loess profile researches, possible climate changes in future - „Earth today and tomorrow", history of Stari Slankamen.



Picture 1. The future look of the museum „Loessland"
(source: Tourist Center of the Municipality of Inđija)

Other additional facilities will include a tourist information centre, souvenir shop and themed café. These facilities will provide the basis for tourism development (Vasiljević et al., 2011a).

Museum will have a souvenir shop, which will offer models of the loess profile, various publications related to loess or ice ages, CD/DVD movies about loess, toys in the shape of mammoth that symbolized the ice ages.

Also, the European Centre for the Loess Researches should be established as the part of the museum.

To improve the tourist offer, musseum will also have themed café that will consist of two parts: one that will symbolize the ice age and offer the products such as ice coffe, ice shake, ice cake, ice burger, and the other that will represent the interglacial period decorated in the tropical style.

One of the major ideas of this project was to make it available to hold various workshops, conferences, exibitions and thematic shows. With these events, scientific, cultural and tourist significances of the site would be merged, and it would result in the raise of people's educational level and increased touristic trade.

CURRENT SITUATION AND FURTHER STEPS TOWARDS THE DEVELOPMENT OF THE FIRST LOESS GEOSITE

Current situation shows that the location where the museum is suposed to be built is owned by private owners, who built two summer houses. Considering nature protection, loess profile is in great danger (Picture 2). Analyzing the current situation of the loess profile, geoconservation becomes an imperative for the future activities.

To meet the criteria about destination development it is necessary to ensure the access to the site, which should include clearly marked tourist signalization. Nothing has been done about this so far. When it comes to the accessibility of the site, it was pointed out that Loessland and Stari Slankamen have excellent position. However, if we consider access to the loess profile, the situation is different. The site can be reached by a path that is partly concreted, as a result of the needs of home owners nearby, and the approach to the site itself is available through the summer path.

The success on the international market should be easier thanks to the fact that there are rare examples of museums around the world that are based on the presentation of geological heritage.

Cooperation with the local population, excellent tourist presentation, the most completed Middle and Upper Pleistocene loess-paleosoil sequences in Europe, paleoclimatic reconstruction value and the representation and preservation of the loess profile represent the main strenghts of this project (Marković et al., 2008).

Cooperation with the local population is the first step in the development of the tourist destination, because it determinates its development. If the local population accepts tourism as a new economic activity in their surroundings, destination will be able to develop properly. Besides the local population, who has realized the importance of tourism development, Tourist Organization of the Municipality of Inđija has to provide significant fi-

Picture 2. Loess Profile Čot
(Photo: T. Višnić)

nancial resources through various national and international projects that would help the construction and development of this destination. In the future, the most important factor is the provision of financial resources for the further implementation of the project.

Rarity stands out as a very important factor of market positioning. In that case, Loessland should be able to attract a large number of visitors, emphasizing its representativeness, condition and uniqueness.

In order to promote this unique geological site, it is possible to organize various conferences to point out the importance of loess profiles, such as the "Loessfest" or "Geotrends".

Due to the insufficient knowledge the public has on the sciencific value of these loess profiles, it is necessery to organize student's excursions, where they will get to know the natural beauties of their country.

The main weakness of entire project is the lack of financial investments which would ensure the further implementation of the project. The current situation is not different from the one in 2008.

One of the major problems of the further development of the site is the existence of two illegaly built houses that are situated at the very front of the loess profile, on the place where the Loess Museum is supposed to be. The temporary solution is to buy one of the houses and transform it into a small loess Museum.

In order to attract and keep tourists, tourist organization must pay attention to the competition nearby, such as geopark Papuk in Croatia.

Although geotourism is a quite young form of tourism, a lot has been invested in it. This is supported by the fact that investments in infrastructure and accommodation facilities are close to their maximum. To meet the criteria about destination development

it is necessary to ensure the access to the site, which should include clearly marked tourist signalization. Nothing has been done about this so far. Access to the site is possible only through footpath, and the streets in the city are not big enough to accept tour busses. The bright side is that location of the site in regards of the travel directions is well-appointed. Regardless of its uniqueness and sciencific value, Loessland needs to promote itself, to achive more competitive market position. If we consider the development of geotourism in Serbia, we can conclude that it is developed in a small extent in some sites such as Resavska and Potpećka caves, Devil's Town, Ovčar - kablar gorge, Uvac gorge and limestone landscapes in Kučaj and Beljanica mountains. Despite the extraordinary potentials that Serbia has, geotourism resources are not sufficiently valorized. Most of these resources can be used for tourism with some small investments and changes (which is the purpose of geotourism).

