33rd Annual TSOP Meeting

A JOINT MEETING OF

TSOP - AASP - ICCP

September 18 – 23, 2016
Houston, Texas USA

The Society for Organic Petrology, AASP-The Palynological Society and the International Committee for Coal and Organic Petrology
JOINT MEETING
TSOP - AASP - ICCP

September 18 – 23, 2016
Houston, Texas USA

The purpose of this joint meeting is to bring together a diverse group of scientists to discuss the close relationships between organic petrology and palynology, to foster thoughtful discussion and address issues that may be of benefit to furthering the respective sciences. Key themes to be addressed during joint activities include source rock/source-rock reservoir resource assessment, microscope methods of characterizing microporosity, coal characterization, and palynofacies/kerogen.

Organizing Committee:

The local Organizing Committee consists of Thomas Demchuk (RPS), Jen O’Keefe (Morehead State U.), Thomas Gentzis (Core Laboratories) and Joe Curiale (Independent). Over the next several months as the technical and social programs are finalized, we will do our best to keep the societies and membership informed of new events, the associated costs, and deadlines. We look forward to a great joint meeting in September of 2016.
The Society for Organic Petrology Newsletter

ISSN 0743-3816, published quarterly
© 2015 The Society for Organic Petrology (TSOP)

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:
Rachel Walker
e-mail: drrachelwalker@gmail.com

Address Changes
Please report any changes in address or contact information to: Paul Hackley, TSOP Membership Chair, phackley@usgs.gov

Members can 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
March Issue: March 5th, 2016
June Issue: June 5th, 2016
September Issue: Sept. 5th, 2016
December Issue: December 5th, 2016

CONTENTS
Memberships & Dues ............................................... 4
Annual Meeting Documents on the Website .......... 4
GSA Energy Division ............................................... 4
TSOP 2016 Joint Annual Meeting ..................... 5
AGI Critical Needs Letter ..................................... 8
New TSOP Members ............................................. 8
Castaño Award Call for Nominations .............. 10
Carl Peters 2014 Spackman Award Summary ........... 10
Ashley Manning-Berg 2015 Spackman Award Summary .......................................................... 11
Amberly Tobin 2015 Spackman Award Summary ......................... 13
Do Comet Hydrocarbons have Biogenic Origins? ............................................................ 14
TSOP 2015 Annual Meeting Report ...................... 14
TSOP 2015 Annual Meeting
Field Trip Report ............................................... 18
TSOP 2015 Meeting
Student Activity Report ........................................ 23
UK CAER Rare Earth Element Research ...... 24
Calendar of Events ............................................... 24
Mudstone Diagenesis Flyer .................................... 25
TSOP 2015 Meeting Photo Page ...................... 26
Institutional/Corporate Memberships

We’d like to make members aware that membership in TSOP is also open to any organization having an active scientific interest in organic petrology or related fields. TSOP especially encourages institutions to join at the special institutional rate of $75/yr and help support the goals of the Society. See the website for details: www.tsop.org/join.htm

TSOP DUES REMINDER!

It’s that time of year again! TSOP dues payments are due on or before January 1st each year so we encourage you to make your payment now so that you can continue your TSOP membership and support the society and its work. Our Dues Prepayment Incentive can save you time and the hassle of arranging your yearly payment. When you prepay your dues four years in advance at the regular rate of $25/yr we will give you the fifth year free!

We encourage members to use our convenient online dues payment system. You can use it to pay by credit card, check (US Members), money order or credit card. You can login at www.tsop.org/mbrsonly and select ‘Online dues payment’ or go to www.tsop.org/dues and access the online form without logging in. Please note that credit card payment processing is via PayPal and you don’t need a PayPal account to use it. If you want to use a dues form, a copy of this year’s form can be downloaded from the website by following the ‘Members only->Dues’ links from the main page (www.tsop.org).

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

Annual Meeting
Programs, Abstracts and Photos available on the website

The abstracts, photos and field trip guide from the 2015 Indonesia TSOP Meeting are all now available on the TSOP members’ website. Just login to the Members Only section of the website and select ‘Ann Mtg Documents’ from the left hand menu. A dropdown box will allow you to choose which meeting you are interested in. Select the item of interest and click ‘Display’!

GSA Energy Geology Division
Cady Award and Medlin Scholarship

Nominations for the 2016 Gilbert H. Cady Award are due February 28, 2016.

Students! Apply for the Medlin Scholarship by March 15, 2016.

Details are on the web: GSA Cady Award and Medlin Scholarship Announcements
JOINT MEETING
TSOP - AASP - ICCP

The Society for Organic Petrology, AASP-The Palynological Society
and the International Committee for Coal and Organic Petrology

September 18 – 23, 2016
Houston, Texas USA
www.tsop.org/2016Houston/

We are pleased to present the third circular regarding this first historic joint meeting of these three related geological, geochemical and biological scientific societies. We have finalized our schedules of technical sessions including the Symposia and Theme Sessions, and further finalized the pre-meeting Short Course, and the two fieldtrips. Some of the social events are yet to be decided upon, so look for additional information on those in the near future.

The purpose of this joint meeting is to bring together a diverse group of scientists to discuss the close relationships between organic petrology and palynology, to foster thoughtful discussion and address issues that may be of benefit to furthering the respective sciences. Key themes to be addressed during joint activities include source rock/source-rock reservoir resource assessment, microscope methods of characterizing microporosity, coal characterization, and palynofacies/kerogen.

