



THE SOCIETY FOR ORGANIC PETROLOGY



NEWSLETTER

Vol. 40, No. 3

September 2023

ISSN 0743-3816

The 40th Annual TSOP Meeting Ulaanbaatar, MONGOLIA, 2024

Gorkhi-Terelj National Park

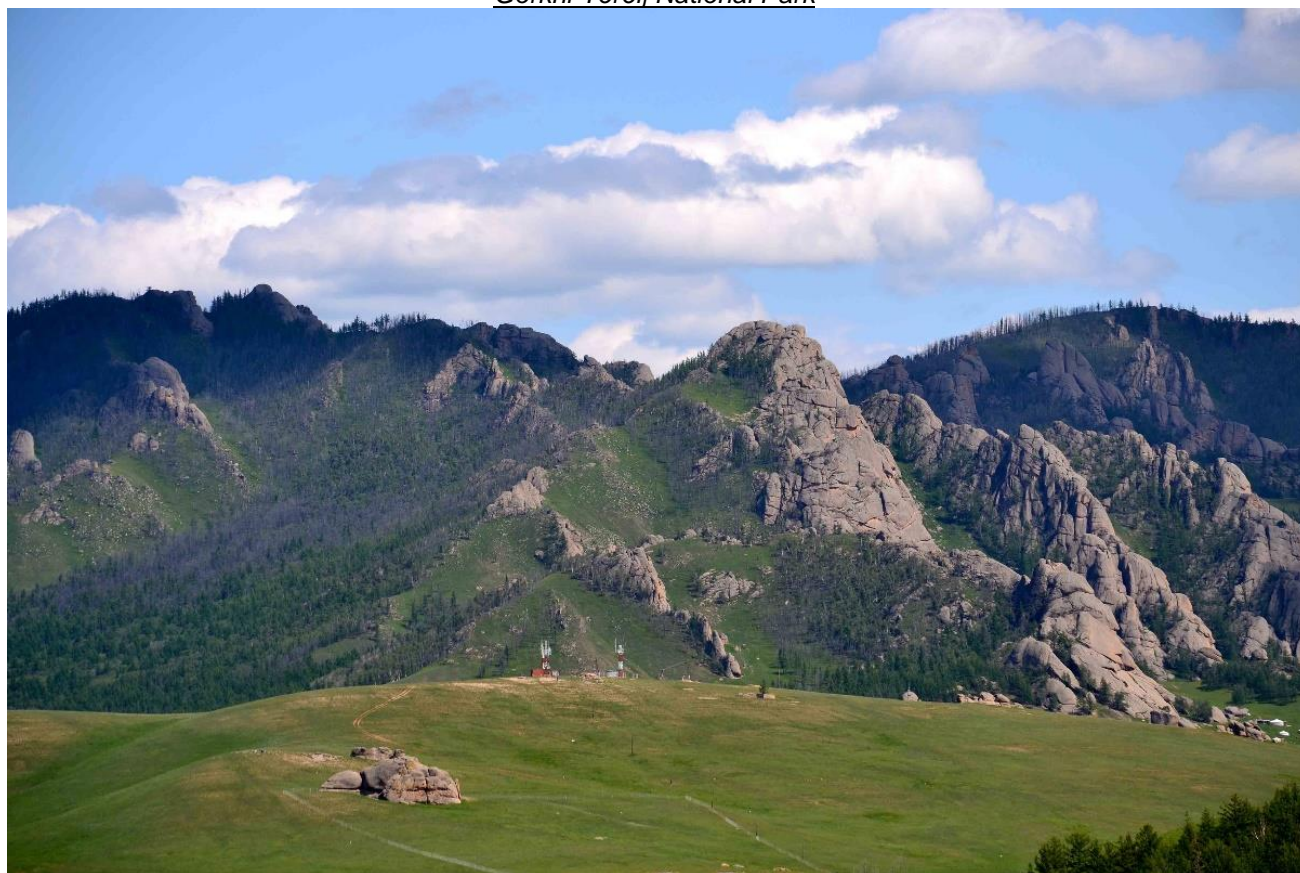


photo from Wikipedia

Planned Annual Meeting of The Society of Organic Petrology

TSOP sponsors an annual meeting which features technical talks and poster presentations, business meetings, field trips, short courses, and social events. Conference Abstract and Program volumes, group photos, field trip guides and short course notes are available to TSOP members through the TSOP secure site. <https://members.tsop.org/>

