

Commission 1.1 Soil Morphology & Micromorphology Newsletter April 2014, vol. 14, p. 1-22

Dear Colleague,

I welcome you to the April Soil Micromorphology Newsletter. Thanks to all the colleagues who sent their contributions. Among them, an extensive report on a Russian meeting devoted to the late Nicolas Fedoroff was sent by Marina Verba and Irina Kovda.

At the moment of closing the newsletter, we received a very sad news: our colleague Dr Hari Eswaran passed away on April the 16th. I am grateful to Prof Georges Stoops who was willing to write some words for him in a short time. All those who had the honour to meet him will remember him as a great person, a great micromorphologist and soil scientist.

Several meetings are waiting for us very soon: the **EGU meeting** in Vienna; the **World Congress of the IUSS in Jeju** (Korea) and the **International Workshop on Archaeological Micromorphology** (Amersfoort): you will find information about the micromorphology sessions and their schedules. Preliminary information about the **2016 Mexico XV Micromorphology Congress** is provided as well. Information about three micromorphology courses, meetings and publications is also available.

Best regards,

Rosa M Poch

Chair Comm. 1.1. Soil Morphology and Micromorphology - IUSS
Department of Environment and Soil Science, University of Lleida, Catalonia.
rosa.poch@macs.udl.cat

PLEASE, VISIT THE COMMISSION 1.1. WEBSITE <http://loess.umcs.lublin.pl/micro.htm>

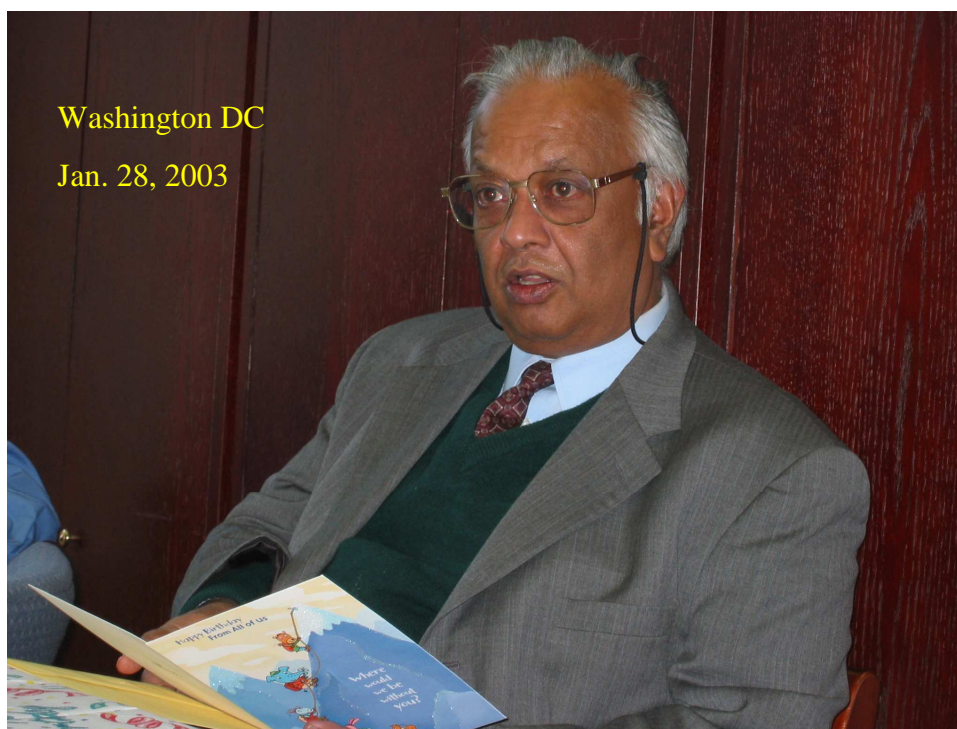
Maintained by Przemyslaw Mroczek, Dept. Physical Geography and Paleogeography, Maria Curie-Skłodowska University, Poland loess@poczta.umcs.lublin.pl

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IN MEMORIAM HARI ESWARAN

The micromorphology community lost one of its pioneers, **Hariharan (Hari) Eswaran**, who passed away in the USA on April 14th, 2014, surrounded by his friends. He leaves behind a mother and several sisters to mourn his loss.



Hari Eswaran was born on January 28th, 1941 in Kluang, Johore, Malaysia. After obtaining the Higher School Certificate at the English College in Johore Bahru, he joined the University of Malaysia where he obtained in 1964 a B.Agric.Sc. After attending the half year Soil Survey Course at the Agricultural University of Wageningen in 1966, he enrolled at the “International Training Centre for Post-Graduate Soil Scientists” at the State University of Gent, where he obtained in 1967 his MSc degree in Soil Survey (thesis: “A micromorphological study of some soils from West Coast of Peninsular Malaysia”). In 1970 he there also defended his PhD thesis “Pedogenesis of Basaltic Soils in Tropical Regions”.

After a further stay at ITC-Gent, where he continued research on pedogenesis in the tropics, using micromorphological and mineralogical technique, at the same time supervising many students of tropical regions, he moved in 1976 as visiting professor to the Department of Agronomy of Cornell University (USA). In 1980 he joined the University of Hawaii, later in 1989 the USDA-NRCS in Washington DC, as program leader. In this function he managed an international program of technical assistance in the area of survey, conservation and management of soils. He retired in 2010. As leader of this Soil Management Support Service (SMSS) he organized throughout the tropics many International Committee Meetings (ICOM) such as ICOMOX (on Oxisols), ICOMAND

(Andisols), and ICOMID (Aridisols). During these meetings local experts discussed with specialists from all over the world problems of classification of special soils, contributing to a better understanding of soils and to a continuous updating of the “Keys to Soil Taxonomy”, leading finally to a new edition of “Soil Taxonomy”. He organized more than 40 international training courses in 25 countries. In his function as program leader he was directly involved in management, advising or evaluation of many International Agricultural Research Centers, such as ICRISAT, IBSRAM, IITA, ICARDA, ICRAT, the World Bank, international donors and US institutes.