The venue for this meeting will be the historic Magnolia Hotel in downtown Houston. The Magnolia was built in 1926 as the former Post-Dispatch Building. It was re-purposed in 2003 as The Magnolia Hotel, and further underwent a significant upgrade in 2009. The hotel is centrally located in downtown within walking distance of excellent restaurants and pubs. Over the past several years downtown Houston has undergone a major revitalization with many new office buildings, exciting arts and entertainment venues, and several world-class restaurants. We believe the downtown will provide exciting possibilities for every need and want.

SHORT COURSE
Saturday All-day Short Course: It is the pleasure of the Organizing Committee to present an all-day pre-meeting short course entitled, “Integration of microscopy and geochemistry in petroleum source rock evaluation”. The course will be taught by Dr. Richard Tyson (GeTech,UK). The course will be presented in a classroom setting, and will emphasize the integration of microscopy and geochemistry to better understand and characterize source rocks in both conventional and unconventional exploration. Microscope methodologies discussed will include both palynofacies and organic petrographic techniques. Additional details of the short course are being finalized and will be published in upcoming announcements.
**SYMPOSIA/THEME SESSIONS**

After considerable discussion, a number of integrated Symposia and Theme Sessions have been finalized. These will include:

1. **Microscope methodologies in recognizing and characterizing organic microporosity** (Joint TSOP/ICCP Theme Session: Monday PM)
2. **Palynofacies and Kerogen** (Joint TSOP/ICCP/AASP Theme Session: Tuesday PM)
3. **Multi-modal Characterization of Source Rocks, including Source-Rock Reservoirs** (Joint TSOP/ICCP/AASP Symposium: Wednesday All-Day)
4. **Palynofloral Contributions to Source Rocks** (AASP/TSOP Theme Session: Thursday AM)
5. Additional AASP-sponsored Sessions will include an **Alfred Traverse Symposium**.

At this moment, a list of Invited/Keynote Speakers has been finalized, and invitations will be sent out very shortly. For many of the proposed joint sessions, at least one organic petrography/geochemistry and one palynology Keynote Speaker will be invited. All interested scientists will be strongly encouraged to contact us and propose to submit their abstract(s) for one or more of these Sessions and the all-day Wednesday Symposium. Exact details regarding these sessions will be forthcoming in the next respective Newsletters, and will appear on respective websites very soon.

**FIELD TRIPS**

**Friday-Sunday Pre-Meeting Field Trip:** This 2+ day field trip will visit Eagle Ford Formation outcrops in west Texas, and will be led by Barry Warwack (Manager of Reservoir Geology, Core Laboratories, Houston). The field trip will depart on the afternoon of the Friday prior to the meeting, and return by Sunday late afternoon or early evening. The Eagle Ford Formation is a world-class source-rock reservoir resource in the subsurface of south Texas, and the accompanying strata have been researched extensively in stratigraphic, geochemical and biostratigraphic studies.

**Saturday Post-Meeting Field Trip:** This will be a one-day excursion to Cretaceous through Eocene strata of east-central Texas. These strata are equivalent to the important Wilcox Formation that forms major reservoirs in the subsurface of the deepwater Gulf of Mexico. The field trip will leave early Saturday morning from the Hotel, and return early evening back to Houston. Final details of both field trips will be presented in upcoming Newsletters and on the respective Society websites.

**SOCIAL EVENTS**

Multiple social activities of interest to all participants are being discussed and should be finalized in the very near future with the hotel and off-site venues.

**Monday PM Icebreaker:** The Monday evening Icebreaker will take place on the rooftop patio of The Magnolia Hotel (weather permitting). The patio offers a great view of the Houston downtown skyline and sunset.

**Tuesday PM Happy Hour:** On the Tuesday late afternoon, a Happy Hour will accompany an opportunity to view the posters that will be part of the technical aspect of the meeting. Drinks and finger food will be served and there will be sufficient opportunity to chat with authors about their poster displays.

**Mid-Meeting Event:** A special event is being planned for the Wednesday Evening at a nearby locality in Downtown, preferably within walking distance of the Hotel. The hope is to find an outdoor venue to view the Houston skyline and enjoy the early Fall weather. This event will immediately follow the end of the Wednesday all-day Symposium, so it is our hope to continue the discussions and renew friendships in this relaxed atmosphere. Details of this event are still being determined.

In addition to all these events, attendees will have sufficient opportunity to enjoy the Houston downtown with its numerous world-class restaurants, and abundant drinking establishments.
SOCIETY BOARD MEETINGS
Along with the technical and social activities, the respective Societies will have their necessary Board of Directors meetings, and Business Luncheons. The current schedule includes:

**ICCP Council Meeting:**  
Sunday  
September 18th  
16:00-21:00

**TSOP Council Meeting:**  
Sunday  
September 18th  
17:30-21:00

**TSOP/ICCP Business Luncheon:**  
Tuesday  
September 20th  
12:00-14:00

**TSOP Council Meeting:**  
Tuesday  
September 20th  
19:00-21:00

**AASP-TPS Outgoing Board Meeting:**  
Tuesday  
September 20th  
19:00-22:00

**ICCP Council Meeting:**  
Thursday  
September 22nd  
18:00-21:00

**AASP-TPS Business Luncheon:**  
Friday  
September 23rd  
11:30-13:30

**AASP-TPS Incoming Board Meeting:**  
Friday  
September 23rd  
17:00-18:30

TRANSPORTATION AND ACCOMMODATIONS
Houston is a significant transportation hub and the Intercontinental Airport (IAH) is serviced by all major airlines from Europe and Asia. Both airports (IAH and HOU) are serviced by the major US-based airlines: IAH is a major hub for United Airlines, and HOU is a major hub for Southwest Airlines. All the major American airlines (e.g. Delta and American) fly into IAH numerous times through the day. All major European, Asian and Middle East airlines (e.g. KLM, British Airways, Air France, Lufthansa, