

Session #246

IMPR - PHYTOLITHS IN INTEGRATED ARCHAEOBOTANICAL AND ETHNOARCHAEOLOGICAL STUDIES

Theme: widening_horizons_through_human_environment_interconnections

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Keywords: phytoliths, crop-processing, fodder, non-food plant uses, ethnobotany, ethnoarchaeology

The session “Phytoliths in integrated archaeobotanical and ethnoarchaeological studies” is dedicated to the wide range of applications of phytoliths in archaeology, paleoanthropology and palaeoethnobotany. The identification of plant remains at an archaeological site can be indicative of the resources and environments exploited by peoples, their subsistence strategy and further economic and cultural practices. Research questions that can be addressed concern agronomy, economy and diet in the past, i.e. how phytoliths can be used to reconstruct the cultivation, processing and use of plants for food and animal fodder. In addition, phytoliths can help to disentangle plant uses for non-food purposes as well. In this case, information can be gained about, for instance, architecture, medicinal uses, textiles and other aspects of domestic, economic and ritual spheres.

In this session, studies of modern ethnographic contexts are also welcome, that offer insights into traditional plant uses and that can be used to calibrate the interpretation of the phytolith fossil assemblage from comparable archaeological contexts. Through this comparison, deposition processes, traditions and cultural choices behind human behaviour in the past can be better identified and understood. Presentations can focus on the investigation of phytoliths from specific objects or from different contexts from one or multiple sites. Contributions that show a comparison of the phytolith record with other kinds of archaeobotanical records (macro-remains, wood/charcoal, starch, pollen and NPPs, plant biomarkers), as well as with other proxies (stable isotopes of osteological records or seeds, faunal assemblages, etc.) are particularly welcome. Case studies and reviews may concern different periods and geographical regions.

This session is part of the 12th International Meeting for Phytolith Research, or IMPR, the official scientific conference of the International Phytolith Society.

1) IMPR - PHYTOLITH IDENTIFICATION, CLASSIFICATION AND MORPHOMETRY

Theme: widening_horizons_through_human_environment_interconnections

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Keywords: Phytolith taxonomy, identification, classification, morphology, morphometry

Phytolith analysis is an established field of research that is applied worldwide to a broad range of research areas, including archaeobotany and palaeo-ecology, amongst others. On the one hand, classification of a large number of common phytolith morphotypes is very well established. As a result, it is well possible to identify phytoliths on (sub)family, genus and sometimes species level, and/or to assign them to plant parts. On the other hand, when considering all plants of the world, it is only partly known which plants produce phytoliths, what type of phytoliths they produce, and whether and how these phytoliths can be distinguished from those of other taxa and plant parts. Another challenge is the description of phytolith in a uniform way, so that outcomes of different studies can be easily understood and compared. While the publication of the International Code on Phytolith Nomenclature versions 1.0 and 2.0 were important milestones, improvement of phytolith taxonomy, which, by definition, includes description, identification, nomenclature and classification of phytoliths, continues to be an ongoing important line of research.

The session “Phytolith identification, classification, and morphometry” aims to discuss the above-mentioned topics and welcomes all types of contributions about phytolith taxonomy and classification, for example, but not limited to, the application of the International Code for Phytolith Nomenclature 2.0, studies concerning the development of new identification criteria based on morphology, and studies presenting or applying identification criteria based on phytolith morphometry. These studies can relate to both archaeological and modern plant material.

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Session #256

IMPR - PHYTOLITHS BIOGEOCHEMISTRY - FROM PHYTOLITHS FORMATION AND ROLE IN MODERN PLANTS TO NEW PROXIES FOR ARCHAEOLOGY AND PALAEOECOLOGY

Theme: widening_horizons_through_human_environment_interconnections

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Keywords: phytolith formation, biochemistry, isotopes, radiocarbon dating

Biosilicification in plants is a complex process under genetic and environmental control. Suggested functions of phytoliths are structural support, protection against grazing and pathogens, and regulation and storage of minerals and heavy metals. For phytoliths to be deposited, plants need to take up silicon from their environment. Some plants produce many phytoliths, while others produce hardly any. Also the degree of taxonomic identification of phytoliths to plant groups, or even plant parts, is diverse. Concerning phytolith formation, there are still questions to answer, for example, the variation of phytolith formation within individual species, quantitative aspects and chemical aspects. An additional challenge is how we can turn aspects of phytolith biogeochemistry into proxies to use in environmental and archaeological research, e.g. by using chemical elements within phytolith structure (e.g. Carbon, Calcium, Aluminium, Nitrogen) for isotope analyses or for radiocarbon dating. Furthermore, this session also deals with those chemical aspects of both phytoliths and pedological processes that affect phytolith preservation and distribution. Proper understanding of taphonomy is key to the interpretation of the original plant assemblages.

This session aims to discuss new methodological developments in phytolith formation and quantification while studying phytoliths in the fields of plant systematics, evolution, physiology and biochemistry. The session welcomes contributions that address questions such as, but not limited to: where in the plants are phytoliths formed? What types of cells or other structures silicify, and how does phytolith formation vary within plants and within species? Can we increase the use of chemical aspects of phytoliths as a proxy in archaeological studies, including dating Carbon in phytoliths? How can isotope studies be applied to phytolith records? Which compounds and elements other than silica are included in phytoliths?

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PHYTOLITHS IN GEOARCHAEOLOGY AND MICROMORPHOLOGY

Theme: widening_horizons_through_human_environment_interconnections

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Keywords: phytolith, micromorphology, geoarchaeology, bulk sample, thin sections

Phytolith studies are an essential aspect of modern geoarchaeological research. Phytoliths are indeed observed on samples provening from diverse geographical locations, environments and time periods. Present session intends to bring together geoarchaeologists/micromorphologists and phytolith specialists working on archaeological deposits.