Hari Eswaran published more than 200 journal articles and 10 books. He was since 1988 corresponding member of the “Royal Academy of Overseas Sciences” (Belgium), member, honorary member or fellow of several national and international societies, and received several scientific awards, such as the “International Soil Science Award” (SSSA, 1991) and the “IUSS Guy Smith Award” in 2012.

Since the beginning of his studies at ITC-Gent Hari felt in love with micromorphology. Especially during his further stay in Gent he developed several new approaches, contributing to the development of soil micromorphology, and experimented with new methods, e.g. the, at that time, newly developed SEM. When organizing the many ICOM field meetings, he always arranged to have in the group a micromorphologist who had prepared detailed descriptions of the profiles visited, that were *in situ* discussed in view of genesis and classification, sometimes in the burning sun, sometimes in pouring rain. This contributed greatly to the understanding of the micromorphological characteristics of a number of tropical soils. In several countries he encouraged young people to include micromorphological research in their studies and work.

Hari Eswaran was a very kind, helpful and open person, gaining in a short time the sympathy of people meeting him. He was gifted to explain complicated subjects in a very didactic way, transferring his enthusiasm soon to his audience. The micromorphological community lost one of its great defenders.

Georges Stoops

YOUNG MICROMORPHOLOGIST PUBLICATION AWARD



The Jury of the Young Micromorphologist's Publication Award has decided that the awardee for the 2014 edition is

Amanda J Williams

for her publication:

Williams, A.J., Buck, B. J., & Beyene, M. A. (2012)

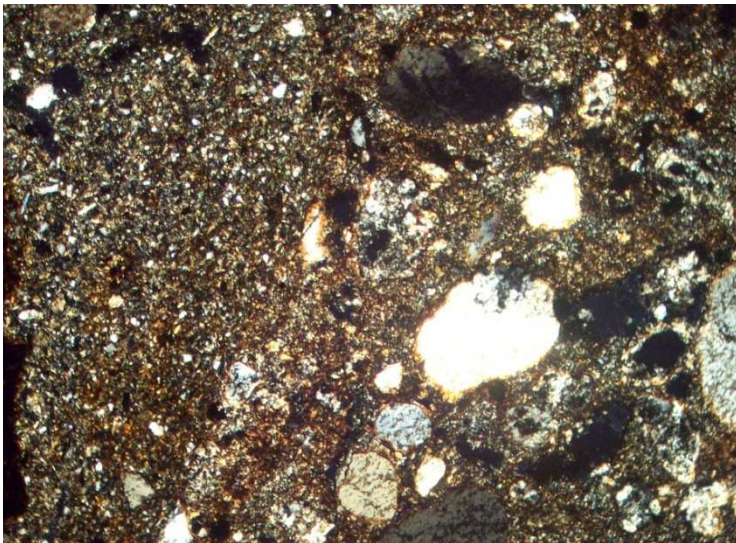
Biological soil crusts in the Mojave Desert, USA: micromorphology and pedogenesis.

Soil Science Society of America Journal, 76(5), 1685-1695.

Congratulations, Mandy!

This award will be announced at the business meeting of the Commission 1.1. at the Jeju WCSS next June.

COURSES



II Curso Latinoamericano de Micromorfología de Suelos y Técnicas Complementarias

*II Latin-American course of
Soil Micromorphology and
Complementary techniques*

Universidad Nacional de
Colombia
Departamento de Geografía
Bogotá (Colombia)

July 28 -August 02- 2014

This course will take place at the Geography Department and Geosciences - Department of National University of Colombia, in Bogotá city.

The main aim is to extend the knowledge of the micromorphology discipline to the Spanish speaking public in America, following its first edition in 2011. The course will deal with micromorphological techniques, petrographic microscopy, clay and coarse fraction mineralogy, with one day devoted to field work at Guasca Municipality. The course is aimed at researchers on Agronomy, Geography, Geology, Archaeology, Biology and more environmental sciences. The course will be given in Spanish.

Lecturers:

Carolina Mallol (Universidad de La Laguna, Spain)
Rosa Poch i Claret (Universitat de Lleida, Spain)
Marion Weber (Universidad Nacional de Colombia, Colombia)
Juan Carlos Loaza (Universidad Nacional de Colombia, Colombia)
Kim Robertson (Universidad Nacional de Colombia, Colombia)
Jorge Alberto Sánchez (Instituto Geográfico Agustín Codazzi, Colombia)

For information about fees and payment look at this web site:

<http://www.humanas.unal.edu.co/peec/cursos-y-diplomados-2014-1/geograf-a/ii-curso-latinoamericano-de-micromorfolog-a-de-suelos-y-tecnicas/>

More information with William Posada and Juan Carlos Loaza:

waposadare@unal.edu.co
jcloaiza@unal.edu.co

**Intensive Training Course
on Soil Micromorphology
Tremp, 28 september –
4 october 2014**



Organizers: Departament de Medi Ambient i Ciències del Sòl – Universitat de Lleida and Institut Cartogràfic i Geològic de Catalunya – Centre de Tremp

Contents: 4,2 ECTS

Principles of mineralogy and petrography, optical mineralogy – Sampling for micromorphology - Guidelines for the description of thin sections of soils and regoliths - Micromorphology of soil materials and identification of soil formation processes: carbonate-, gypsum- , and salt affected soils, volcanic soils, clay accumulation, hydromorphic soils, tropical soils, glacial and periglacial processes - Micromorphometry and image processing - Applications of micromorphology: Soil genesis and classification; Agronomy: sealing and crusting, structure and porosity; Archaeology; Geomorphology and sedimentology; Optional weekend excursion around the Tremp basin: Geology, Mediterranean soilscapes, soil genesis, archaeology (roman village of Isona).

