International Union of Soil Sciences

Commission 1.1 Soil Morphology & Micromorphology *Newsletter*

October 2011, vol. 9, p. 1-28

Dear Colleague,

It is my pleasure to send you the October2011 Newsletter, full of promising information about courses, meetings, publications and research, thanks to the collaboration of many of you that sent the results of your investigations. Regarding meetings, we have two very important ones ahead: Eurosoil and 14th IWMSM, in July 2012. You will find their micromorphology session contents below. Registration and call-for-abstracts is open for both.

I hope you will enjoy reading all this news as much as I enjoyed preparing them!

Rosa M Poch

Chair, IUSS-Commission 1.1.

SUMMARY

ON THE 100TH ANNIVERSARY OF THE BIRTH OF EKATERINA A. YARILOVA

E.A. Yarilova is a worldwide known specialist in soil micromorphology, the only Russian laureate of the Kubiena Award, a person who efficiently contributed to the development of micromorphology in her country by teaching many soil scientists, maintaining contacts with western specialists through "the iron curtain" in the Soviet Union, and reading the books of Kubiena and Brewer to her colleagues.

E. Yarilova was born on March 25, 1911 into the family of Arseniy Yarilov, a prominent soil scientist, the first Editor of "Pochvovedenie" journal, and also an economist, and ethnographer. He was acquainted with famous scientists of the last century: G. Vysotskii, V. Vernadskii, N. Dimo, K. Gedroits. Her mother was a historian and ethnographer, and the girl received a brilliant education.

In 1930-1935, E. Yarilova was student of Soil and Geology Faculty of Moscow State University, where her teachers were K. Gedroits, N. Kachinskiy, I. Antipov-Karataev; in 1939, she defended her Ph.D. thesis entitled "Studies of manganese migrations in soils". During the War, Yarilova stayed with her family in Southern Siberia working at Khakasskaya Experimental Station of Irrigational Agriculture, and since 1944 started the research work in Dokuchaev Soil Science Institute in Moscow until her retirement in 1975 and even after it. There, she worked in the Laboratory of Soil Mineralogy headed by Academician B. Polynov, and started to study the initial pedogenesis on crystalline rocks. It happened that three young ladies – specialists in mineralogy and soil science: E. Yarilova, I. Feofarova, and E. Parfenova became interested in some mineralogical aspects of soil formation in the late 1950-ies. At that moment, they were lucky to "discover" the famous "Micropedology" of W. Kubiena, which determined their future activities: they all became the first micromorphologists in the USSR.

E. Yarilova started to publish her results in this new area in the 1960-ies. Basing on her own research and those with numerous students and colleagues, she produced thorough and systematic micromorphological descriptions of the main soil types of the former Soviet Union. More attention she paid to chernozems, solonetzes, chestnut soils.

A good knowledge of three European languages permitted E. Yarilova to participate in many national conferences and international congresses starting with that in Berlin in 1954. In 1969, at the III International Conference of Micromorphologists in Wroclaw, she was elected as a member of the International Working Group of Soil Micromorphology and contributed to the creation of the "Handbook of Soil Thin Sections Description" by both discussing the problems and defending the concepts and terms elaborated by the Russian school of micromorphology.

The results of micromorpholohical studies of soils E. Yarilova published in many papers in "Pochvovedenie" journal and in two manuals, written together with Elena I. Parfenova : "Mineralogical studies in soil science", 1962, and "Handbook for micromorphological studies in soil science", 1977.

Concluding, we may say that the voluminous contribution made by Yarilova to micromorphology in Russia comprised at least three aspects. First, she was a pioneer and promoter of studying soils in thin sections, showing and proving the advantages of the method. Second, she created a "database" – high-quality descriptions of many soils of the USSR. Third, she educated soil scientists in micromorphology and maintained an exchange of micromorphological information in the USSR and foreign countries.

In March 2011, the micromorphological Subcommission of Dokuchaev Soil Scientists Society held a special jubilee meeting with scientific presentations on micromorphology of arid and cryogenic soils, problems of terminology followed by the recollections about this prominent scientist, generous teacher and wonderful person.

NEXT MEETINGS AND CONGRESSES

14th International Working Meeting on Soil Micromorphology

8-14 July 2012 Lleida-Spain

Session 1. Soil genesis and classification
Convener: Irina Kovda
Co-Conveners: Curtis Monger, Ángel Faz, Octavio Artieda

The role of micromorphology for soil genesis and classification has been acknowledged since Kubiena's time. A special issue of SSSA on its contribution to soil classification was published in 1985 and broadly used. However, there are few publications using micromophology as a tool for identifying and/or confirming properties of diagnostic horizons in the WRB and national classification systems. The evolution of this system in the early 2000-ies proves the need of addressing to micromorphology for solving some problems concerning argic, cambic and other horizons. This may be an additional impetus for the progress in micromorphology as well. This symposium will be focused on the importance of micromorphology for better understanding and interpretation of soil genesis and soil processes including their initiation due to climate change, urban environment or other anthropogenic impacts in present time or in the past. Current role of micromorphology for national soil classification systems will be discussed, and the proposals about its possible input into the new project of the Universal Soil Classification are welcome.

Session 2. Environmental significance of mineral weathering
Convener: Martine Gerard
Co-Conveners: Georges Stoops

Mineral weathering is not only an important factor in the formation of soil material, but also in building the landscape, in pollution events such as the deterioration of monuments or in mining wastes management and potential effect of former mines on the environment. It has a largely underestimated and often not well understood impact on the bio-geosphere. Weathering of a mineral in a rock is affected also by the nature of other minerals and the total fabric, as well as previous alteration processes. These complex interactions can be studied only on undisturbed samples with mineralogical and microgeochemical methods using microscopic and spectroscopic techniques. Light microscopy, cathodoluminescence, Raman and submicroscopic techniques (SEM, TEM) and WDXRA, EDXRD, LAMA, FTIR, MNR, XAS etc. will yield information on different levels that has to be understood in function of the fabric. The aim of this symposium is to present both methodological and case studies contributing to the above mentioned research topics.

Session 3. Interpreting soil quality and agro-environment sustainability
Convener: Karl Stahr
Co-Conveners: Iñigo Virto

This session will include works using soil micromorphology and studies including microscopic observations of soil thin sections for the evaluation of soil quality indicators (i.e. porosity, organic matter distribution, water movement, and others), and soil functioning. Studies on the evaluation of changes in soil quality in relation to human-induced alterations of soil, and soil degradation or restoration following different agricultural and non-agricultural management are welcome, as well as studies including or describing innovative techniques of soil thin sections analysis allowing for the interpretation of soil quality.

Session 4. Interactions between organisms, organic matter, fabrics and minerals
Convener: Joselito Arocena
Co-Conveners: Albert Solé-Benet, Rafael Rodríguez, Maja Kooistra

Organisms are the most active organizers of organic and mineral components to form the common types of soil fabrics. The purpose of this session is to highlight recent knowledge to advance the understanding of the significant role of organism in soils. We call for submissions from all aspects of soil studies involving organisms such as the breakdown of minerals, nutrient cycling (e.g., nitrogen and phosphorus), soil biodiversity, mycorrhizal associations, bio-remediation of soils, and the formation of granular structure. Geo-archeological studies such as role of organisms in the conservation of ancient arts, artifacts and buildings are also welcome in this session. Experimental data to highlight the role of soil fauna (e.g., earthworms) in the alteration of records from previous processes such as clay skins in Bt horizon and related archaeological artifacts are suitable for this session. We also encourage the presentation of studies on new techniques (e.g., synchrotron-based micro X-ray diffraction) to understand the mechanisms / associations of organisms with minerals.

Session 5. Soils in extreme environments and under extreme events
Convener: Brenda Buck
Co-Conveners: Farhad Khormali, Thilo Eickorst

This session will present new and exciting research on all aspects of research related to soils that have formed in or been affected by extremes in environmental conditions. Research surrounding soils forming in or being affected by extreme conditions is increasingly important for many exciting fields of research including improving environmental and human health, examining the potential for extraterrestrial life, and predicting environmental responses to future climate change through a better understanding of the past. Applicable topics include research on soils that have characteristics attributed to extremes in climate (e.g. moisture/temperature), parent materials (e.g. unusual in composition or lithology, toxic constituents), biota (e.g. adaptations to extreme environments or evidence of significant control on soil characteristics), topography (e.g. extreme slope, aspect, and/or altitude), and age (e.g. extremely old surfaces, polygenetic). Research on natural soils is applicable as well as on anthropogenic soils regarding artificial soil formation and changes in land use.

Session 6. Ultra-micro technologies, micromorphological methods and image analisis
Convener: Marcello Pagliai
Co-Conveners: Fabio Terribile, Amy Brock, Rosa M. Poch

The session focuses on the promotion of discussions between specialists performing research using ultra-micro technologies, micomorphological methods and image analysis on soil structure, soil fabric, soil micromorphology and soil hydraulic in order to reach a better understanding on relationships between aggregation, n-modal porosity, configuration of pores and soil hydraulic properties. A detailed insight into the complexity of the pore system in soil can be obtained by using scanning electron microspoy to quantify micropores inside the soil aggregates, and image analysis on thin sections prepared from undisturbed soil samples to quantify macropores, which determine the type of soil structure. Technological and theoretical advances in sample preparation and image analysis have improved the methods for direct quantification of soil pores. By three dimensional analysis of the soil pore system is now possible to gain quantitative information about important parameters, such as pore connectivity and tortuosity, affecting in particular the preferential flow of soil water (funnel and fingered flow). This can be obtained by stereology and serial sectioning. The session also focuses on the more advanced, non-destructive image analysis techniques such as the X-ray computed tomography and the Synchrotron, both permitting a detailed insight of the spatial pores arrangement and the study of the associated water movement. All these methods allow the evaluation of soil quality through the quantification of indicators like soil porosity and structure and, in turn, the identification of processes of soil degradation.