Traditionally, both specialists work on different mediums: the phytolith specialist analyses bulk samples, while the geoarchaeologist/micromorphologist studies thin sections of sediment/soil blocks preserving the original stratigraphy of the deposits. Consequently, both approaches document different aspects of the phytolith record. Thin sections inform about the spatial context and formative processes. The analysis of bulk samples details the morphological diversity of the assemblages and relative concentrations. Integrating both methods has thus potential to considerably boost their respective analytical capacities and to fuel discussion in both research fields. Of major relevance are issues relating to morphological diversity, the (post)depositional histories and the discrimination of phytoliths sharing (or not) a common botanical origin.

One is forced to note that indeed few phytoliths specialists attend micromorphological workshops. Likewise few micromorphologists attend IMPR. The purpose of present session is to initiate such meetings aiming at bridging both research fields. As a first step, micromorphologists are invited to report on their phytolith observations regarding the questions above highlighted, and to discuss them with the broader phytolith community.

A microscopic session will follow these presentations. Its purpose is to raise awareness among specialists of both fields on the potential of phytolith analysis of thin sections.

PHYTOLITHS AS A PROXY FOR PALAEOENVIRONMENTAL RECONSTRUCTION

Theme: widening_horizons_through_human_environment_interconnections

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Keywords: palaeoecology, phytolith analysis, palaeoenvironmental reconstruction, soils and sediments

Worldwide, phytoliths are used as a proxy to identify changes in vegetation and environments through time. These changes may reflect ecological processes, climatic shifts and/or anthropogenic activities useful to understand the past of human societies and landscapes. Thanks to their resistance to degradation, phytoliths usually preserve well also where other kinds of organic remains are lacking. They can be found in very old deposits (up to 60 million of years), but also have been used to characterize modern ecosystems. Often phytolith studies are carried out in multiproxy palaeo-environmental investigations. For instance, being well representative of grassland ecosystems, they are complementary proxies to charcoal and pollen analyses, and are useful for the reconstruction of forest history.

The session “Phytoliths as a proxy for palaeoenvironmental reconstruction” invites contributions that use phytoliths for paleoecology, paleoclimatology, and paleobiogeography. According to different sets of archives, e.g. from lake sediments to soil sequences, phytolith studies that are carried out in natural settings and/or in relation with archaeological sites or cultural developments are welcome without any chronological and geographical restriction. Studies where the phytolith record is associated and compared to other palaeo-environmental proxies are also very welcome. This session is part of the 12th International Meeting for Phytolith Research, or IMPR, the official scientific conference of the International Phytolith Society.

Session #342

IMPR - MICROSCOPY SESSION: PHYTOLITHS IN SOIL THIN SECTIONS.

Theme: widening_horizons_through_human_environment_interconnections

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Keywords: Phytoliths, Micromorphology, Microscopy, Context

The present session is structured as a microscopy workshop in relation to the study of phytoliths in archaeological soil and sediment thin sections. As such, the workshop is related to the session "Phytoliths in geoarchaeology and micromorphology".

We aim to an informal meeting with a focus on the exchange of ideas and experiences in this arena in a practical way. Hands-on microscope work will provide an opportunity for participants to discuss relevant questions regarding methodological approaches, analytical tools and interpretation of results.

The overall goals of the workshop are: to raise awareness among phytolith specialists and micromorphologists / geoarchaeologists on the potential of applying phytolith analysis to archaeological thin sections and promote its practical integration to address archaeological questions.

Participants are welcome to bring their own research materials. Additionally, thin sections related to the presentations of the session "Phytoliths in geoarchaeology and micromorphology" will be made available during the workshop.

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Session #326

EVERYTHING YOU ALWAYS WANTED TO KNOW ABOUT PHYTOLITHS (BUT WERE AFRAID...): THEIR CONTRIBUTION TO THE MODELING OF PAST HUMAN BEHAVIOR

Theme: assembling_archaeological_theory_and_the_archaeological_sciences

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Keywords: phytolith, archaeology, theory of archaeology, past human behavior

This session aims at analyzing and shedding light on the role played by phytoliths studies for the understanding of past human behavior in relation to environment and plant uses both local and non-local, and therefore on their impact on theoretical models shaping our current understanding of human interactions with each other and with nature.

For 50 years, phytoliths have been used in archaeology to bring answers to human behavior related to territory exploitation, impact of human activities on natural vegetations, foodways, trade, transmission of cultural traits, and translocation of plants due colonization.

Phytoliths have been applied to a vast array of supports, primarily on sediments, but also to material culture, such as ceramics, metallic pots or lithic industry, and more recently to human remains, specifically on dental calculus.

But, did they succeed in bringing relevant answers to the archaeologist's questions? Have phytolith studies been able to change our views on past human life, more than just providing anecdotal, one-time information? Did they contribute to change theoretical models regarding past human life and societies activities?

This session doesn't aim only at phytoliths specialists working in archaeology, but also at archaeologists or other specialists who use phytoliths in their own research as many other lines of evidence.

Hence, this session calls for communications that show evidence of such impacts of phytolith studies on our understanding of past human behavior, actions and interactions. Key questions are : What are the strengths and weaknesses of phytoliths? What is exactly their potential? How are they changing our views on the past? To which new analytical approaches do they contribute? What are our expectations about their future potential?

The session is sponsored by the Society for Phytolith Research and it organized in parallel to the IMPR, but it is not formally part of it.