Practical work: There will be a maximum of 2 people per microscope. The schedule foresees plenty of time for observation of the thin sections provided by the lecturers, as well for study of the own thin sections brought by the students.

Lecturers:

Prof. Àngels Canals (UB)
Prof. Mercè Bergadà (UB)
Dr. Vera M. de Melo Marcelino (UGent)
Prof. Rosa M. Poch (UdL)

Prof. Rafael Rodríguez (UdL)
Dr. Albert Solé-Benet (CSIC-EEZA)
Em. Prof. Georges Stoops (UGent)
Prof. Esperança Tauler (UB)

Language: English

Fees: 400 €

Accommodation: Youth Hostel of Tremp, besides several hotels are available.

Diploma: Official diploma of the University of Lleida will be handled after completion of the course.

Website and registration: <http://www.ice.udl.cat/fc/curso/801>¹

Contact: Rosa M Poch rosa.poch@macs.udl.cat

¹ We are working on the page, so that the registration page appears in English. If you have difficulties, please contact me.

Course on Soil Mineralogy and Micromorphology

15th Edition

30th June – 12th July 2014, Buenos Aires

The 15th edition of the "Course on Soil Mineralogy and Micromorphology" will take place at the Post Graduate School "Alberto Soriano" of the Faculty of Agronomy of the University of Buenos Aires, in collaboration with the Soils Institute of the INTA-Castelar, Argentina, from the 30th June to the 12th July 2014. This intensive two weeks course is given by Prof. Dr. Héctor J. M. Morrás every two years since 1985. It will count in this occasion with the collaboration of Dr. E. Favret, Dr. L. Moretti, Ms. Sc. F. Behrends, Ms. Sc. M. Castiglioni, Ms. S. E. Bressan and Mr. J. Delgado on lectures and the practical part of the course on several analytical techniques.

The course will be given in Spanish.

The first week is devoted to the study of inorganic fractions of soils, focused on clay mineralogy and concepts on processes of mineral weathering, soil formation and soil organization, including an introduction to analytical techniques particularly X-ray diffractometry. The second week is centered on soil micromorphology including the descriptive system and the principles and techniques of optical and electronic microscopy. During the course numerous examples of the application of mineralogy and micromorphology to different fields of research, specially to soil genesis, soil physics and soil management are exposed and discussed.

For more information, the people interested on the course may contact Prof. Morrás to **hmorras@cnia.inta.gov.ar** or the Post Graduate School to **epg@agro.uba.ar** or through the site **www.epg.agro.uba.ar**

Possible course on making thin sections!!!

George MacLeod (U Stirling) is considering running a soil thin section training course at the University of Stirling (UK). In order to gauge the level of interest he has created a short survey web page at <http://www.thin.stir.ac.uk/training/>

If you are interested, please fill the survey and/or contact him: g.w.macleod@stir.ac.uk

MEETINGS



<http://www.20wcsc.org/>

PLEASE TAKE NOTE OF THE SCHEDULE OF MICROMORPHOLOGY WITHIN THE WCSS:

June the 9th

12:40- 13:40 (lunch time! Bring your lunch package)

BUSINESS MEETING OF COMMISSION 1.1.

During this meeting the Kubiëna Medal will be awarded to Rienk Miedema

Room 302(3F)

13:40-15:30

Oral Session 9 [C1.1-2] Interactions between Soil Structure, Living Organism and Organic Matter.

Convener: Farhad Khormali

Halla Hall B (3F)

June the 10th

13:40-15:30

Oral Session 18 [C1.1-1] The Role of Environment on Soil formation: Morphological Indicators

Convener: Daniela Sauer

Room 202(2F)

June the 13th

13:40-15:30

Oral Session 64 [DS1] Micromorphological Answers to Palaeopedological and Polypedogenetic Questions.

Convener: Rosa Maria Poch

Room 402(4F)



European Geosciences Union General Assembly 2014

Vienna | Austria | 27 April – 02 May 2014

Add Session to your Personal Programme

SSS3.1/GM1.13/SSP3.1.21

Soil and sediments micromorphology: reconstruction of palaeoenvironments, anthropogenic processes, or more recent human impact on ecosystems (co-organized)

Convener: Luca Trombino | Co-Convener: Martine Gérard

Orals

/ Wed, 30 Apr, 13:30–15:15 / Room B11

Posters

/ Attendance Wed, 30 Apr, 17:30–19:00 / Blue Posters

Poster Summaries & Discussions:

PSD9.14 / Wed, 30 Apr, 12:15–13:00 / Room B7



Second announcement & registration

The International Workshop on Archaeological Soil Micromorphology 2014

May 26 - 29
Cultural Heritage Agency of the Netherlands
Amersfoort, The Netherlands

Registration for this workshop is now open. If you want to participate, please fill in the online registration form at www.cultureelerfgoed.nl/en/micromorphology. The number of participants is limited to 40. If the workshop is fully booked, you can put your name on a waiting list.

We are also inviting abstract submissions for poster presentations. See the website for submission guidelines. In order to allow for sufficient microscope time, there will be room for only a limited number (6 max.) of short (10 min.) oral presentations, preferentially focussing on new methods and innovations. If you want to give an oral presentation, please contact the organizers.