2024	Ulaanbaatar, MONGOLIA - TBA
2025	Yogyakarta, INDONESIA - TBA
2026	CHINA -TBA

Please note the updated message about the Annual Meeting in the website:

https://www.tsop.org/annual_meetings.html



The Society for Organic Petrology

TSOP is a society for scientists and engineers involved in coal petrology, kerogen petrology, organic geochemistry, and related disciplines. The Society organizes an annual technical meeting and field trips; sponsors research projects; provides funding for graduate students, and publishes a website, Facebook Page, quarterly newsletter, annual meeting program and abstracts and special publications. Members are eligible for discounted subscriptions to Elsevier journals *International Journal of Coal Geology* and *Review of Palaeobotany and Palynology*.

The Society for Organic Petrology Newsletter
(ISSN 0743-3816) is published quarterly.
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GUIDELINES:

The TSOP Newsletter welcomes contributions from members and non-members alike. Readers are invited to submit items pertinent to TSOP members' fields of study. These might include meeting reports and reviews, book reviews, short technical contributions including those on geologic localities or laboratory methods, as well as creative works such as poems, cartoons and works of fiction. Photos, graphs and other illustrations are welcomed. Low-resolution images are discouraged, as they cannot be reproduced well in print. Articles are preferred in Microsoft Word, RTF or plain text formats.

Contact the Editor:

Biao Fu: editor@tsop.org

Membership Information:

Please report any changes in address or contact information to Brett Valentine, TSOP Membership Chair:
bvalentine@usgs.gov

Members can also update their own information by logging into the secure TSOP website:
www.tsop.org/mbrsonly/

The TSOP Newsletter is published quarterly by The Society for Organic Petrology and is distributed to all Society members as a benefit of membership.

Membership in the Society is open to all individuals involved in the fields of organic petrology and organic geochemistry. For more information on membership and Society activities, please see: www.tsop.org

For purposes of registration of the TSOP Newsletter, a permanent address is:

The Society for Organic Petrology
c/o American Geological Institute
4220 King St., Alexandria,
VA 22302-1520 USA

Newsletter Submission Deadlines

December Issue: Dec. 10th, 2023
March Issue: March 10th, 2023
June Issue: June 10th, 2023
September Issue: Sept. 10th, 2023

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Dear TSOP Members,

After what feels like two short years, I have reached the end of my term as TSOP President, and thus this is my last letter to you.

Following the cancellation of the 2020 annual meeting in Xuzhou and two (highly successful) virtual meetings in 2021 and 2022, the in-person Joint 74th ICCP and 39th TSOP Meeting which took place in Patras, Greece recently was a welcome return to some pre-covid normality. I have much to say about the Patras meeting and will start by congratulating the organizing committee on hosting a superb event! Special thanks to Stavros Kalaitzidis and Kimon Christanis who were always available during the meeting to ensure that every aspect was on point.

The ice-breaker reception at a venue with beautiful views of the Gulf of Patras provided a great opportunity to meet old friends and new ones. In line with meeting theme focused on challenges related to the energy transition, a fantastic short course showcasing the latest developments in techniques and emerging applications of organic petrography was presented by George Siavalas and Malgorzata Wojtaszek-Kalaitzidi. We were addressed by several dignitaries representing national and academic authorities during the opening, and thereafter followed two days of interesting and insightful technical talks, with an excellent excursion day to the Delphi and Mycenae archaeological sites. I was unable to attend the post-conference field trip, but judging from social media posts it was clearly as successful as the technical sessions and other events associated with the meeting.

Prior to the meeting starting TSOP Council held their annual outgoing meeting as well as a session to discuss the revision of TSOP's objectives. An update of these discussions was given at the business luncheon, with key points being:

- **Outcomes of a workshop on the future of TSOP and the recent member survey:** Although the existing objectives are considered relevant, greater emphasis should be placed on promoting "non-traditional" applications of organic petrology.
- **Virtual seminars:** These will continue as annual events going forward.
- **Establishment of a student committee:** I wish to welcome our new student committee members Tushar Adsul (current chair), Itumeleng Matlala and Priyanka Shukla, and encourage members to support and reach out to integrate them into our community
- **Development of a TSOP mentorship program:** Please contact TSOP Councillor Carolina Fonseca at cmfonseca13@gmail.com for more information and to participate.

During the business luncheon and awards ceremony, we also celebrated the achievements of several peers, including Prof. Sue Rimmer as the 2023 John Castaño Honorary Membership Award recipient, the society's highest honour. We welcomed a new Vice President, Magdalena Misz-Kennan, and councillor, Sherry Zheng, on TSOP Council. Many thanks to outgoing councilor, Grzegorz Lis, for his active participation and unwavering willingness to contribute to TSOP during his term.

Lastly, it was an absolute honor and privilege to be entrusted with this role. I wish to thank all TSOP Council members with whom I've served for being collaborative, collegiate, and just nice people, and TSOP membership for believing in my abilities to hold office. It has been a rewarding and enjoyable learning experience, and I look forward to supporting TSOP in whichever way possible in future. And so, it is not goodbye, but until our paths cross someday.

Best wishes,

Kaydy Pinetown, TSOP President 2021-2023



TSOP Membership Dues

TSOP dues payments are due on or before **December 31st each year**. We encourage you to check your dues status and make your payment so that you can continue your TSOP membership and support the society and its work.

TSOP dues are currently set at:

Individuals:

- \$25 per year or
- \$100 for 5 years (5 years for the price of 4!)

Students:

- \$15 per year

Institutional/Corporate:

- \$75 per year

Join or Renew Your Membership



You can use our convenient online dues payment system to pay dues by credit card. You can login at the [Members Only TSOP](#) website and select 'Online dues payment' or go to www.tsop.org/dues and access the online form without logging in.

Thank you for your interest and support of TSOP and we look forward to a renewal of your TSOP membership.

TSOP is an AAPG Affiliated Society.
Abstracts from annual meetings are available through [AAPG Datapages](#)



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<https://www.linkedin.com/groups/12634595/>

2023 John Castaño Honorary Membership Award



Sue M. Rimmer

College of Agriculture, Life and Physical
Sciences—Geology, Southern Illinois University

The highest honour of The Society for Organic Petrology, provided for in its Bylaws, is Honorary Membership. It is awarded to persons distinguished in a scientific discipline of significance to the Society, in recognition of their contributions in research, service to TSOP, or education. Sue was the recipient of 2023 John Castaño Honorary Membership Award due to her outstanding contributions to coal geology and petrology.



Sue Rimmer was absent from the meeting due to illness and Joan Estate (Right) being presented for her with the Castaño Award at the 2023 TSOP Luncheon.

Congratulations!

THE RALPH GRAY AWARD

Best Refereed Paper in Coal and Organic Petrology



This is a TSOP award for the best refereed paper in coal and organic petrology was approved by Council in early 2009. With the permission of the Gray family, the award was named after Ralph Gray (1923-2009), a petrologist with wide-ranging experience and interests, particularly well-known for his work in industrial applications.