Most of the geological heritage has been located in situ, in nature, except for collections that have been located ex situ - in the museums.

The main tourist product of „Loessland", as one of the leading geotourism destinations in Serbia and in the region, should be composed of a fully completed tourist presentation of the site. This should include tourist guides, well-marked ecopaths which would be used by visitors in order to avoid disruption of the natural resource, and multilingual information boards.

As a very important part of the story of loess, it is quite nesessery to devote attention to the ice ages and the old inhabitant of the Pannonian Basin – mammoth. The best way to perform this is to establish a special section in the museum that would provide adequately arranged rooms, where visitors would learn more about Milutin Milanković, the origin of the Ice Age and the mammoths.

A special stop should be a place where the guides could emphasize the importance of the Bruhnes – Matuyama boundary. Brihnes - Matuyama magnetic boundary is what makes the loess profile in Stari Slankamen unique in Europe, and this should be used in the purpose of tourism.

If we observe the total tourist trade on this site, it is possible to conclude that the domestic tourists are dominating in the overall number of visitors, especially individual visitors. There are no travel agenicies that offer organized visits to this site. The promotion of tourist products of geotourism is very low, or almost non-existent. Promotion requires a large financial investments, but the effects from its arising are not viable in the short term. Promotion at the regional level would certainly decrease funds that are supposed be invested in promotion. Therefore, it is necessary to design a marketing approach that would be effective enough to attract tourists.

Involvment of the Loessland into geoparks „Titelski breg" or „Fruška gora" would ensure a promotion within a large international network of geoparks (European geoparks or Global Geopark Network) that would attract foreign visitors as well.

The promotion of the museum could be achieved by including the site into the European Museum Forum.

The promotion within the domestic tourism can be done through the mass media where the opportunities of geotourism destination could be presented. Performances in the fairs of tourism could establish a partnership with travel agencies and tourism organizations.

Offer in the form of an internet presentation, which does not require significant financial resources, might be the best way to enter the international travel market.

Over the next several examples tourist offer of the famous geotourism destination in the world will be presented, in the way that geoturism activities are organized and recognized as well as the ways to promote them. The same activities, events, preformances and appearances on the market could be applied to Loesslend in the curse of development of the first loess geosite in Europe.

Some of the geotourism sites were already sufficiently known to the public (such as Yellowstone National Park in United States of America) and their name is the brand for itself. "Loessland" has a specific name that remains in people's memory, and it could become a recognizable brand in the field of geotourism.

Apart from the name, it is necessary to step into the market with the effective slogan, that will attract the attention of targeted audience, as some of the well developed geoturism destinations already have. Geopark Burren in Ireland, with slogan „Naturally yours" is a good example in this field. In that manner, Loessland's slogan could be: "The witness of the past", because it is clearly referring to its purpose.

Management of the protected areas for tourism is a mans attempt to stay in touch with nature. This shows the recreational purpose of national parks, as the largest and best organized types of the protected areas (Stojanovic, 2007).

Tourism planning in protected areas has to be long-termed, integrated in the environment and in accordance with the inclusion of the local population. The role of tourism in promotion of the protected areas can be seen through the development of various forms of sustainable tourism, that aim to educate visitors about the biological and geological diversity.

The most common medium used to promote tourist destinations is Internet (Vasiljević et al., 2009). The great advantages of Internet is that it enables the customer to have much easier and direct access to a very large amount of up-to-date information. In order to complete a promotional goal, Loessland is has to establish a Web site or create a page on social networks, because each tourist institution should have a Web site, to help tourists get informations about the contents of the museum, offers, activities, ticket prices, visiting hours and other related questions. The project Loessland is only presented in the form of PowerPoint presentation on the Web site of Tourist Organization of the Municipality of Inđija.

Following the example of the Croatian Geopark "Papuk", where the publications are divided by areas, Loessland could have special publications for geology, paleoclimatology and climate changes as well as tour guides for visitors. This way, the museum would offer a lot of information to the visitors who want to know more about loess.

Guided programs should be defined by segments of visitors, their age, profession, or purpose of their visit. A good example of this kind of product differentiation is the North West Highlands Geopark in Scotland, which has special programs related to geology, e-geology, petrology, erosion, etc. Loessland should have miscellaneous programs such as: touristic geology, geology for students, geology for kids, geology for experts, as well as the program "Let's read the loess".