Session 7. Micromorphology of sediments
Convener: Elvira Roquero
Co-Conveners: Héctor Morrás, Przemyslaw Mroczek

This session will deal with the application of Micromorphology to study depositional and postdepositional processes of unconsolidated sediments from different sedimentary environments (fluvial, marine, eolian, lacustrine, colluvial deposits...) other than glacial and periglacial that will be covered in other sessions. Contributions dealing with the recognition transported materials and identification of transformation from loose sediments to soil material under different ecological conditions (water table fluctuations, freezing processes, bioturbation) are also welcome.

Session 8. Micromorphology for paleopedology and loess-paleosols sequences
Convener: Peter Kühn
Co-Conveners: Daniela Sauer, Sergey Sedov, Xiubin He

The existing set of pedogenic features in palaeosols and pedosediments and herewith the clarification of the formation of relic and buried soils can be used as environmental indicators based on the process-oriented paradigm: factors -- processes -- features. In a pedostratigraphic context, those features in their relation to the environmental setting play a key role for paleoenvironmental reconstruction. This session focuses on the combination of established and new micromorphological methods applied for the analysis and interpretation of palaeosols and pedosediments as palaeoenvironmental proxies and their correlation with other geological archives to better understand the climatic, ecological and environmental changes particularly during the Pleistocene and Holocene.

Session 9. Convener: Richard MacPhail
Co-Conveners: Mercè Bergadà, Luca Trombino, Marie-Agnès Courty

The use of soil micromorphology in archaeology has developed exponentially over the last decades both in numbers of workers and sites studied. Much of this is due to funding opportunities related to commercial archaeology (mitigation projects) carried out within research contexts. Importantly, these may often parallel crucial academic investigations of non-threatened sites and fundamental research. This session, therefore, will include both examples of our developing research database and how aspects of this research are applied to the very many diverse sites that require investigation. Subjects to be covered are the employment of soils and sediments to interpret past land use and human impact, and the analysis of archaeological materials and features. Our chief aim is to demonstrate how all these can be integrated for the accurate interpretation of palaeoenvironmental and cultural contexts.

Session 10. Archaeometry and geoarchaeology
Convener: Selim Kapur
Co-Conveners: Alexander Tsaskin

Soils are increasingly understood as associated with other Earth's materials and functions. Our session encourages researchers from various backgrounds to present their cases in which micromorphological visualization serves for better understanding the dynamics of the Earth's processes. Linkage between micromorphology and geosciences is our new joint endeavor, and we welcome the topics of diverse coverage from weathering of rocks through the creation of biologically affected microstructures through the compatible conservation of historic objects and buildings, as e.g. being currently developed in the Mediterranean world of classical monumental and vernacular architecture.

Session 11. Glacigenic sediments
Convener: John Menzies
Co-Conveners: Jaap Van der Meer

Session 11 will introduce participants to the concepts, methods and application of glacial micromorphology as applied to glacigenic sediments. Micromorphology supplies both new questions and alternative answers to some fundamental issues within glacial sedimentology. Specifically the debate as to the origins, means of deposition and/or emplacement of subglacial sediments will be the central focus of the Session. This Session is directed at geoscientists interested in tills and associated glacigenic sediments both lithified and non-lithified. The Session will consist of lectures, microscope work, and short case studies. The objectives are to instruct attendees in: sampling techniques, methods of impregnation, sediment descriptions and interpretations, and in the general language and taxonomy of glacial micromorphology. Lectures on the development and evolution of micromorphology, the basic tenets of micromorphology and its application to glacigenic sediments, will intersperse with discussions of specific class-set examples from the course leaders' archive collections of thin-sections.

Registration and abstract submission will be open from November 1st, and should be done through the Conference website:
http://www.lleida2012.udl.cat/

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S9.1. Title: **Soil genesis and soil micromorphology**
Convener: Stahr Karl - Hohenheim University - Germany
Co-Conveners: Kapur Selim - University of Cukurova – Turkey, Poch Rosa M.- University of Lleida - Spain

Genesis via micromorphology has contributed to extend the knowledge on the processes of soil development by the study of many profiles, by many soil scientists throughout the world. However, the more interdisciplinary faces/links, that have been improved on most applicative sciences, has led micromorphology (initially meant to reveal the secrets of pedology and sedimentology/(paleosols-saharan dust contributions to soils and the paleo-environment) to serve via its approach to soil, mineral and various material changes as a tool in enhancing our knowledge on ancient and/or contemporary materials such as ceramics, pottery and mortars/cement in the recent decade. Consequently, the challenge of the contemporary soil genesis driven micromorphology is becoming an indispensable tool for the sciences of Archaeology, Geosciences and Material Sciences in revealing the past technologies of the ancient materials as well as the in-depth questions raised until today on the dilemma of hydration, mineral formations in concrete and fabric characteristics.
We encourage all scientists to present their abstracts to this Symposium where the participants will find utmost satisfaction during the discussions of the papers revealing the use of the major principles of soil genesis via micromorphology in other sciences.
Furthermore micromorphological methods allow to detect the relative sequence of new formations, infillings and cementation. Also new methods have brought light into unknown dimensions.

S9.2. Title: **Advancement in soil micromorphology**
Convener: Terribile Fabio - University of Napoli Federico II - Italy

In the last decades, soil micromorphology has given important contribution to the advancement of soil science and its application in agriculture and forestry. This was possible thanks to the uniqueness of the approach that enable to observe and analyze the soil system at multiple scales of investigation and also to the development many different analytical approaches. The complexity of today's environmental challenges indeed require to rethink soil micromorphology and to develop new tools to better understand the physical, chemical and biological processes underlying soil functioning. This symposium aims to gather experts to present and discuss, through both case studies and/or methodological works, major advances in the micromorphology of the soil investigation including new approaches and new techniques such as ICP-laser ablation, new applications of micro-analytical techniques (EDS, WDS), synchrotron techniques, microdrilling of thin sections, X-ray microtomography, new procedures for image processing and other novel techniques

S9.3. Title: **Imaging structure and probing properties of soil interfaces and aggregates**
Convener: Totsche Kai Uwe - Friedrich-Schiller-Universität Jena - Germany
Co-Conveners: Rennert Thilo - Friedrich-Schiller-Universität Jena – Germany, Vogel Hans-Jörg - Helmhotzzentrum für Umweltforschung - Germany

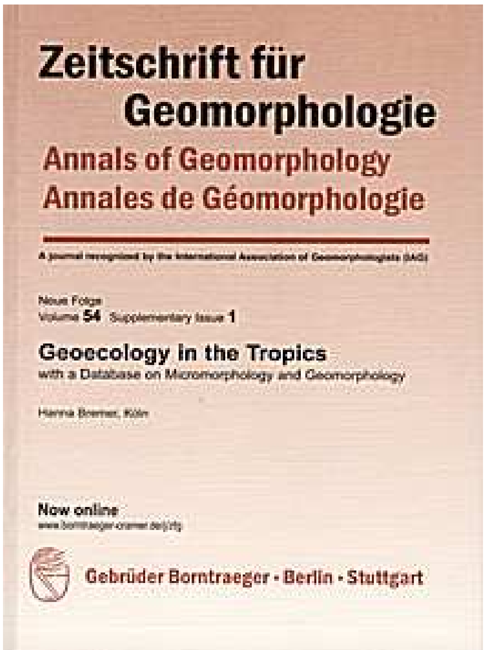
Soil is built of a dynamic and hierarchically organised system of various organic and inorganic constituents and organisms. Their combination and spatial structure defines a large, complex and heterogeneous biogeochemical interface, which is a hotspot of important soil chemical and biological processes. The interplay and interdependencies of biochemical and biophysical processes governing the formation, maturation, fate and properties of biogeochemical interfaces and soil aggregates have still to be unravelled. A crucial prerequisite for the understanding of processes occurring at biogeochemical interfaces is to elucidate their mineral and organic composition, the microbial communities acting at and forming biogeochemical interfaces and the spatial arrangement of these constituents including the hierarchical structure and architecture of the pore network and of aggregates. Recent advances in tomographic techniques have helped to image and to visualize the soils' pore-network structure and interfaces. Spectroscopic (e.g., XAS, XPS, SIMS) and microscopic methods (e.g., SEM, TEM, AFM) have helped to characterize interface properties at the micro- to nano-scale. To this session, we therefore invite contributions on imaging the soil structure, on the characterization of interfaces and aggregates allowing for the analysis of properties, and the combination of both.

Deadline for abstracts submission is 10 October 2011, and should be done through the Conference website:
http://www.eurosoil2012.eu/

The AK Geoarchäologie webpage always includes an overview of conferences: http://www.akgeoarchaeologie.de/tagungen.htm

The next AK Geoarchäologie meeting will be from the 17th-20th of May 2012 in Leipzig. Micromorphology presentations are welcome.

PUBLICATIONS



Geoecology in the Tropics with a Database on Micromorphology and Geomorphology
by Hanna Bremer.
Zeitschrift für Geomorphology N.F., 2010, Vol. 54, Suppl. Issue 1
337 p. 132 fig., 91 tab. Paperback.
EURO 139,00
More information: www.schweizerbart.de

During more than 20 years the Geographical Institute of the University of Cologne (Germany) studied regoliths and landscapes in different tropical regions. This resulted in more than 1200 samples studied both in the field and the laboratory, included in the “Cologne Regolith Database” (CRD). More than 30 parameters, each comprising several components, were thoroughly (“gründlich”, as said in German) studied and statistically evaluated. The present book can be considered as a synthesis of the work done by Prof. Hanna Bremer, her colleagues and her students.

The book treats the different aspects of rock weathering in the tropics, mainly based on mineralogical and micromorphological studies, the transformation of the saprolite to other regolith material, followed by the analysis of erosional and morphogenetic processes. Throughout the book the influence of parent material and environmental conditions is emphasises, without forgetting the role of palaeoenvironment. Because of the wealth of information given, it is regrettable that several concepts (e.g. regolith versus saprolite and soil; micromorphological terms) are not always clearly and strictly defined.

The book contains many diagrams and instructive colour pictures of profiles and thin sections. It is regrettable that, for the latter, only XPL images are shown, and that due to the relative small size of the frame (40 x 65 mm) and the low magnification used, details mentioned in the extensive captions are often hardly visible. The numerical system to distinguish titles and subtitles (e.g. 10.5.3. Planar processes – 10.5.3.1. Field observation) makes the structure of the text very clerar and cross referencing efficient.

Geoecology in the Tropics contains a wealth of data and new insights concerning the genesis of tropical regoliths and their relationship with geomorphology. Extensive citation of less well known local publications opens new horizons, and compensates a rather limited referencing to international literature. Although this is not a traditional book on soils, it is most interesting and innovative with regard to soil formation in the tropics because of its integral approach, and therefore highly recommended for pedologists and ecologists working in the tropics.

G. Stoops

(book review published in Pedon, N° 22, page 21, 2011)

RESEARCH NOTES AND RECENT PAPERS

Steven G. Driese[1], Lee C. Nordt[1], Gary E. Stinchcomb[1], Kelly E. Graf[2], Ted Goebel[2] and Michael R. Waters[2] (2011)

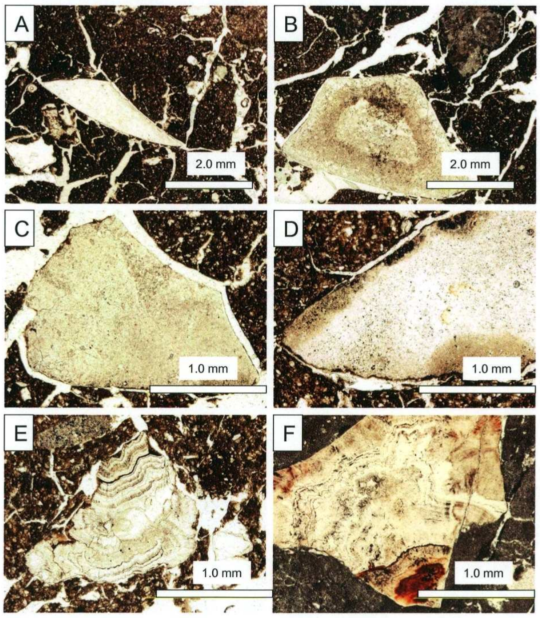
Applications of soil micromorphology, pedology and geochemistry to interpreting potential for disturbance of stratigraphic context at geoarchaeological sites: Texas Vertisols and Alaskan Gelisols.

1. Dept. of Geology, Baylor University, One Bear Place #97354, Waco, TX, 76798-7354, USA;, 2. Center for the Study of the First Americans, Departments of Anthropology and Geography, Texas A & M University, 4352 TAMU, College Station, TX , 77843-4352, USA

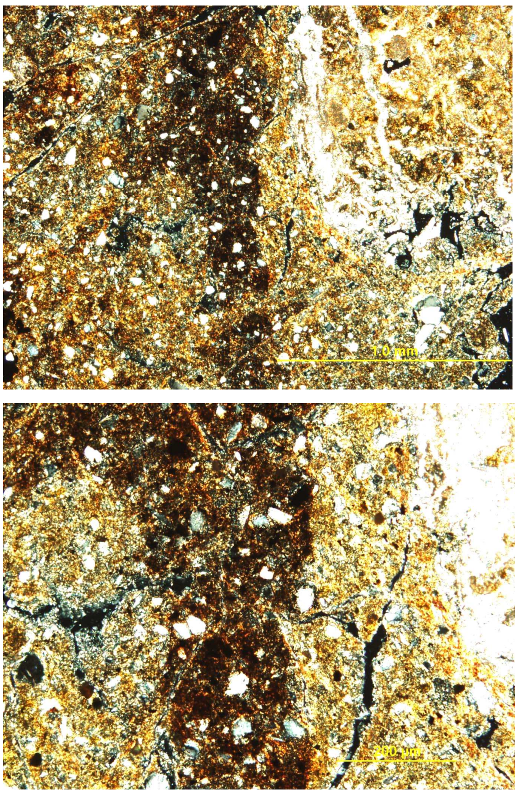
Geoarchaeological sites hosted within "active" soils are often considered suspect because of the concern for their possible disturbance of stratigraphic context. Micromorphology, pedology, and geochemistry are tools useful for assessing soil mixing. Clay-rich floodplain soils (Typic Haplusterts) were examined at the Friedkin archaeological site along Buttermilk Creek in southwestern Bell County, TX, which is significant because of evidence for pre-Clovis (13,200-15,500 BP) humans in North America (Waters et al., 2011, Science, v. 231, p. 1599-1603). The soil contains abundant lithics and was assessed for disturbance by vertic soil processes (shrink-swell and cracking) affecting the stratigraphic integrity of the archaeological materials, as well as for other soil characterization data useful for interpreting pedogenic influences on site formation. Although gilgai relief is very subdued, two soil profiles (microlow and microhigh) were sampled to examine any significant differences. Vertic features are only weakly to moderately developed in thin section, and consist mainly of stress cutans around detrital grains, slickensides, and cross-striated birefringence fabrics; although there is evidence for clay shrink-swell, there has not been significant upward vertical displacement associated with pedoturbation and no mixing of cultural horizons. Vertical fractures with dark infilling are small in width (<1 mm) and preclude downward movement of artifacts. Microdebitage is abundant in all levels within the soil profile. Based on high-resolution OSL dating, sedimentation was more or less continuous, and pedogenesis kept pace with sedimentation as evidenced by rather uniform leaching profiles established using bulk soil elemental chemistry as well as standard soil characterization data.

Vertisols at Debra L. Friedkin site, TX. Note lack of gilgai microtopography, soil cracks that taper to diameter of <micro-artifacts at Clovis and pre-Clovis levels, and lack of master slickenside surfaces or "bowl-shaped" structures related to lateral shearing (cf. Burleson Vertisol).

Micromorphological observations from the Owl Ridge site in central Alaska occurring in periglacial soils (Gelisols) indicate that most of the strata are overprinted with cryoturbation processes common in frost-affected soils (e.g., Gelisols of USDA Soil Taxonomy) and result from frost-action (e.g., banded fabric, lenticular structure, stone-jacking, silt capping, fragmented organics and Fe concentrations), however, physical mixing of soil matrix appears to be confined to individual horizons (i.e., intra-horizon mixing) and the archaeological integrity between strata is likely intact. But it is unclear from this analysis whether microstratigraphic relationships (e.g., mm- to cm-scale) are intact. Lastly, secular changes in spodic soil processes through the profile suggest changes in paleovegetation/paleoenvironment that may be associated with paleoclimate change. Although frost-affected micromorphic features occur at varying abundances throughout the profile, there is a notable lack of frost features in the stratum 2b loess, which is dated as 11,000-11,500 BP. Whereas observations suggest that spodic and cryogenic soil processes occurred concurrently at some times in the past, there is also evidence for cryogenic overprinting (polypedogenesis) in the profile. These observations suggest that predominance of spodic and cryogenic processes may have alternated through time, with spodic processes corresponding to slightly warmer periods promoting soil formation associated with coniferous vegetation, and cryogenic processes dominating during colder periods in which soil formation was inhibited or disrupted by freeze-thaw processes. The results from both Texas and Alaska demonstrate the importance of soil micromorphology in interpreting site formation, determining the stratigraphic integrity of archaeological sites, and providing implications for paleoclimate change.



Vertisols at Debra L. Friedkin site. TX. Comparison between average size of micro-debitage and apertures of soil cracks at level of Clovis and pre-Clovis



More information: Michael R. Waters, et al. 2011. The Buttermilk Creek Complex and the Origins of Clovis at the Debra L. Friedkin Site, Texas. Science 331, 1599. DOI: 10.1126/science.1201855

Donatello Magaldi, Alessandro Lorè, Paolo Lorenzoni, Roberto Sulpizio, Giovanni Zanchetta, Giuseppina Benedetti e Fabiola Ferrante. Revisione della Micromorfologia del Suolo a cura di Francesca Tescari, DSSNP, Università di Firenze

The filling of karstic depression of Piano Locce (Gran Sasso range, Abruzzi, Italy): genesis and significance (Genesi e significato del riempimento della depressione carsica di Piano Locce sul Gran Sasso d'Italia (Abruzzo)

"Il Quaternario" Italian Journal of Quaternary Sciences,22(2) 2009:171-188

A deep test hole until 90 m was carried out on the clastic filling of a karstic valley (polje) of the Gran Sasso (Piano Locce) range near S. Stefano di Sessanio (L'Aquila Province, Italy). This allowed to sample alternated lacustrine and pedogenetic materials almost exclusively formed on medium-fine textured pyroclastic deposits. On almost one hundred samples some routine chemical-physical, optical micro morphologic , SEM –EDS micro- chemical determination and spectrometric by X ray emission analysis were performed.

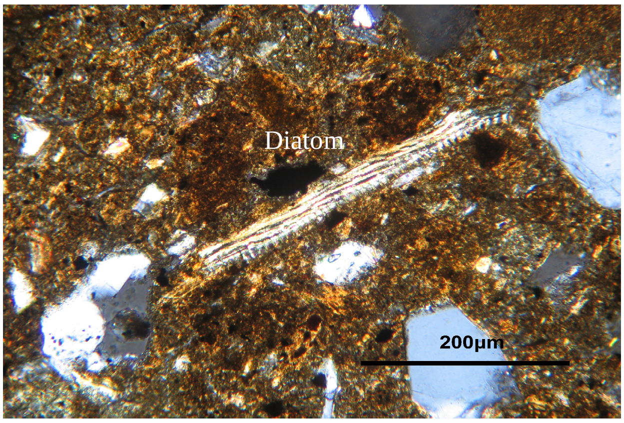
After the results elaboration the collected samples were grouped (α, β, γ) as follows:

α Group was related to not pedogenic sedimentary material(lake and or marsh); γ Group was identified as soil or soil derived material perhaps to be classified as Udifluvent according to USDA Soil Taxonomy; β Group was considered as a mixture of the previous groups , except soils which were classified as Hydraquents. The pedogenic process were prevailing on the ripening, so originating anisotropic microstructures with some orientation of clay domains in thin section of undisturbed samples.

The SEM analysis indicated that most of volcanic glass was completely weathered: only the less weathered sample of the core bottom (78-80 m) was classified as related to latite-trachyte rock.

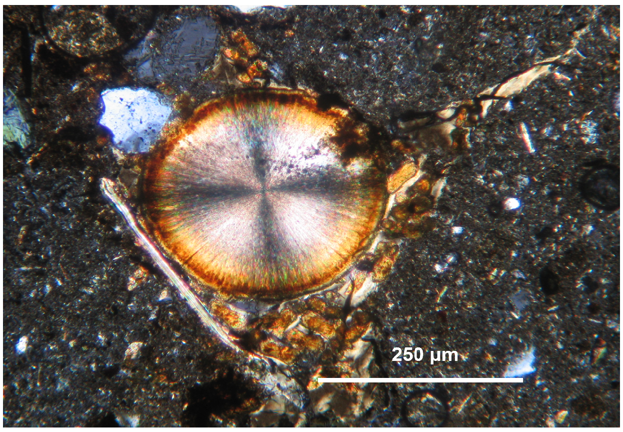
Such a composition could be related with the Vico Pleistocene eruption which is constituted by trachite-phonolitic lavas ((Peccerillo, 2005).Consequently , this sample could be correlated to pyroclastic deposit of the Adriatic Sea collected from a core 170,000 years before present dated (Calanchi et al., 2008).

Taking into consideration the low contents of Na2O and ClO , a correction (3 – 4 %) was made for the sum of alkaline oxides in order to classify the glass as a tephritic-phonolite and phonolite lavas which are assumed to be erupted by the Campania volcanism (Peccerillo, 2005). Based on the composition of both pyroxene and plagioclase minerals and the paragenesis , 2 samples were attributed to the Latium volcanism .



It was also considered that the silt/clay ratio vs. the core depth , which demonstrated an inverse trend with the percentage of organic matter, could be assumed as a paleo-climatic index. Low values of the index could indicate more favourable conditions for pedogenesis unlike higher values which could indicate colder and perhaps more arid periods. On the conclusion, all results are like to indicate that Piano Locce depression during Quaternary age was subjected to various sedimentary and pedogenetic phases which occurred on pyroclastic deposits coming from the Co-magmatic Roman Province, starting until the present age from 200,000 years ago and more .

Climatic variations in a high mountain environment are suggested by trends of both organic matter and silt/ clay ratio as well as micromorphological features which in few case show periglacial aspects. Where favourable climatic conditions occurred, some scarcely developed hydromorphic soils formed. A very limited colluvial and/ or eolian material from more developed soils of different climatic environment (red soils as Xeralfs or Ustalfs) together some occasional deposition of creeks from surrounding carbonate slopes contributed to fill the Piano Locce and nearby karst valleys .



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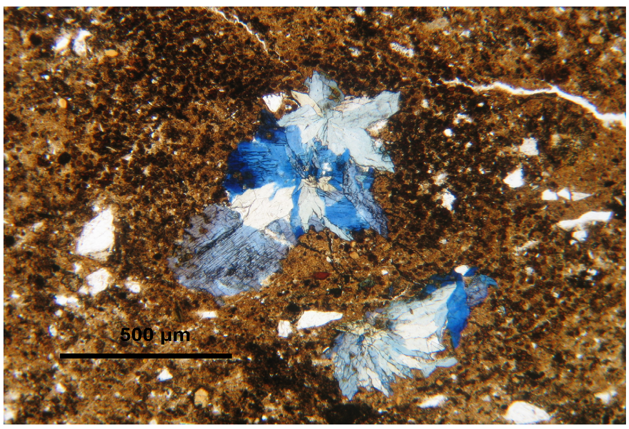

Vivianite

Alfonso Meléndez[a], Ana M. Alonso-Zarza[b], Carlos Sancho[a]

Multi-storey calcrete profiles developed during the initial stages of the configuration of the Ebro Basin's exorrheic fluvial network

Geomorphology 134 (2011) 232–248

[a] Departamento de Ciencias de la Tierra, Universidad de Zaragoza, 50009, Zaragoza, Spain

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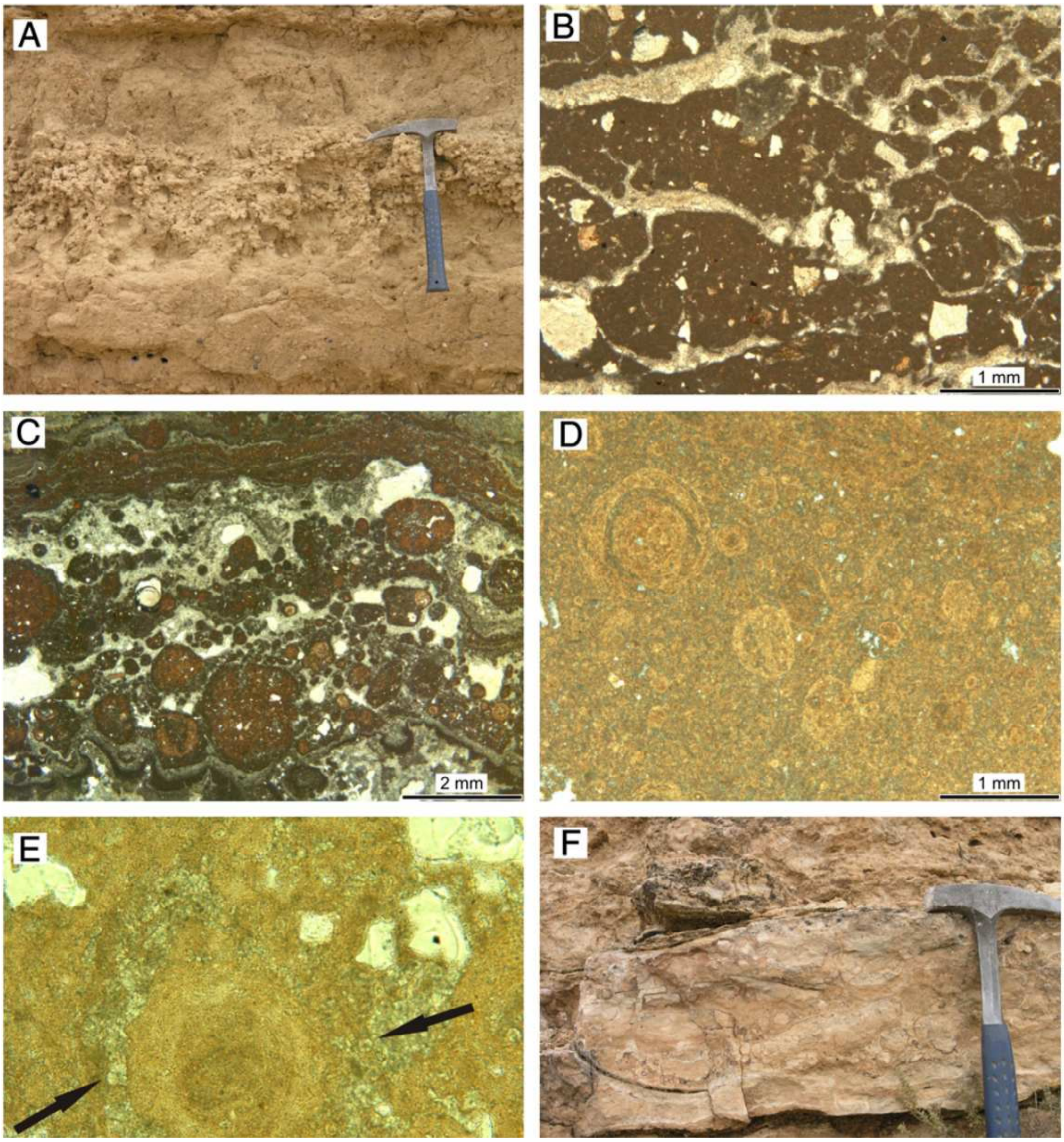
Multi-storey calcrete profiles developed in the Quaternary on strath terraces of the Cinca and Alcanadre rivers, tributaries of the Ebro River in NE Spain. Two calcrete profiles (Tor 1 and Tor 2) near the village of El Tormillo show horizons with an arrangement that differs from that of commonly described calcrete profiles. Significant lateral changes occur in these profiles within a distance of less than 200 m, reflecting their pedofacies relationship. The Tor 1 profile on terrace Qt1 (the highest and oldest) consists of six horizons (from bottom to top): 1) coarse fluvial gravels; 2) mudstones with carbonate nodules; 3) a chalky horizon; 4) laminar horizons, including one peloidal horizon; 5) a multi-storey horizon formed of at least six minor sequences, each of which includes a lower detrital layer, a pisolithic horizon, and a thin discontinuous laminar horizon (these sequences indicate several cycles of brecciation and/or reworking); and 6) a topmost laminar and brecciated horizon also including reworked pisoliths. Some 200 m to the north of Tor 1, horizon 5 undergoes a lateral change to channel fill-deposits. The infill of the channels shows a fining-upwards sequence ranging from clasts of about 10 cm in diameter to red silts with sparse pebbles. All the clasts come fromthe underlying calcrete horizons. Laminar horizons are interbedded with the clastic channel deposits. The youngest calcrete profiles developed on terrace Qt3 of the Cinca River and on the Qp4 and Qp6 mantled pediment levels. All show relatively simple profiles composed mostly of lower horizons of coated gravels, with thin laminar horizons at the top. Most of the horizons, especially the laminar ones, show biogenic features such as alveolar septal structures, calcified filaments, biofilms, spherulites, micropores and needle-like calcite crystals. These features indicate the important role of vegetation in the formation of all the above profiles. The interbedding of clastic sediments and pisolithic horizons within the Tor 2 profile indicates several stages of stabilisation during profile formation. These sequences are an indication of the sedimentation, soil formation and reworking processes operating on the soil surface. The alternation of these processes is interpreted as the result of climate–vegetation changes. The channel-fills of Tor 2 indicate erosion and reworking of the hard laminar calcrete horizon. Both Tor 1 and Tor 2 are multi-storey profiles reflecting the complex sedimentation–erosion–pedogenesis relationships at the final stages of the development of its corresponding fluvial terrace. The study of these calcretes shows that these supposedly abandoned terraces continue to be active even though the fluvial network is entrenched. Both the pedofacies relationships and the complexity shown by Tor 1 and Tor 2 reflect the complex and unstable geomorphic setting in which these profiles developed. After the establishment of the exorrheic network, less complex calcrete profiles were produced in the lower terraces.



Detailed view of the lower part of Tor 1. This is composed of three sub-horizons, the intermediate one consisting of irregular carbonate nodules formed around roots. B. Photomicrograph of the chalky horizon, which consists of micrite with etched detrital grains. A network of desiccation and root cracks, partially filled by cement, can be observed. C. Photomicrograph of peloids inwhich the nuclei consist of sandy micrite and the coatings are absent or very thin. D. Peloids showing a well developed concentric coating and embedded in a micrite matrix. E. The peloid in the central part of the picture is coated and etched by spherulites of about 20 µm diameter (arrowed). F. Pisolithic horizon in Tor 1. These decimetre-scale horizons are vertically stacked with some intercalations of laminar horizons.

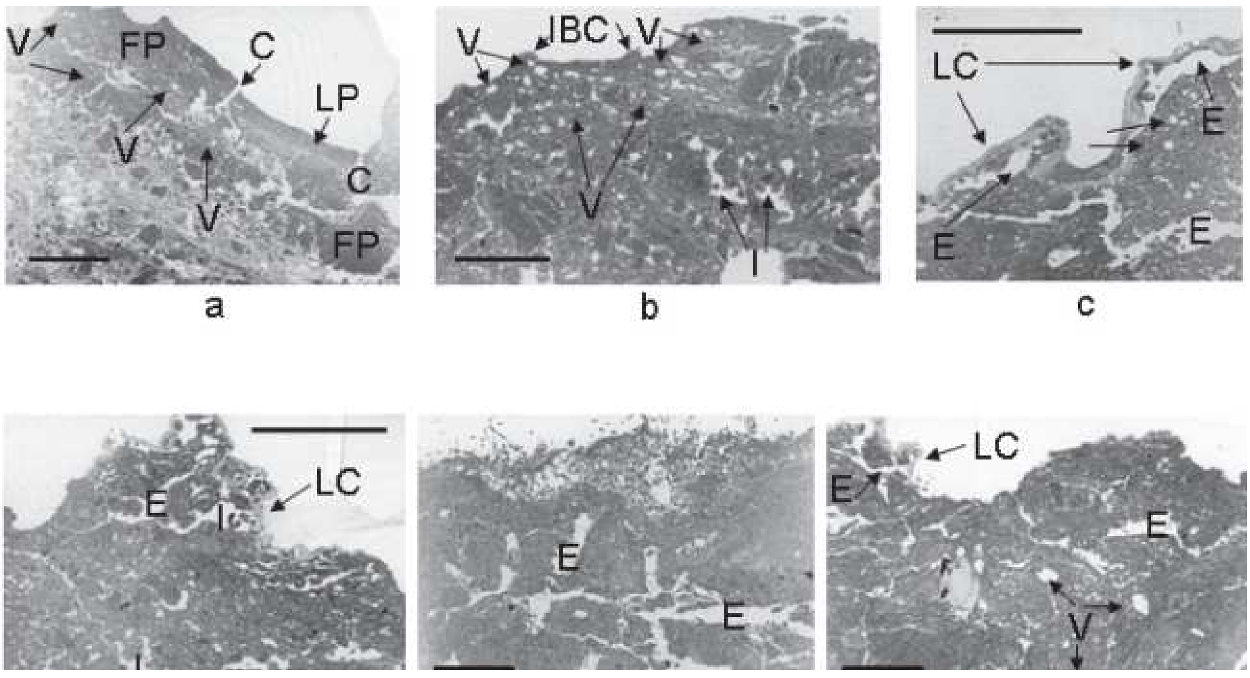
Isabel Miralles, Yolanda Cantón, Albert Solé-Benet. 2011.

Two-dimensional porosity of crusted silty soils: indicators of soil quality in semiarid rangelands?

Soil Sci. Soc. Am. J., 75: 1289-1301.

Estación Experimental de Zonas Áridas – CSIC. Almería (Spain)

Little is known about the morphological characteristics of pores in soil crusts. The objective was to characterize the two-dimensional (2D) porosity (amount, shape, size, and area of pores) of soil crusts to ascertain their potential as indicators of soil quality for natural crusted soils. The 2D-porosity was described in thin sections and measured by image analysis of polished resin-impregnated soil blocks. Physical soil crust and incipient biological soil crusts appear to be the lowest-quality soils in terms of number of pores (average of 131–133 cm-1) and area occupied by pores or meso-macroporosity (3.5–4.2%). Their most abundant pore types were small unconnected rounded pores. Soil crust infiltration coefficients (65–72% annual) were among the lowest and their high erosion rates (81– 204 g m^{-2} yr^{-1}) were not only due to their lower total porosity, but also to their pore shapes and sizes. Biological soil crusts appear on higher-quality soil, where the higher the organic C content, the more evolved the soil crust is (with lichens and cyanobacteria). Such soil crusts have better developed pore-systems with specific meso- and macropore morphologies, for example, large, interconnected elongated and irregular pores. Biological soil crusts (BSCs) dominated by lichens have the largest meso-macroporosity (up to 23.65%) due to the predominance of elongated pores. In many cases, infiltration is low (46–57%) because the biological crusts are somewhat detached from the soil underneath, but the armouring effect decreases erosion rates (7–23 g m^{-2} yr^{-1}). Soil crust pore numbers, size, and shape were useful indicators of soil quality.



Photographs of thin sections of the crusted soil surfaces in the study area, where the general soil structure can be observed in plain light: (a) physical soil crust, PSC, formed by a structural crust over a very well-developed depositional one. Observe a dense layer formed by fine mineral particles (FP) with some small disconnected rounded pores (vesicles V) and cracks (C) at the top, and layered fine particles (LP) and vesicles below the surface. (b) View of an incipient biological crust (IBC) near the bottom of a SW-oriented slope with many rounded unconnected pores (Vesicles V) in the upper part and few irregular (I) pores in the middle part. (c) Lichen crust, LC1, from a NE-oriented slope. Lichen (LC) is mostly detached from the soil beneath it; large elongated (E) pores quite connected and few rounded pores (V). (d) Lichen crust, LC2, from a divide; the lichen is somewhat detached from the soil beneath it; as in LC1, interconnected irregular (I) and E pores can be observed. (e) Mixed crusted surface, CVS1, formed by mosses, lichens, and cyanobacteria, from the middle of northeastern-oriented slopes (pediment) over a well-developed soil structure. The fabric is highly porous with many large, interconnected, E and I pores. (f) Mixed crusted surface, CVS2, formed by LC, mosses, and cyanobacteria, from the bottom of pediments over a medium-grade soil structure; some large and fine interconnected, E pores can be observed and some rounded unconnected pores (R). The black bars are 10 mm in all photographs.

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Brenda J. Buck*, James King** and Vicken Etyemezian** 2011.

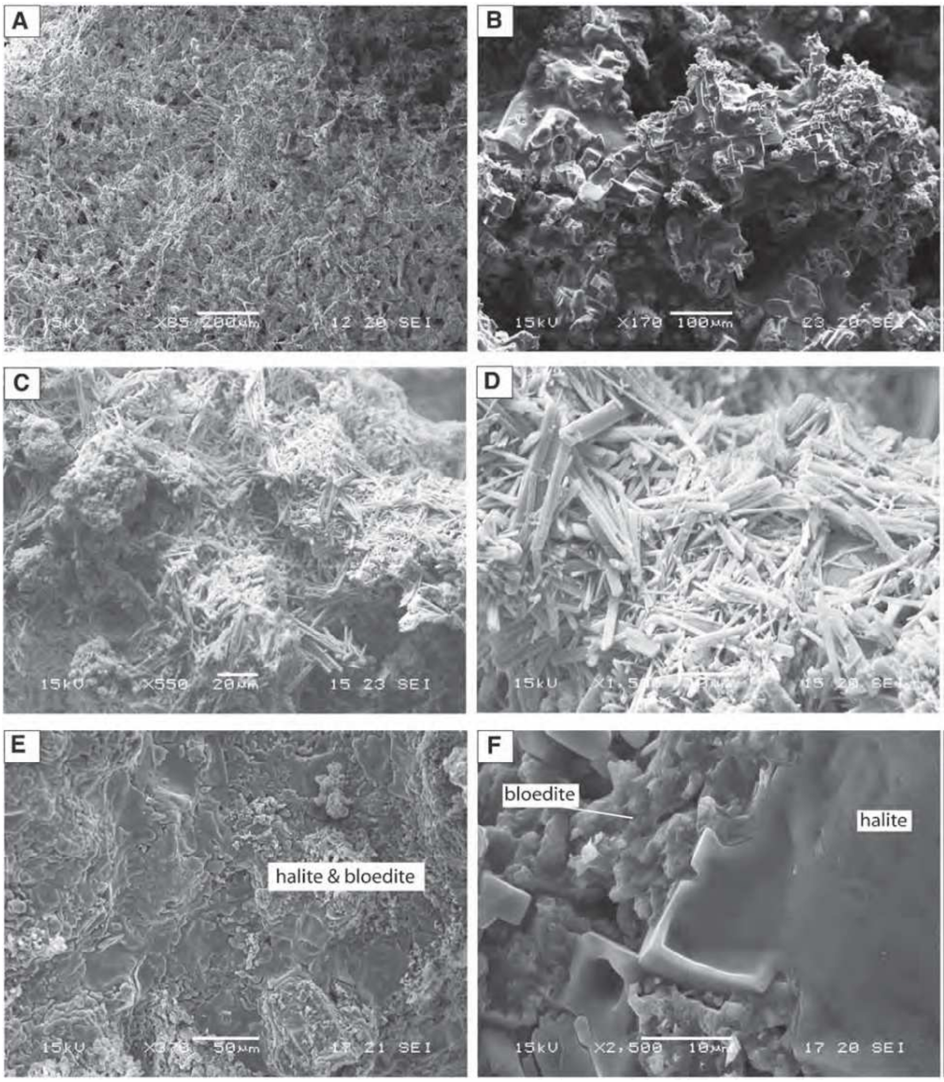
Effects of Salt Mineralogy on Dust Emissions, Salton Sea, California

*Dep. of Geoscience, Univ. of Nevada-Las Vegas 4505 Maryland Pkwy. Las Vegas, NV 89154

**Desert Research Institute, 755 E. Flamingo Rd., Las Vegas, NV 89119

Soil Sci. Soc. Am. J. 75:1958–1972

Some of the most emissive surfaces on Earth are dominated by salt minerals. We hypothesized that the vulnerability of surfaces to eolian erosion may be controlled by salt mineralogy and crystal habit. We used x-ray diffractometry (XRD) and scanning electron microscopy–energy dispersive x-ray spectrometry (SEM-EDS) analyses to measure salt mineral assemblages and crystal habits along exposed shorelines of the Salton Sea, California. Potential dust emissions were also measured using the Portable In-Situ Wind Erosion Lab (PI-SWERL). Results indicate that surfaces with the highest emissions, up to ~1 mg m^{-2} s^{-1}, are composed of hydrous/anhydrous salt minerals and minerals with acicular or prismatic crystal habits. Hydrous/anhydrous minerals (mirabilite/thenardite, eugsterite/glauberite, gypsum/bassanite, and numerous Mg sulfates) are more unstable under changing environmental conditions, are likely to dissolve and reprecipitate repeatedly, form less cohesive tiny individual crystals or small aggregates, and are therefore more likely to result in highly emissive surfaces. Salt minerals with acicular or prismatic habits are more likely to be disruptive, enhance salt heave, lessen the degree of interlocking precipitates, and form loose, “puffy” crusts that are highly emissive. Low-sloping surfaces near the shoreline had greater fluctuations in water content and relative humidity, triggering frequent salt mineral dissolution–precipitation and increased emissions. A high water table also allowed a continuously replenishing supply of salt crystals, increasing the potential for extensive dust emissions. Surfaces containing salt minerals are incredibly dynamic, but understanding the processes that control surface characteristics is an important step in mitigating dust emissions.



Scanning electron microscope images of (a) the surface of Site PL-7A composed of mats of organic filaments binding dipyramidal thenardite (<5 mm), prismatic glauberite (<15 mm) crystals, and 20- to 200-mm-diameter salt mineral aggregates cemented with anhedral to subhedral halite and bloedite; (b) the base of salt crust at Site PL-7A composed primarily of well-cemented anhedral to euhedral cubic halite up to 50 mm in diameter; (c,d) the surface of Site PL-8 composed of loosely cemented prismatic glauberite (<1–33 mm wide by <15 mm long); and (e,f) the surface of Site PL-2 composed of tightly interlocking crystals of cubic halite, with tiny (<1–5-mm) anhedral to subhedral bloedite.

Zueng-Sang Chen , Zeng-Yei Hseu, Shih-Hao Jien

The formation of redoximorphic features in plinthitic rice-growing soils

Various redoximorphic features and Fe/Mn nodules with different types and sizes were commonly found in plinthitic rice-growing soils of northern Taiwan. Micromorphology is playing a key role in understanding important formation mechanisms of those redoximorphic features and Fe/Mn nodules in the soils. Due to frequent fluctuation of ground water table and regular flooding in the soils; easily reduced Fe and Mn mobilized from reduced zones of soil matrix, following illuviated along the channels or precipitated in the pores, and then formed different redox concentrations. Certainly, the types and sizes of redox concentrations are determined by hydrological conditions including annual saturated and reduced duration.

Enclosed figures show different redoximorphic features in plinthitic horizon of the rice-growing soils in Taiwan, which were observed in thin sections through polarized microscope. The figures are (1) the illuviation of oriented clay and free Fe along a channel in the rice-growing soils in northern Taiwan (the photo was taken under cross polarized light (XPL) and the length of white bar is 0.5 mm), and (2) the compound Fe/Mn nodules with oriented clay and free Fe that formed in situ in the plinthitic horizon in the rice-growing soils in northern Taiwan (this photo was taken under cross polarized light (XPL), and the length of white bar is 1 mm). These studies have been carried out by Taiwanese colleagues including Professor Zueng-Sang Chen (Department of Agricultural chemistry, National Taiwan University), Professor Zeng-Yei Hseu (Department of Environmental Science and Engineering, National Pingtung University of Science and Technology), and Assistant Professor Shih-Hao Jien (Department of Soil and Water Conservation, National Pingtung University of Science and Technology). In these colleagues, Dr. Jien is the award-winner of “2010 Young Micromorphological Publication Award”.

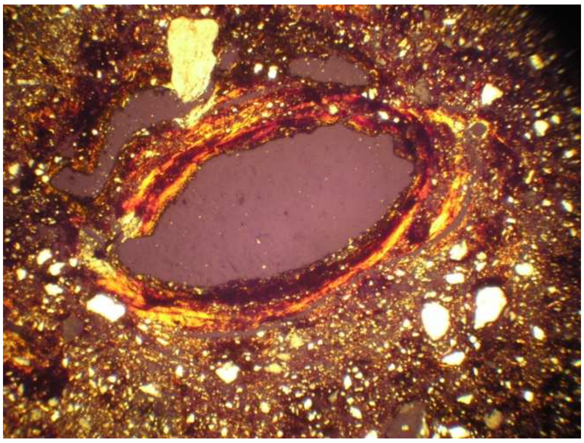


Fig. 1

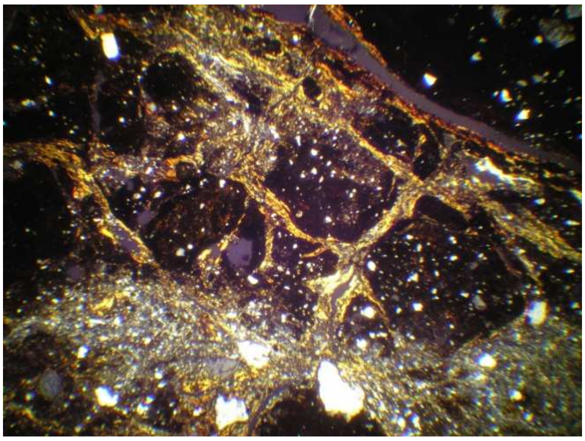


Fig. 2

Richard MacPhail is sending us his recent publications

Macphail, R. I., 2011, Soils and sediments, in Harding, J., and Healy, F., eds., The Raunds Area Project. A Neolithic and Bronze Age Landscape in Northamptonshire. Volume 2 Supplementary Studies.: Swindon, English Heritage, p. 737-838.