The 2023 winner of the Ralph Gray Award is:

Silurian wildfire proxies and atmospheric oxygen by Glasspool I J, Gastaldo R A. *Geology*, 2022, 50(9): 1048-1052. <https://doi.org/10.1130/G50193.1>

THE DAL SWAINE AWARD

Best Refereed Paper in Coal and Hydrocarbon Source Rock Geochemistry



The Dal Swaine Award for Best Published paper is presented to the authors of the paper judged to be the best for the year in inorganic or organic geochemistry and/or mineralogy of coal or hydrocarbon source rocks.

The 2023 winner of the Dal Swaine Award is:

Effects of contact metamorphism on the lithium content and isotopic composition of kerogen in coal. by Teichert, Z., Eble, C.F., Bose, M., Williams, L.B., *Chemical Geology*, 602, art. no. 120885. <https://doi.org/10.1016/j.chemgeo.2022.120885>

39th TSOP & ICCP Meetings Highlights

The joint 39th Annual TSOP Meeting & 74th ICCP Meeting was held in Patras, Greece, from September 17th to 24th, 2023. With the support of University of Patras and several sponsors, the meeting achieved a great success with strong attendance among TSOP members and students around the world. TSOP would like to extend both thanks and congratulations to the Organizing Committee for holding such a successful conference.



Photos taken by various meeting attendees

Thank you for your attention

Ice Breaker Party at “Deck”



As served as both an introduction and a conversation starter, the Joint ICCP-TSOP Ice Breaker dinner party was conducted at the beginning of the conference. Many of our members see each other for the first time after the global coronavirus pandemic.



Photos taken by various meeting attendees

TSOP short course



Dr. George Siavalas & Dr. Malgorzata Wojtaszek-Kalaitzidi gives excellent short courses entitled 'Organic Petrography in support of Environmental Studies' on Monday 18th of September 2023. The course was closed with microscopic session.



Photos taken by various meeting attendees

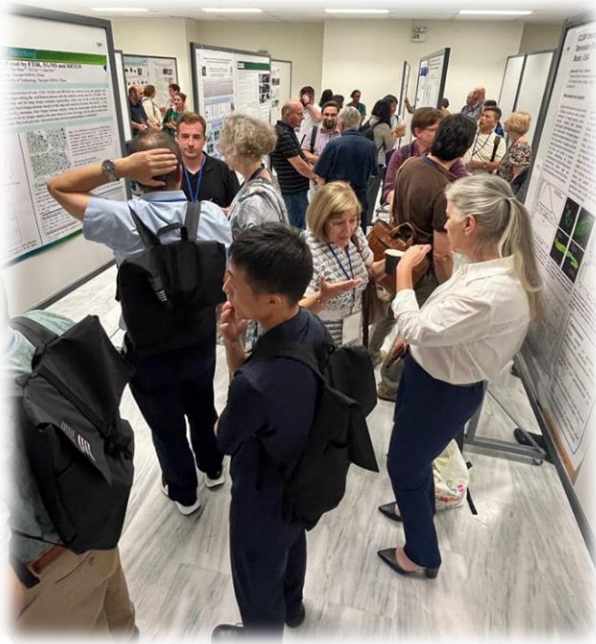
Visit TSOP meeting website:

https://www.tsop.org/annual_meetings.html for details...

TSOP Technical Sessions



A two-days technical session consists of many excellent presentations and posters. Our members/colleagues share their new ideas and applications of organic petrology in the energy transition era. All abstracts of the presentation are collected in a special volume of the **Greece Geological Society** and will be shown in **AAPG Datapages**.



Photos taken by various meeting attendees

Field Trips



One of the most interesting activities was probably the two days field trip to the petroleum systems of Western Greece and Ptolemais lignite basin. The mid-week field trips to Delphi or Mycenae Archaeological sites were also very fascinating. Participants can learn the geology, history, and profound culture of Greece.