In order to extend the offer, it is possible to open "The Room of the Loess Dolls" and "The Loess Lab". "The Room of Loess Dolls" would be a room where carbonate formations - loess dolls could be presented. Loess dolls have interesting shapes that move the human imagination.

They have the shape of the bulb and their origin is caused by infiltration of the rainwater into the interior of loess (Jovanović, 2012).

"Loess lab" would represent a geological laboratory that aims to spread knowledge about the loess. It is conceived as a laboratory where employees track visitors through the process of observation and sampling of loess. "Loess lab" would be an educational window into the Earth and its secrets, especially in secrets of the ice age.

In order to promote Stari Slankamen as a geotourism destination, it is necesary to establish a Tourist Information Center. The center could have tasks such as organizing the sightseeing of Stari Slankamen, training of tour guides, organizing excursions to nearby places, publishing information and promotion materials and cooperation with travel agencies. Unfortunately, the Information Center does not work at this time.

CONCLUSION

The aim of the entire "Loessland" project is the creation of a competitive tourist product, so it can be used for the economical development of the entire region. It is necessary to ensure the development of the sustainable forms of tourism, such as geotourism. The pure existence of the resources is not enough for the development, it is necessary to use existing resources, to build an adequate offer for the visitors, make certain publications, organize scientific conferences, because geotourism has an educational function as well.

Because of the wealth of geological and geomorphological formations, Vojvodina region has a potential for the development of geotourism, but nothing has been done so far.

The loess profiles in Stari Slankamen represent a natural resource, which has a great potential and has the need for a proper protection, conservation and presentation.

The formation of the modern thematic museum "Loessland" involves a series of activities aimed at touristic valorization of the loess profile and creation of an attractive and competitive tourist products, which would be the driving force of economic development of the area. This way, the loess profiles could be valorized and its tourist potential would be used. Its competitive advantage, in the longer term, could be applied to both domestic and international tourism market.

Scientific and educational significance of the loess profiles is multifaceted and compelling, especially in the geological terms. Loess profiles represent an open geological laboratory in which it is possible to study Quaternary paleogeography and paleoclimatology.

With the implementation of the project, Stari Slankamen could become a geotourism destination, one of the first in the region, and the unique loess profile Čot would gain public importance.

It was found that the loess profile Čot has a certain market value and it is necessary to move on to the next phase, the implementation of the project. This phase requires large financial resources that can be obtained from the various international projects. Also, the help from the authorities is needed. The Republic of Serbia has pledged to allocate certain funds to protect its own nature.

REFERENCES

Barta, G., Halisch, M., Muller, C. (2013): *Aspects of loess doll development with impacts of understanding the paleoenvironment*, Geophysical Research, vol. 15

Cande, S.C., Kent, D.V. (1992): *A new geomagnetic polarity time scale for the Late Cretaceous and Cenosoic.* J.Geophys. Res., 97, 13917-13951

Heller, F., Evans, M.E. (1995): *Loess magnetism Reviews of Geophyisics* 33, 2:211-140

Imbrie, J., Hays J. D., Martinson D. G., McIntyre A., Mix A. C., Morley J. J., Prell N. G.,, and Shackleton N. J. (1984): *The orbital theory of Pleistocene climate: Support from a revised chronology of the marine 180 record*, in Milankovitch and Climate, Part I, pp. 269-305, D. Reidel, Norwell, Mass.,

Jordanova, V.K., Farrugia, C.J., Quinn, J.M., Torbert, R.B., Borovsky, J.E., Sheldon, R.B. and Peterson, W.K. (1999): *Simulation of off-equatorial ring current ion spectra measured by Polar for a moderate storm at solar minimum.* Journal of Geophysical Research

Jovanović, M. (2011): *Geonasleđe u formiranju turističkog proizvoda.* U: Studija izvodljivosti razvoja ekoturizma u zaštićenim prirodnim dobrima Vojvodine (sa posebnim osvrtom na Ramsarska područja). Univerzitet u Novom Sadu, Departman za geografiju, turizam i hotelijerstvo: 55-73, In Serbian

Jovanović, M. (2012): *Srednje pleistocene lesno-paleozemljišne sekvence Vojvodine - doktorska disertacija.* Departman za geografiju, turizam i hotelijerstvo, PMF, Novi Sad, In Serbian

Jovanović, M., Zvizdić, O. (2009): *Geonasleđe lesnih profila u Vojvodini*, DMIIZG „Branislav Bukurov", In Serbian

Jovanović, M., Gaudanji, T. (2009): Geonasleđe srednjepleistocenih lesno-paleozemljišnih sekvenci Vojvodine. Zaštita prirode, br.60 1-2, In Serbian

Košćal., M., Menković, LJ., Mijatović, M., Knežević, M. (2005): *Geomorfološka karta Vojvodine 1:200.000.* Geozavod – Gemini, Beograd. In Serbian

Kukla, G.J., Fink, J. (1977): *Pleistocene climates in Central Europe: at least 17 interglacials afer the Olduvai Event.* Quat.Res. 7:363-371

Liu T, Ding Z. (1998): *Chinese loess and the paleomonsoon.* Annual Review of Earth Planetary Science 26: 111–145.