More information on the programme:

Monday 26th: Evening registration & reception
Tuesday 27th: Sessions
Wednesday 28th: Sessions; social dinner at Worldrestaurant "Dara"
Thursday 29th: Excursion (8:15 - 17:00)

The excursion will visit:

- The UNESCO World Heritage site of the former island of Schokland.
- The prehistoric/medieval living mound Firdgum with reconstructed turf-built house
- The prehistoric celtic fields and funerary monuments of Noordse Veld, Zeijen.

For more information, please visit our website at:
www.cultureelerfgoed.nl/en/micromorphology.

We hope to see you in Amersfoort!

On behalf of the organizers,

Hans Huisman
h.huisman@cultureelerfgoed.nl

15 INTERNATIONAL CONFERENCE ON SOIL MICROMORPHOLOGY
Universidad Nacional Autónoma de México (UNAM),
MEXICO CITY, DECEMBER 2016

LIST OF THE SESSION TOPICS – FIRST DRAFT FOR THE DISCUSSION.

At the business meeting of the last 14th IWMSM, the participants agreed that the themes of the forthcoming meetings should be significantly amplified. Novel theoretical and applied research issues, methodological approaches and opportunity fields of the micromorphological investigation should be invited and incorporated in the programs of the future conferences. The organizers of the forthcoming 15 International Conference on Soil Micromorphology, to be held in Mexico City in 2016 (proposed dates – beginning of December) assume that broad discussion of the Conference thematics within the micromorphological community is the best way to implement this agreement. This discussion should anticipate the event with a significant time lag. As the first step we present below the first draft of the list of the scientific topics and invite the Community to send comments, proposals and critical remarks. At the second phase, this feedback will be studied and summarized by the Organising and Scientific Committees to produce the Preliminary Program as the basis for abstract submission. At the last phase, the final program will be of the “Darwinian selection” of topics: depending upon the number of submitted abstracts the topics could be left unchanged, split, joined together or cancelled to produce the definite list of scientific sessions.

- 1) ***Micromorphology of key pedogenetic processes.*** Linking of microscopic observations and analytical data for process identification and modeling, in particular:

- Microscopic features of mineral alteration and geochemical indexes of weathering
- Crystal morphology of pedogenic carbonates and their isotopic signatures.

Combination and interaction of diagnostic features on micro-scale. Microscopic evidences for developing polygenetic models of soil formation. Contribution of micromorphology to development of soil classifications.

Regional problems of micromorphological studies of soil genesis and soil classification, to be highlighted in the forthcoming Conference:

- Soils of tropical and arid ecosystems
- Soils and geomorphic processes in karstic and volcanic landscapes

- 2) ***Soil ecosystem and agrosystem services:*** micromorphological criteria for soil quality, soil degradation, sustainable functioning.

- 3) ***Microscopic indicators of incipient pedogenesis on the natural and artificial surfaces, biofilms, biodeterioration.*** Micromorphological methods are especially effective for identification of the earliest stages of the soil and regolith development. This topic includes studies of:

- Biocrust development in natural extreme environments: periglacial environments of Antarctica and Greenland, extra-arid deserts, high mountains.
 - Early soil and ecosystem development on the fresh surfaces in the profoundly disturbed landscapes (quarries and tailings, eroded landsurfaces, military polygons etc)
 - Biodeterioration of construction materials.
- 4) **Soil-biota interactions on microscale:**
- Root (rhizosphere) – soil interface processes
 - Effects of mesofauna on soil porosity and aggregation; feeding features.
 - Bacterial films, exocellular polymers as agents of soil microstructure development
- 5) **Pedogenesis of the man-made soils and ecosystems:** micromorphological features and indicators in the soils of urban landscapes, industrial zones, landfill sites, artificial agricultural substrates; micromorphological criteria for the Technosol and Anthrosol specification.
- 6) **Micromorphological evidences of natural and technogenic catastrophes.** Short-term but violent event both natural (meteorite falls, volcanic eruptions, earthquakes, hurricanes, tsunamis) and human-induced (nuclear tests, industrial catastrophes, military clashes) catastrophic events affect dramatically landscapes and societies. Soils and near-surface terrestrial sediments receive the materials and impacts generated by catastrophic events which produce recognizable and persistent microscopic evidences. Study of these features and linkage to the type and scale of the catastrophic processes both recent and ancient are expected within this topic.
- 7) **Micro-paleopedology: paleosol-sedimentary sequences (loessic, volcanic, alluvial) and surface paleosols under microscope.** Micromorphological tools to improve resolution of paleopedological records and correlate them with the global climate proxies.
- 8) **Archaeological soil micromorphology:** site-formation processes, ancient cultural landscapes, microartifacts; problems of conservation of archaeological heritage.
- 9) **Novel methods, techniques and approaches in micromorphological research:**
- X-ray tomography and perspectives of three-dimensional soil micromorphological analysis
 - New opportunities in electron microscopy and microanalysis, experiences in applying environmental SEM and tunnel electron microscopy to soil objects
 - Computer techniques of micromorphometric research: towards quantification of porosity, structure, pedofeatures.
- 10) **New opportunity fields for soil micromorphology:**
- Forensic applications
 - Extraterrestrial regoliths



If you are interested to participate in the discussion group, Sergey Sedov created a forum:

Micromorphology2016

<https://groups.google.com/forum/?hl=en#!forum/micromorphology2016>

serg_sedov@yahoo.com

Report on the Working Meeting of the Micromorphology Commission of Dokuchaev Soil Society Moscow, 27 November 2013

The regular working meeting of the Micromorphology commission of Dokuchaev Soil Society was held on the November 27, 2013 in V.V.Dokuchaev Soil Institute, Moscow. It was attended by about 40 scientists from Moscow State University, Institute of Geography, Dokuchaev soil Institute, Tomsk State University, Institute of Physico-Chemical and Biological Problems of Soil Science, Publishing House Nauka (Science) etc. together with the on-line translation.