Photos taken by various meeting attendees

View the full album of photos online at the **TSOP Photo Gallery!**

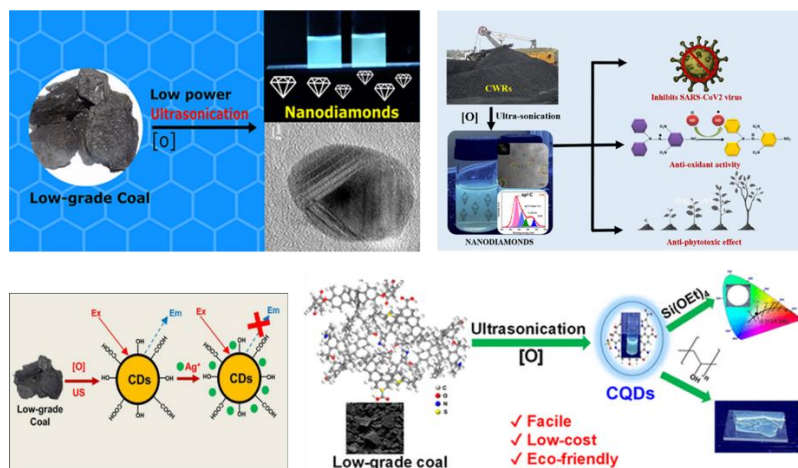
Carbon Quantum Dots and Nanodiamonds from Coal: A Unique and Futuristic Application of Coal Feedstocks

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Coal, one of the most abundant natural carbonaceous materials, is the cheapest and most significant energy source all over the world. Based on its maturity, coal is divided into four main ranks: lignite, subbituminous, bituminous, and anthracite. It has been utilized in a wide range of commercial applications, including the production of thermal power, different steel industries, and as a source of heat and fuel for cooking in developing or underdeveloped nations. However, coal combustion is the largest contributor of anthropogenic CO₂ (greenhouse gas) in the atmosphere. Therefore, various alternative energy technologies are being developed to phase out coal, which may make coal research futile in the very near future. Thus, the world immediately needs more conscious and alternate use of these immense coal resources to make it sustainable and profitable. Because of its carbonaceous nature, coal could be a fantastic precursor material for the production of different kinds of futuristic carbon nanomaterials in a cleaner way, leading to a new pathway of alternative use coal for economic profit [1-3]. Also, utilising abundant low-grade coal feedstocks is becoming more and more crucial due to the significant decline in the reserve to production ratios of hard coal. Along with other coal deposits around the world, India also has abundant coal resources in its states. Northeast India contains a good deposit of high-sulfur subbituminous Cenozoic coal. However, its poor quality for use in thermal applications has left it underutilized for several years.

Although the formation of various advanced carbon materials like carbon nanotubes, carbon microballs, carbon nanodots, onion-like fullerenes, and graphene/graphene oxide from coal sources have been attempted, the methodologies adopted are of drastic, tedious, and not environmentally friendly. In addition, the yields have not been sufficient for required uses. Thus, the current prerequisite of such coal to nanocarbon conversion technologies is the development of novel large-scale processes. This has led to the initiation of a new R&D project by Dr Binoy K Saikia, CSIR-NEIST, Jorhat (India) on efficient and sustainable

utilization of these low-grade coal feedstock in production of the advanced carbon materials essential for future use [4-7]. We have developed a novel and scalable process for the conversion of low-grade high-sulfur coal into value-added carbon materials including fluorescent carbon quantum dots (CQDs) and fluorescent nanodiamonds (NDs) using a straightforward wet-chemical synthesis method assisted by ultrasonic energy and ultrafiltration techniques [2-4]. The process was patented in India and in the USA. The process developed are of low-cost, short reaction time, few steps, and they are environmentally friendly. Additionally, using our unique process, CQDs can be upgraded to higher quantum yield and co-doped with nitrogen and sulfur functionalities for optical applications. The coal-based CQDs underwent additional toxicity testing for high-end use and were revealed to be safe for biomedical and environmental applications. The study of the cell-images also showed that the synthesised