Macphail, R. I., and Crowther, J., 2011, Experimental pig husbandry: soil studies from West Stow Anglo-Saxon Village, Suffolk, UK, Antiquity Project Gallery, Volume 85, 330, Antiquity (http://antiquity.ac.uk/projgall/macphail330/).

Macphail, R. I., and Linderholm, J., 2011, Micromorphology in Burch, M., Treveil, P., and Keene, D., eds., The development of early medieval and later Poultry and Cheapside: excavations at 1 Poultry and vicinity, City of London, Volume MOLA Monograph 38: London, Museum of London Archaeology, p. CD Tables 11-12.

Macphail, R. I., Crowther, J., and Macphail, G. M., 2011, Soil micromorphology, chemistry and magnetic susceptibility, in Ford, B. M., and Teague, S., eds., Winchester - A City in the Making. Archaeological investigations between 2002 and 2007 on the sites of Northgate House, Staple Gardens and the former Winchester Library, Jewry St., Volume Oxford Archaeology Monograph No 12: Oxford, Oxford Archaeology, p. 376, CD Part 373.317 (Soil Micromorphology Report.pdf).

Macphail, R. I., 2010, Dark earth and insights into changing land use of urban areas, in Speed, G., and Sami, D., eds., Debating Urbanism: Within and Beyond the Walls c. AD 300 to c. AD 700 (Conference Proceedings Leicester University Nov 15th 2008), Volume Leicester Archaeology Monograph 17: Leicester, Leicester Archaeology, p. 145-165.

Macphail, R. I., and Goldberg, P., 2010, Archaeological materials, in Stoops, G., Marcelino, V., and Mees, F., eds., Interpretation of Micromorphological Features of Soils and Regoliths: Amsterdam, Elsevier, p. 589-622.

Macphail, R. I., and Crowther, J., 2010, Soil Micromorphology, in Lewis, J., Leivers, M., Brown, L., Smith, A., Cramp, K., Mepham, L., and Phillpotts, C., eds., Landscape Evolution in the Middle Thames, Valley. Heathrow Terminal 5 Excavation Volume 2, Volume Framework Archaeology Monograph No. 3: Oxford/Salisbury, Framework Archaeology, p. CD-Rom, Section 16, Figs 11-62.

Macphail, R. I., Allen, M. J., Crowther, J., Cruise, G. M., and Whittaker, J. E., 2010, Marine inundation: effects on archaeological features, materials, sediments and soils: Quaternary International, v. Geoarchaeology and Taphonomy, no. 214, p. 44-55.

PROJECTS

Fire in Thin Section

by Carolina Mallol, cmallol@ull.es, Universidad de La Laguna, Spain.

The *Neanderthal Fire Technology Project*, funded by the Leakey Foundation in 2010, is executed by members of the Prehistoric Hunter-Gatherer Societies research team based at Universidad de La Laguna (Tenerife, Spain) and collaborators from Universidad Autonóma de Madrid and the Weizmann Institute of Science (Rehovot, Israel). The project involves research into the material expression of human actions related to combustion by means of experimentation and Ethnoarchaeology, in order to provide reference material that can be used towards the interpretation of the archaeological record of prehistoric simple combustion structures. More specifically, the research has a focus on combustion structures from Neanderthal sites.

In the summer of 2010, an experimental season was carried out involving the making, excavation and sampling of 25 simple combustion structures. At present, field and micromorphological and geochemical (FTIR) data is available for most of them, except a few that were left in the ground for taphonomic control. Excavation, sampling and analysis of 12 Neanderthal combustion structures from the Middle Palaeolithic site of El Salt (Alcoy, Spain) were also carried out in parallel to the experimental work. Finally, three subrecent (approximately 2000, 1000 and 50 years old) archaeological combustion structures from aboriginal sites of the Canary Islands were included in the study with the goal of providing data on aspects of relatively short-term weathering and diagenesis of combustion features.

The highlights of the results are the micromorphological patterns emerging from different actions performed prior to or during combustion, such as wetting the substrate, adding meat, tossing trash into the fire, sweeping the ash, trampling the fire or sleeping on top of a bed of grass laid on top of hot coals. In addition, the collection of thin sections provides reference material for the characterization of a Type *Pinus nigra* Simple Combustion Structure, as this was the wood taxon selected as a standard for all the experiments except one. The micromorphological data show that this type of fire generates a relatively thin layer of calcitic ash directly on top of the substrate. The “black layer” in this type of fire is the ground surface in contact with the fire, its color resulting from carbonization of the microscopic particles contained in it (and not derived from partially combusted fuel).

We believe that some of the human actions performed in association to fire, such as cooking meat on coals or sweeping and trampling of fresh ash, may leave a material imprint. Hence, characterizing the association of such actions and their material expression will provide analytical tools with which we can approach the study of archaeological simple combustion structures in search for clues about past human behavior. In our approach, we go from known to unknown, by obtaining experimental and ethnoarchaeological reference data that can be compared with the archaeological record.

COURSES

Steve Driese is sending us information about his course on soil micromorphology at Baylor University (Waco, Texas, US).

Geology (Geo) 5342 *"Micromorphology of Soils and Paleosols"* (3 credits)

Fall Semester, 2011

Instructor: Dr. Steve Driese Steven_Driese@baylor.edu
GTA: Ms. Lauren Michel: Lauren_Michel@baylor.edu

Course Description:

"Micromorphology is the description, interpretation, and measurement of components, features and fabrics in soils and paleosols, at the microscopic level."

see: Bullock et al. (1985), ***Handbook for Soil Thin Section Description***

Objectives:

This course emphasizes practical laboratory microscopic (micromorphological) study of thin sections of surficial (Earth) materials, including modern soil, stream sediments, and weathered rock (saprolite), as well as "fossil soils" preserved in the geologic record as paleosols. Goals are to: (1) develop familiarity with the major mineralogical and textural properties of surficial materials as observed in thin sections, (2) develop an understanding of the genetic processes that lead to the formation of soils and weathered materials on the Earth's surface, in order to reconstruct climate and landscape records of the past, and (3) become familiar with the physical structure of soils and paleosols, relevant to environmental and economic assessments. Micromorphology is an extremely valuable investigative methodology now principally taught in geoscience departments (such as here at Baylor University), and can lead to future opportunities in both academic institutions as well as in the environmental and geoarchaeological industries!

Organization:

The course is divided into two major parts. Part I concerns the fundamental properties and constituents comprising soil and paleosols. Part II deals with case studies of micromorphology of soils and paleosols. There will be a lecture exam following each part of the course, and no comprehensive final examination. The laboratory will have eight written papers/reports due for the eight major thin-section suites. Each laboratory requires completion of thin-section description sheets for each sample. Two-week laboratory suites constitute 10% of the grade total, whereas one-week suites count 5%. Note that the laboratory comprises 60% of the course grade! A unique aspect of this course is that rather than a "topical" treatment, soils and paleosols are examined micromorphologically in the context of their actual soil/paleosol-stratigraphic-climatic framework, which I think is far more informative. You will undoubtedly learn more from the laboratory exercises than from my lectures!

You should expect to spend an average of about 8 hours (total) per week on this course.

Prerequisites:

I will assume that each of you has had some prior training in the earth sciences, including basic coursework in mineralogy, optical mineralogy, and freshman chemistry, and that you each have a good basic knowledge of soils and geological parent materials. If you want to get more soils basic background, Buol et al.'s (1997) *Soil Genesis and Classification* would be helpful, or Birkeland's (1999) *Soils and Geomorphology*, or alternatively, Retallack's (2001) *Soils of the Past: An Introduction to Paleopedology*, which is the required text for the Geo 5340 Paleopedology course that I also teach.

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ARCHAEOLOGICAL SOIL MICROMORPHOLOGY TRAINING: LONDON 7-11, 14-18 November 2011

(Contact: r.macphail@ucl.ac.uk)

7-11 November – training week (See attached syllabus and programme). Includes New Material from:

- Hominid sites: Korean Late Pleistocene alluvial soils and Middle Pleistocene Kent, UK ['Elephant Site'],

- Trackway deposits and insights into traffic (e.g., Iron Age road precursor to Roman road near Shrewsbury; other new examples from UK and Norway),

- Stabling deposits (Neolithic and EBA ashed rock shelter dung, Negev Desert; Iron Age seasonal byre waste, Vestfold, Norway),

- Bavarian LBK: proxy evidence of animal husbandry

- Settlement studies and proxy land use indications, Vestfold, Norway (earth-based longhouse wall and hearth/furnace materials; ring ditch-, well- and grave-fills; manured fields and colluvia; track and pathway deposits; wooden floor silting deposits).