The meeting was originally planned at the mid-October 2013 in memorandum of French pedologist, micromorphologist and paleopedologist Prof. Dr. Nicolas Fedoroff (18.10.1934 – 14.02.2013) who had strong scientific and personal relationships with Russia.

The meeting included three presentations:

1. Irina Kovda and Maria Gerasimova. *Nicolas Fedoroff – notes on biography and scientific contribution*
2. Maria Gerasimova and Maria Bronnikova. *Kursk Chernozem – modern and paleopedological microfeatures*
3. Marina Lebedeva, Maria Dergacheva and Sergey Ponomarev. *Micromorphology of Pleistocene paleosols in Western Siberia (Volodarka site).*



Nicolas Fedoroff at the age of five (1939)

I. Kovda and M. Gerasimova gave some details on the story of the Fedoroff family starting from Nicolas' grandfather Mikhail Fedorov who used to be a public figure and a statesman in Russian Government before the revolution of 1917. Later on he had to immigrate from the country and since 1920 he was living in France.

Nicolas was born in Paris. His French education in combination with Russian mentality and the ideas he got from his aunt – Quaternary geologist - Vera Malysheff resulted in the formation of very specific pedogenetic approach based on micromorphology.

The second part of the presentation was dedicated to the overview of Nicolas' main areas of interest and such as:

- Micromorphology for pedology - soil forming processes diagnostics and mechanisms;
- Micromorphology for paleopedology;
- Micromorphology for archaeology;
- Development of micromorphology (methodology, terminology, Handbook);
- Teaching, training and organizing activities in micromorphology



Nicolas and Georges Stoops (Belgium) at the Micromorphology meeting in Paris, 1985

The next two presentations were related to application of micromorphology to paleopedology – one of the favorite topics of Nicolas Fedoroff.

M. Gerasimova and M. Bronnikova presented their results of detailed morphological study of a Kursk Chernozem profile. This study was conducted for the last year XII International Symposium and Workshop on Paleopedology held in Kursk, Russia. An initial idea of this study was to show a thoroughly described and examined reference profile of a Russian Chernozem to the participants of ISFWP-XII. The section prepared for this study revealed a complicated morphology. This was a rare case where a lower part of the surface Holocene Chernozem was superimposed on the upper part of a Bryansk paleosol (MIS-3).

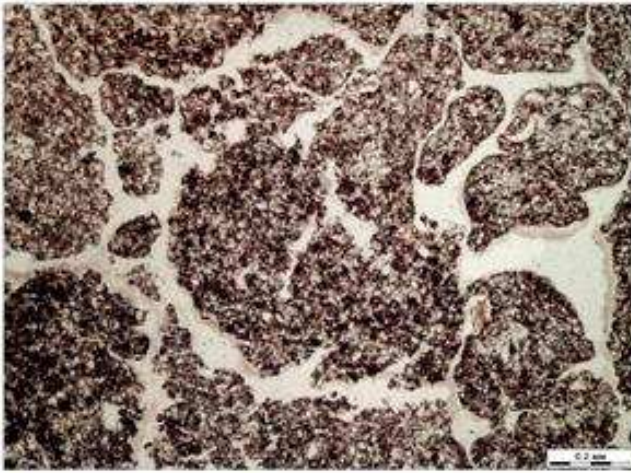


Nicolas at an international meeting with his wife Marie-Agnès Courty, Larry P. Wilding (USA) and Jaime Porta (Spain)

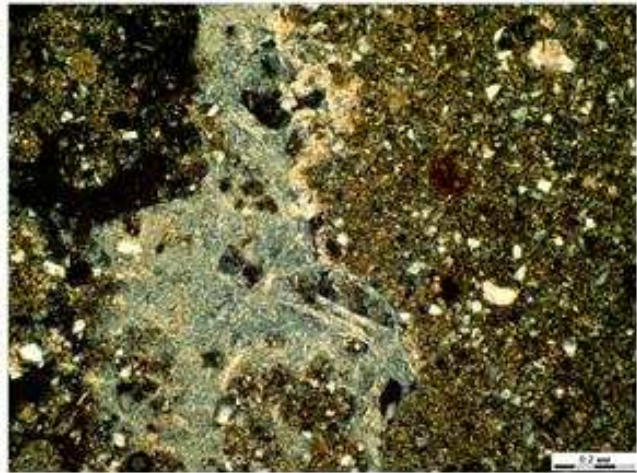


Field morphology of the Chernozem partly superimposed on MIS-3 paleosol and virgin steppe vegetation

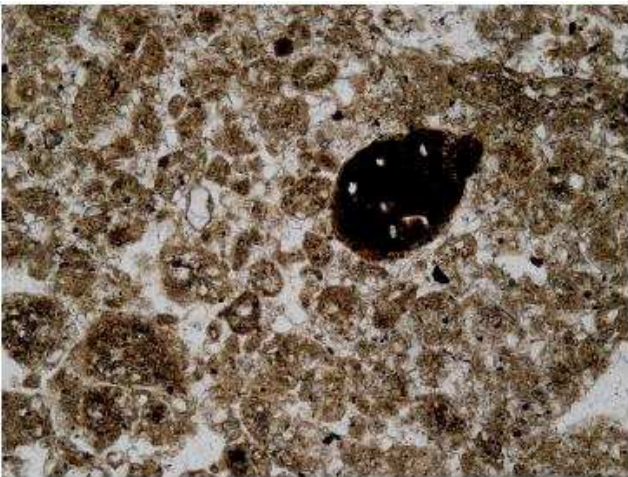
The section was studied, the description of morphological and analytical results was published in the ISFWP-XII Field Guide and the profile was demonstrated during the Field Workshop. The meso- and micromorphological parts of this study were presented during the meeting of the Micromorphology commission. Major results are as follows. The profile of the recent Holocene soil has a typical morphology for Chernozems of moderately continental provinces of European Russia: its thick very well structured, humus-rich dark-humus horizon abounding in diverse biogenic features and by a carbonate-accumulative horizon with abundant and extremely diverse calcareous pedofeatures dominated by labile (mould-like, needle-shaped, felt-like) forms of secondary carbonates. A proximity of the buried MIS-3 soil to the surface has not affected its main morphological and analytical features that are well preserved. The paleosol has: 1) a grayish brown, glossic humus-cryometamorphic horizon with a well-developed granular ooidal microstructure, clayey or iron-clayey films on aggregates; 2) carbonate-accumulative horizon with a very high content of carbonates and abundant impregnative, nodular and labile carbonate pedofeatures; 3) iron pedofeatures in all horizons, more common and more contrasting in the lower ones (combination of iron oxides segregations with depleted zones); 4) heavy texture; 5) no vertical clay differentiation, no indications of clay translocation. All these features are quite typical for earlier described paleosols of the Bryansk interval.



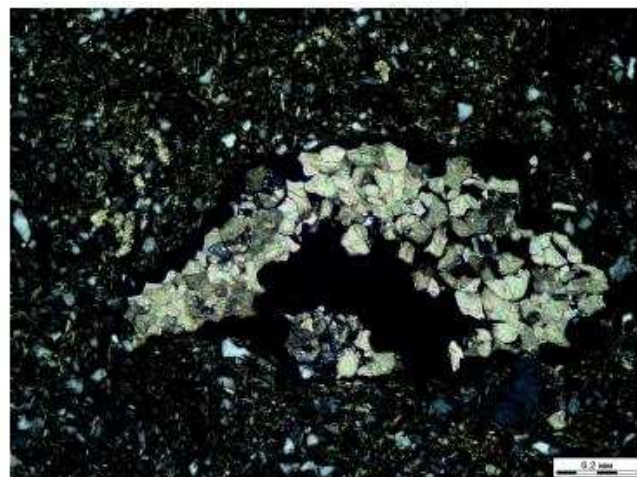
A. Vermicular microstructure of the A horizon of Chernozem; the infilling in the rounded void is composed of mostly fresh earthworm casts, PPL



B. Needle-shaped calcite infilling with microsparite grains in the upper part Bk of Chernozem, XPL



C. Ooidal (granular) clearly separated microstructure, and a Fe-Mn clayey nodule, Ab horizon of MIS-3 paleosol, PPL



D. Loose discontinuous infilling of sparite crystals, Ab, Ab horizon of MIS-3 paleosol XPL.

M. Lebedeva and her co-authors presented preliminary micromorphological results for the Pleistocene loess-paleosol series in Volodarka. The outcrop was studied in Altai Region (250 km South of Novosibirsk) on the exposure of Ob' River (Figure). This unique series has been known by the participants of Paleopedology summer school for young scientists guided by Prof. Dr. Maria Dergacheva (NOTE: next summer school is scheduled in Volodarka from July 30 to August 4, 2014. More information is available upon request via mid555@yandex.com).



50-m thick loess-paleosol pedocomplexes on the Ob' River exposure, Altai region

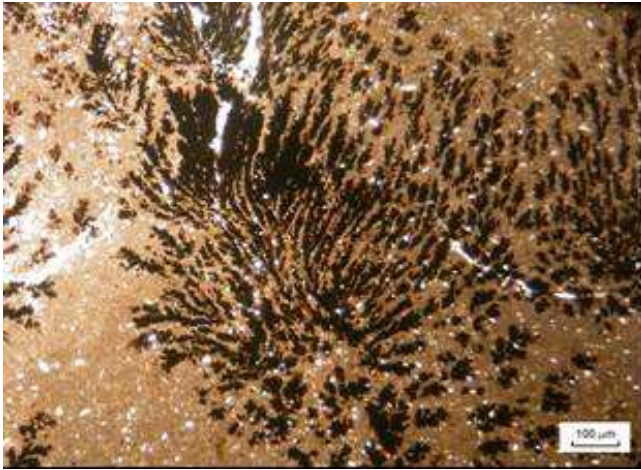
The specificity of Volodarka site is the combination of modern and paleopedological features in the present soil cover due to the presence of shallow and exhumated paleosols. The complicated Pleistocene history is recorded in details within the 50 m thick loess-paleosol

pedocomplexes, and a variability of relict pedofeatures can be discovered in surface soils.

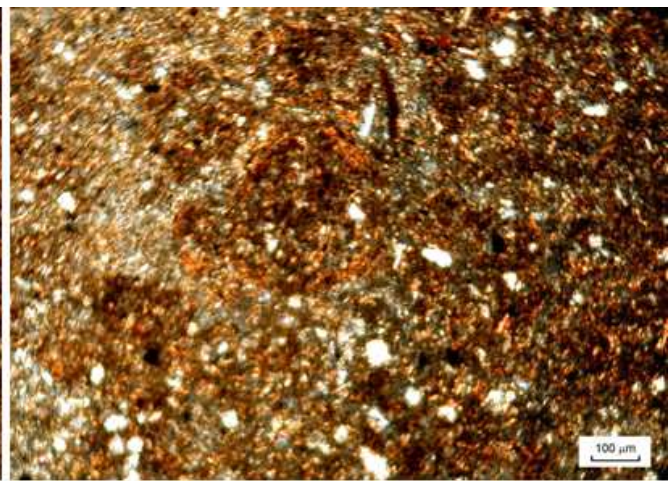
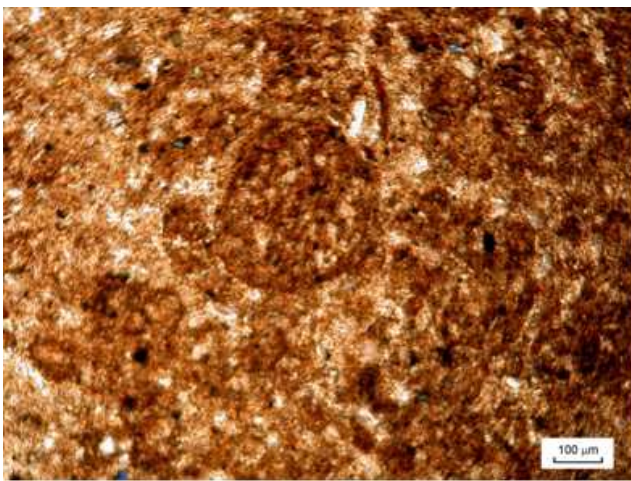
Alternation of wetter and drier, colder and warmed stages were reconstructed for the upper paleosol based on the micromorphology. Active processes of humus and carbonate accumulations were followed by wetter pedogenesis and temporal stages of cryogenic environment. Present day Chernozem exhibits the unique combination of modern labile carbonates and relict hard nodules together with the degrading ancient humus horizon.



Modern Chernozems with incorporated buried soil expected to represent Belov loess-paleosol pedocomplex (~600 kyrs)



Carbonate nodule with FeMn from the topsoil horizon of the modern Chernozem



Microstructure with relict cryogenic ooidal aggregates, 60-70 cm. PPL and XPL

Irina Kovda and Maria Bronnikova,
Institute of Geography, Russian Academy of Sciences, Moscow

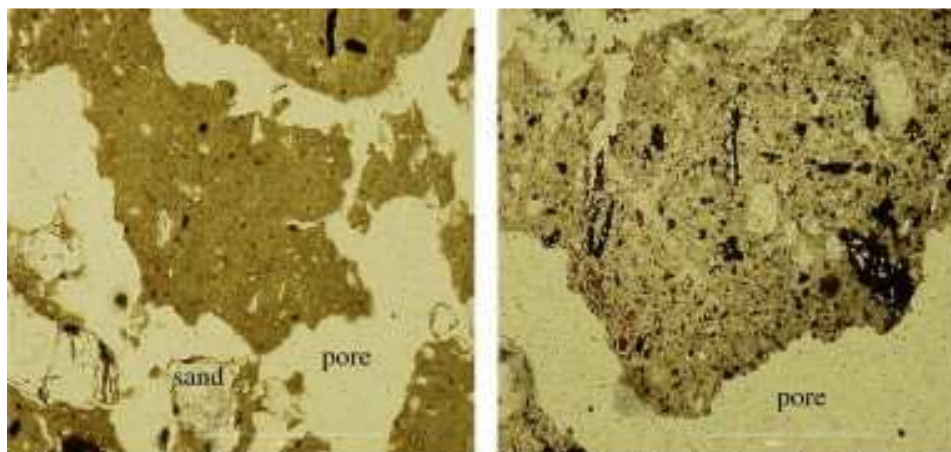
PUBLICATIONS AND RESEARCH NOTES

Zinn, Y. L., Guerra, A. R., Silva, C. A., Faria, J. A., & Silva, T. A. (2014)

Soil organic carbon and morphology as affected by pine plantation establishment in Minas Gerais, Brazil.

Forest Ecology and Management, 318: 261-269.

Reforestation with *Pinus* sp. trees is often associated with changes in soil physical and chemical soil properties, including depletion of soil organic carbon (SOC). In some cases, leaching of Fe compounds complexed by organic compounds can also occur, bleaching soil colors and perhaps further affecting SOC dynamics. This work aimed to compare SOC concentrations and stocks, as well as soil Fe compounds, under pine plantation and native semideciduous forests in Brazil. The hypotheses tested were that, under pine stands, SOC concentration and stocks decrease, and bleaching caused by Fe mobilization through the profile also affects SOC dynamics. Thus, paired plots consisting of neighboring pine plantations and native forests were sampled in triplicate to a 1-m depth in four different clayey soils (1 Oxisol and 3 Ultisols). Soils were characterized by mineralogical, chemical and physical analyses, SOC content by dry combustion, extraction of Fe compounds (total and amorphous oxides, and organically-bound) and also micromorphology. Soil order influenced how pine plantation affected soil structure, as bulk density increased in the Oxisol but generally decreased in the Ultisols. SOC concentrations and stocks reached 8.5% in the 0–5 cm layer and 309 Mg ha⁻¹ to a 1-m depth, respectively), which are high values compared with the Brazilian literature. Although SOC concentrations were significantly lower in subsurface layers of two soils under pines, after correction for changes in bulk density, only one Ultisol in the midslope position showed SOC stocks significantly lower (by ca. 56 Mg ha⁻¹) to a 0–40 cm depth, but not to a 1-m depth. Changes in Munsell colors indicative of bleaching or Fe mobilization were noted in all soils, and could be ascribed to consistent and simultaneous changes in amorphous Fe oxides and SOC in a midslope Ultisol, demonstrating podzolization in that site. In addition, soil thin sections suggested that Fe compounds were removed from the general matrix of peds in the Ultisols under pines, and concentrated in other areas of the same peds, which can explain changes in color dissociated from vertical changes in concentration of Fe forms. In summary, pine plantations in the studied area seem more prone to conserve SOC than in other cooler or drier regions in Brazil, although changes associated with Fe mobilization can occur in some Ultisols in midslopes, as reported elsewhere in sandier soils under cooler climates.