CQDs offered potential as a bio-compatible material for cell- and bio-imaging applications. CQDs generated from coal were employed to create a silver/carbon quantum dot nanocomposite, with CQDs acting as a reductant and stabilizer for silver nanoparticles. Interestingly, coal-derived CQDs also has a potential application as a nanofertilizer promoting the plant growth [4]. Another very exciting discovery of coal-based CQDs is as a solid phosphor for prospective optical applications with high-intensity white-light emission with promising use in near future [6]. Thus, coal resources could open up a new avenue for its alternative and futuristic applications in numerous modern fields.

References

1. Das, T.; Boruah, P. K.; Das, M. R.; Saikia, B. K. Formation of onion-like fullerene and chemically converted graphene-like nanosheets from low-quality coals: application in photocatalytic degradation of 2-nitrophenol. *RSC Adv.* 2016, 6, 35177–35190.
2. Das, T.; Saikia, B. K.; Dekaboruah, H.P.; Bordoloi, M.; Neog, D.; Bora, J. J.; Ramaiah, D. Blue-Fluorescent and Biocompatible Carbon Dots Derived from Abundant Low-Quality Coals. *J. Photochem. Photobiol. B, Biol.* **2019**, 195, 1–11.
3. Das, T.; Saikia, B. K. Nanodiamonds Produced from Low-Grade Indian Coals. *ACS Sustain. Chem. Eng.* **2017**, 5(11), 9619–9624.
4. Saikia, M.; Singh, A.; Dihingia, A.; Khare, P.; Kalita, J.; Saikia, B. K. Scalable Production, Cell Toxicity Assessment, and Plant Growth Promotion Activities of Carbon Quantum Dots Derived from Low-Quality Coal Feedstock. *Chem. Eng. J.* **2022**, 433, 133633.
5. Saikia, M.; Das, T.; Saikia, B. K. A Novel Rapid Synthesis of Highly Stable Silver Nanoparticle/Carbon Quantum Dot Nanocomposites Derived from Low-Grade Coal Feedstock. *New J. Chem.* **2022**, 46 (1), 309–321.
6. Boruah, A.; Bora, S.; Thakur A.; Dutta S. H.; Saikia B. K. Solid-State Phosphors from Coal-Derived Carbon Quantum Dots. *ACS Omega* 2023, 8, 28, 25410–25423.
7. Boruah, A.; Roy, K.; Thakur, A.; Haldar, S.; Konwar, R.; Saikia, P.; Saikia, B. K. Biocompatible Nanodiamonds Derived from Coal Washery Rejects: Antioxidant, Antiviral, and Phytotoxic Applications. *ACS Omega* 2023, 8(12), 11151–11160.

Source rock organic petrography of black shale from the -Figuil Basin, Northern Cameroon

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The Babouri-Figuil Basin is a Cretaceous intracontinental tectono-sedimentary basin located in Northern Cameroon, with a total area of approximately 120,000 km² (Kouankap Nono et al., 2018). The basin is known for its significant hydrocarbon reserves, which have been explored since the 1950s (Aka et al., 2018). The organic matter in sedimentary rocks from this basin has been extensively studied to understand the petroleum potential of the area (Tchouankoue et al., 2021). However, despite the high potential for hydrocarbon exploration, detailed studies on the organic petrology of the basin are still limited. In this study, we present a comprehensive analysis of an outcrop sample (black shale) from the Babouri-Figuil Basin, with a focus on the organic petrography of the rock.

The sample was collected from the Lower Cretaceous series, which is composed of alternating sandstones, siltstones, and shales (Kouankap Nono et al., 2018; Enow-Bate et al., 2023). The sample has a high total organic carbon (TOC) value of 22.8 wt. %, which makes it particularly interesting for this study (Enow-Bate et al., 2023). The objective of this study is to investigate the organic petrology of the sample from the Babouri Figuil Basin, Northern Cameroon. The aim is to characterize the organic matter in the rock and understand its thermal maturity, depositional environment, and potential for hydrocarbon generation.