Marković, S., Romelić, J. (1995): *Hidrološki problemi Vojvođanskog podunavlja u delu „Danubius Pannonico mysicus" Luidji Ferdinanda Masilija,* Zbornik radova sa Naučnog skupa Prirodne i matematičke nauke u Srba u 18. i prvoj polovini 19. veka, Novi Sad, 26-27. juna 1995, SANU, Ogranak u Novom Sadu, Univerzitet u Novom Sadu, Matica srpska, Novi Sad, strana 79-84. In Serbian

Marković, S.B. and Kukla, G.J. (1999): *Magnetic susceptibility and grain size record in Stari Slankamen section*. Book of abstract Loessfest 99, Bonn: 152-153

Marković, S. (2000): *Paleogeografija kvartara na teritoriji Vojvodine*, doktorska disertacija, Departman za geografiju, turizam i hotelijerstvo, Novi Sad. In Serbian

Marković, S.B., Kostić, N.S., Oches, E.A (2004): *Paleosols in Ruma loess section*. Revista Mexicana de Ciencias Geológicas, v.21, num.1, 79-87

Marković, S.B., Bokhorst, M., Vandenberghe, J., McCoy, W.D., Oches, E.A., Hambach, U, Gaudenyi, T., Jovanović, M., Zoeller, L., Stivens, T., Machalett, B. (2008): *Late Pleistocene loess-paleosol sequences in Vojvodina region*, North Serbia. Journal of Quaternary Science 23, 73-84

Marković, S.B., Hambach, U., Catto, N., Jovanović, M., Buggle, B., Machalett, B., Zöller, L., Glaser, B., Frechen, M. (2009): *Middle and Late Pleistocene loess sequences at Batajnica, Vojvodina, Serbia*. Quaternary Internationa 198; 255-266

Marković, S.B., Hambach, U., Stevens, T., Kukla, G.J., Heller, F., McDoy, W.D., Oches, E.A., Buggle, B., Zöller, L. (2011): *The last million years recorded at the Stari Slankamen (Northen Serbia) loess-paleosoil sequence: revised chronostratigraphy and long-term environmental trends*. Quaternary Science. 30, 1142-1154

Mijović, D. (2002). *Menadžment objekata geo-nasleđa u Srbiji – put ka geoturizmu*, Zaštita prirode, broj 53/2, Zavod za zaštitu prirode Srbije, Beograd. In Serbian

Muhs, D.R., and Bettis, E.A. (2003): *Quaternary loess-paleosol sequences as examples of climate-driven sedimentary extremes.* Geological Society of America Special Paper 370, p. 53-74.

Pesci, M. (1990): *Loess is not just the accumulation of dust,* Quaternary International 7/8 1-21

Smalley, I., Jefferson, I.F., Dijkstra, T.A., Derbyshire, E. (2001): *Some major events in the development of the scientific study of loess*. Earth-Science Reviews 54: 5-18

Stojanović, V. (2011): *Turizam i održivi razvoj,* Departman za geografiju, turizam i hotelijerstvo, Novi Sad. In Serbian

Tauxe, L., Herbert, T., Shackleton, N.J., Kok, Y.S. (1996): *Astronomical calibration of the Matuyama – Brunhes boundary: Consequences for magnetic remanence acquisition in marine carbonates and the Asian loess sequences*. Earth and Planetary Science Letters 140: 133-146

Zoeller, L. & Semmel, A. (2001): *175 year of loess research in Germany – long records and „unconformities*". Earth-Science Reviews 54: 19-28.

Fluvius (2008): *Idejno rešenje muzeja „Loessland*". Beograd. In Serbian

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http://www.burrengeopark.ie/

http://www.indjija-tourism.net

http://www.northwest-highlands-geopark.org.uk/

http://www.steiermark.com/en/excursion-destination-styrian-eisenwurzen-nature-park_20509

http://www.parcapuane.toscana.it/turismo/dove_ing.asp