- Miscellaneous British Late Upper Palaeolithic and Early Mesolithic in soil-sediment sites, prehistoric colluvia, rural and urban cultural soils including dark earth, garden soils and inundation features.

- (Studies commonly supported by EDAX, microprobe, and bulk chemistry, micro- and macrofossil and archaeological data supplied by project team members)

14-18 November – practice week (Time for in depth review of selected thin sections and course material, and help with further analysis of your own thin sections; microphotography and possible access to SEM/EDAX on uncovered thin sections; max 75x50mm)

REPORTS ON COURSES AND MEETINGS

REPORT ON: First Colombian International Training Course in Soil Micromorphology and Complementary Techniques. Medellín (Colombia), 8th - 19th August 2011.

The course was organized by PhD professors Juan Carlos Loaiza Usuga, Raúl Zapata, Walter Osorio (Sciences faculty, Universidad Nacional de Colombia, Sede Medellín) with the collaboration of PhD professors Rosa M. Poch, (Lleida, España), Héctor Morrás (INTA – Argentina) Marion Weber, Marco Márquez (UNALMED – Colombia), Hernán González Santamaría (Soil scientist) and Alberto Arias (MsC in Geomorphology – UNALMED, Colombia).

The Soils and Geomorphology postgraduate program – Sciences Faculty and the Petrology Group of the Department of Geosciences and Environment – Mines Faculty, University National of Colombia – Campus Medellín, hosted the course in their microscopy room. The participants were 18 Postgraduate students and researchers from different sites of South America. About 40% of the time was devoted to microscopical exercises. This course had as main objective to approach the audience (researchers, postgraduate students and soil sciences professionals), to the micromorphological techniques and studies.

During the first week the group was introduced to the study techniques of clay mineralogy (Prof. Dr. Marco Márquez, Medellín), mineral identification (Prof. Dr. Marion Weber, Medellín). Also there was an introduction to sampling techniques and thin section preparation and description (Prof.Dr. Rosa Poch, Catalonia), and to the chemistry of pedogenesis and clay mineralogy in tropical soils (Prof. Dr. Raul Zapata, Medellín). An environmental context of the alteration on the Andes high plateau was also explained (Prof. Alberto Arias, Medellín), as well as the moist tropical soils (Prof. Hernán González), and an introduction to special techniques and advanced studies of soil thin sections (Prof. Dr. Hector Morrás, Argentina).

A two-day field trip was guided by Prof. Dr. Juan Carlos Loaiza, Prof. Alberto Arias, Prof. Hernán González (Medellín) on Sunday 14 and Monday 15 August, along the high plateau of Santa Rosa de Osos. On this trip, across the Andes mountains, several topics were discussed related with soil genesis (Oxisols, Ultisols, Histosols, Inceptisols and Andisols), on mountainous zones. The soil-scape relationships of the high plateau were discussed. The results of several pedogenetic processes that occurred at different periods of time were observed, associated to the relief particularities of the high plateau, that affect the spatial distribution of the soil uses and their related management.

- Pedogenesis 1: Associated to melanization processes, iron remobilization, petrochemical meteorization and surface runoff.
- Pedogenesis 2: Andolization, iron remobilization, surface runoff and gleization.
- Pedogenesis 3: Associated to lixiviation of basic cations, clay eluviation and illuviation, clay destruction, residual quartz enrichment, gleization and surface runoff.

- Pedogenesis 4: Processes that conduct to the formation of plinthites, on a profile affected by intense redox processes.

This high pedogenetic diversity on the high plateau of the Andes Mountains results in a mosaic of several soil types found on a reduced space, which reflect different temporal scales.
The second week was devoted to agronomic applications and soil management, as well as palaeosols (Prof. Dr. Hector Morrás, Argentina), carbonates and gypsum, and an introduction of micromorphometry (Prof.Dr. Rosa Poch, Lleida). Prof Alberto Arias exposed the mineralogy of the parent materials on the batholit of Antioquia region, emphasizing on the quartzodiorites. Dr. Márquez gave a practical introduction to clay mineralogy at the Laboratory of Clay Mineralogy (Department of Geosciences and Environment – Mines Faculty , Medellín).

We would like to thank all the participants for their huge interest and enthusiasm, to the Universidad Nacional de Colombia – Sede Medellín for his collaboration and especially to the visiting professors and the local professors, for their effort. We hope to repeat this course on July 2014, as a course auspiced by the IUSS - Commission 1.1 Soil Morphology & Micromorphology.

Prof. Juan Carlos Loaiza
Sciences Faculty, Universidad Nacional de Colombia, Sede Medellín

REPORT ON: Workshop of the Working Group on Archaeological Soil Micromorphology
Pisa, Italy, 18-22 May, 2011

This year, the annual meeting of the Group was organised by Giovanni Boschian (Department of Archaeological Sciences, Pisa University); the microscope sessions of the meeting were kindly hosted by the Department of Earth Sciences, in its well-equipped microscope room.

The proposal of a third Meeting in Pisa (after the 1998 and 2003 ones) came out during a dinner in an Italian restaurant in Brno, when Giovanni, rather amazed by the Italian food outside Italy, decided to offer his colleagues a chance to enjoy its original version. The proposal was accepted unanimously.

The participants were 44 (at the very limit of the microscope room capacity!); the core of “historical” members of the Group was represented by Richard Macphail, Roger Langohr, Karen Milek, Diego Angelucci, Thomas Beckmann, Matthew Canti, and others; the Basel group was also present with all its members. New faces were also present: the Weizmann Institute was represented by Ruth Shahack-Gross and her colleagues, and several young colleagues (most of them fresh from the Tübingen course) participated for the first time. The presence of these new members was particularly appreciated, because it demonstrates the vitality of the Group, and that these meetings are really useful and appreciated.

Windthrow or not windthrow…

Following a well-consolidated tradition, the meeting consisted mostly in discussion and opinion exchange in front of the microscopes, commenting thin sections brought by the participants. Standard conference-like presentations were limited to an afternoon, and a rich selection of posters was on display in the coffee-break room. The topics presented ranged from methodological and reference topics (phosphate and burnt carbonate micromorphology, x-ray microdiffraction on phosphates) to case studies of different ages and geographic or cultural contexts (ornithogenic soils from Antarctica, North European Middle Ages soils and dark earths, Near-Eastern floors and mudbrick, Roman temples and latrines, Palaeolithic to Neolithic caves of the Mediterranean area, etc.) showing once more the importance of soil micromorphological applications to Archaeology.

All the participants enjoyed pizza, pasta and wine during a typically Italian social dinner that ended up at late night.

The Meeting was concluded by a one-day field trip in Northern Tuscany, through the Alpi Apuane Mountains and Garfagnana Valley. The participants were led through the famous marble quarries, where they could observe the modern extraction techniques, and the traces left on the landscape by more than 2500 years of marble exploitation. The trip continued through soils on loess associated with Late Upper Palaeolithic and Mesolithic lithic industries at Isola Santa, a soil underlying an Etruscan earthwork near Castelnuovo, and late Pleistocene windthrow traces associated with (wild?)fire at Pontardeto.

It is very sad to have to say that no more meetings will be organised within the Department of Archaeological Sciences of the Pisa University. Due to a new Italian law, the Department is closing and will have to join to other Departments; Archaeology will survive "underground", within a much larger Department of general humanities.

But Geoarchaeology and Soil Micromorphology are not dead at all! Hope to see you all again in few years.

Giovanni Boschian
Department of Archaeological Sciences, Pisa University.

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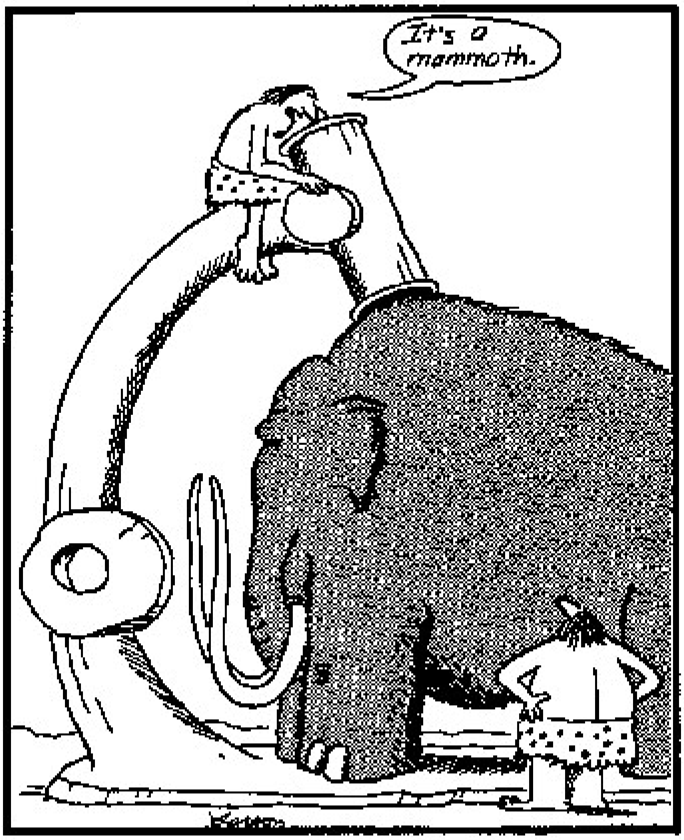

Early microscope