The results indicate that the sample is finely laminated and there is an abundant dull orange to orangey-brown fluorescing, partially (bacterially) degraded lamalginite (Fig.1), suggesting this is a Type I kerogen source rock with excellent oil generating potential. The Type I kerogen composition identified here is corresponding to the Rock-Eval analysis results of Enow-Bate et al. (2023). A few lenses of weak brown fluorescing amorphous organic matter (AOM) are also apparent. Rare examples of structured, dull-yellow fluorescing filamentous algae and spores are present (Fig.1). Vitrinite particles are rare but a single observation of large, well-preserved collotelinite containing yellow/orange fluorescing exsudatinite within fractures was observed. The vitrinite is of good polish quality and readily identifiable. The most abundant maceral group observed in the sample is the Lipinite group composing of alginite (89.0%), and amorphinite (7.6%; with 83% fluorescing and 17% non-fluorescing forms), and herbaceous-derived forms (0.4%) on mineral free-basis. Vitrinite of 2.7% and inertinite of 0.2 % on a mineral free-basis is present in the study sample. The sample contains no solid bitumen and have a mean vitrinite reflectance of 0.36%Ro, indicates that the sample is thermally immature for hydrocarbon generation. The overall maceral composition suggests that the sample is from a lacustrine depositional environment with relatively good access to nearby terrigenous material.

The organic petrographic results in this study, when combined with the bulk properties from Rock-Eval pyrolysis done by Enow-Bate et al. (2023), indicate a prospective hydrocarbon generative potential for the Babouri-Figuil Basin.