Soil under native forest

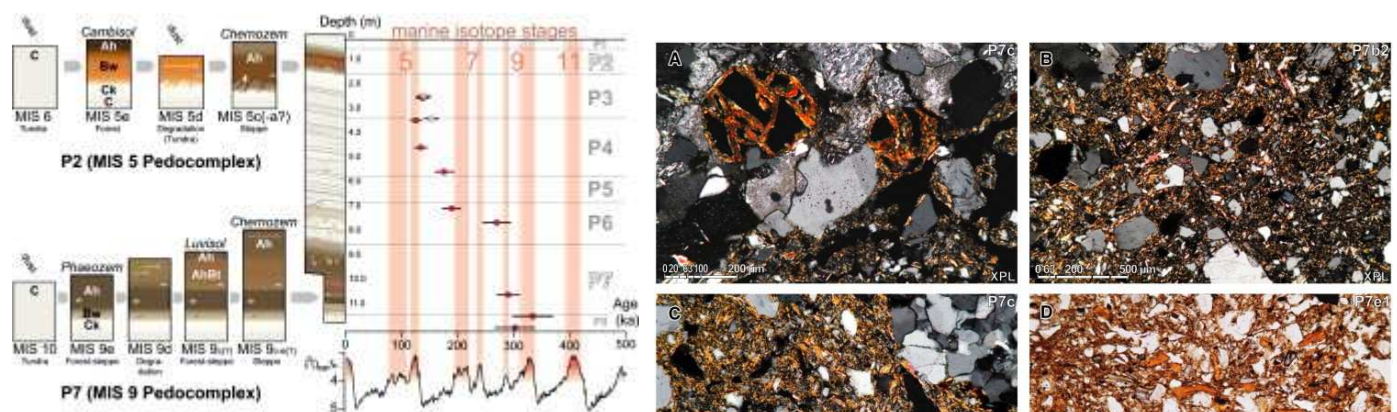
Bleached soil under pine plantation

Sprafke, T., Thiel, C., & Terhorst, B. (2013).

From micromorphology to palaeoenvironment: The MIS 10 to MIS 5 record in Paudorf (Lower Austria).

Catena 117: 60-72

The loess–palaeosol sequence (LPS) in Paudorf, Lower Austria is characterised by varying dust sedimentation rates, re-deposition with admixture of local rock fragments, erosion and pedogenic overprinting. Detailed semi-quantitative micromorphological analyses reveal the complex genesis of the palaeosols/pedocomplexes and the palaeoenvironmental conditions present during their formation. Our genetic model of landscape formation is underpinned with luminescence (post-IR IRSL) ages; the resulting chronological framework indicates that the basal loess sediment was deposited during marine isotope stage (MIS) 10. The overlying lower pedocomplex experienced a complex genesis in a forest-steppe environment during MIS 9. In the sand–loess sediment of MIS 8 a (forest-)steppe palaeosol (MIS 7) developed. The overlying MIS 6 loess sediment shows several intercalated Cryosols. The upper pedocomplex is a Chernozem (MIS 5c[–a?]) developed in a mixture of re-deposited Cambisol (attributed to MIS 5e), dust and local material. This study shows that the palaeoclimatic conditions in the study region were comparable to those of Central Europe during the last two glacial periods, whereas the conditions were more comparable to the Pannonian Basin climate during the last three interglacials.



(A) : Pre-weathered granulite fragment. Note the network of clay neoformations (birefringent) along cracks of the big garnet crystals (isotropic). (B): Speckled to striated b-fabric, few sand-grains with granostriated b-fabric. (C): Clay (partly oriented) in the groundmass. The area is free of clay coatings, except for the rounded aggregate of clay coatings in the left side of the micrograph. (D): Fragments of clay coatings scattered in the groundmass. (E): Relatively thick clay coatings, partly disturbed. (F): Fragment of thick clay coating and partly granular microstructure.

NEW BOOKS

ARCHAEOLOGICAL SOIL AND SEDIMENT MICROMORPHOLOGY

C. Nicosia and G. Stoops (Eds.) Archaeological Soil and Sediment Micromorphology.
Wiley-Blackwell.

Expected date of publication: early 2015. The book, started as an Atlas of the use of micromorphology in archaeology, contains three parts. Part I deals with "Archaeological materials" and contains about 30 relatively short entries. Part II treats "Archaeological context and microfabric", in 9 entries, and Part III presents "Instrumental methods in archaeological soil micromorphology" containing 10 entries. More than 40 authors are involved in this project.

C. Nicosia and G. Stoops

ARCHAEOLOGICAL SOIL MICROMORPHOLOGY WORKING GROUP

The 2015 Archaeological Soil Micromorphology Workshop will be held in the University of Cagliari, Sardinia, Italy. The date is likely to be the second part of May 2015.

Hosts will be **Prof Andrea Vacca** in Cagliari University, and organizers will be **Dr Raimonda Usai** and a team of micromorphologists. The workshop should also include a day or two conference.

MISCELLANEOUS

Off the Bench - Thin section Preparation of Soils and Sediments 2014

Julie Boreham (earthslides.com, UK) is conducting a survey on the current state of Thin Section Manufacture for Micromorphology. This survey has been sent out ahead of the International Workshop on Archaeological Soil Micromorphology, May 2014, Amersfoort, The Netherlands (see Meetings, this newsletter).

She would be most grateful if you could spare 10 minutes of your time to respond to this questionnaire. Here is a link to the survey:

<https://www.surveymonkey.com/s/YWZWLKT>

In case it doesn't work please contact Julie: julie@earthslides.com

Thank you for your participation!

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From Better Soils
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