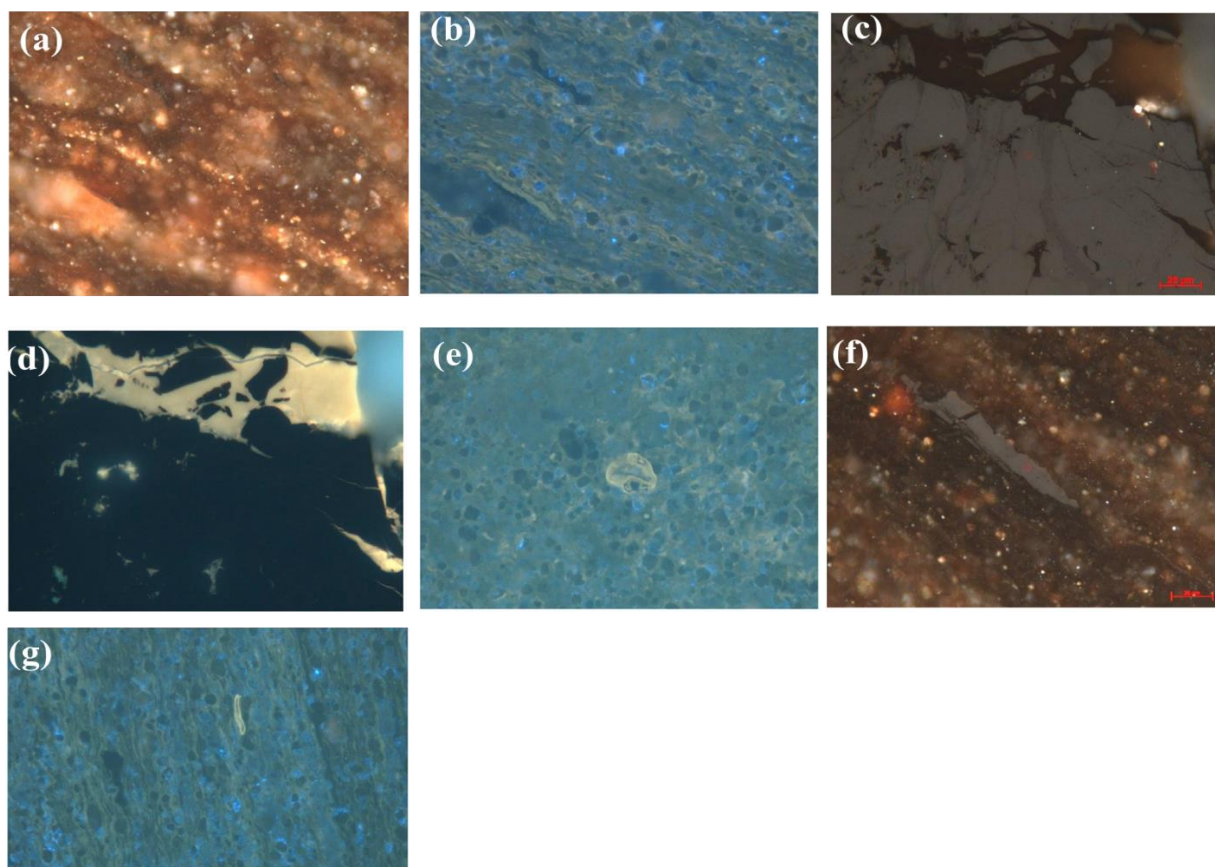


Fig.1: a-g: Photomicrographs of the studied sample. (a) Representative field of view in reflected white light. (b) Identical field of view as “a” under reflected UV light revealing dull orange fluorescing, partially degraded, lamalginite. (c) Example of single large area of vitrinite observed in this sample. (d) Identical field of view as seen in “c”, revealing bright yellow/orange fluorescing exsudatinite trapped in fractures. (e) Dull yellow/orange fluorescing spore (Centre). (f) Vitrinite lens (Centre) with a reflectance of 0.35% Ro. (g) Preserved algal body within dull orange fluorescing lamalginite matrix, displaying dull yellow fluorescence.

References

1. Aka, F. T., Kouankap Nono, G. D., Enow-Bate, B., Bouyo, H. R. T., & Tchouankoue, J. P. (2018). The use of mineral and organic amendments to rehabilitate degraded soils cultivated with banana plants in Cameroon. *Agricultural Sciences*, 9(10), 1150-1163.
2. Enow-Bate, E.P., Nton, M.E., Takem, J.E., Ndip Edwin Ayuk & Mbouemboue Nsangou Moussa Ahmed (2023) Hydrocarbon generative potential of intracontinental sediments of the Babouri- Figuil Basin, Northern Cameroon. *Arab J Geosci* 16, 180 (2023). <https://doi.org/10.1007/s12517-023-11275-7>
3. Kouankap Nono, G. D., Aka, F. T., Tchouankoue, J. P., & Enow-Bate, B. (2018). Physicochemical characterization of degraded soils under banana cultivation in Cameroon. *African Journal of Agricultural Research*, 13(19), 931-942.
4. Tchouankoue, J. P., Aka, F. T., Kouankap Nono, G. D., Bouyo, H. R. T., & Enow-Bate, B. (2021). Potassium solubilizing bacteria (KSB) and potassium use efficiency of maize under NPKS fertilization in Cameroon. *Archives of Agronomy and Soil Science*, 1-

CALENDAR OF EVENTS

Please send in meeting, short course and special event announcements to the Editor
<http://www.tsop.org/events.html>

2023-2024

 geochemical society	<p>18-23 August <u>2024 Goldschmidt Conference</u> –Chicago, IL, USA</p>
 TSOP The Society for Organic Petrology	<p>TBA <u>40th Annual TSOP Meeting</u> –Ulaanbaatar, MONGOLIA</p>
 THE GEOLOGICAL SOCIETY OF AMERICA®	<p>October 15-18, 2023 2023 GSA Annual Meeting - Pittsburgh, PA, USA</p>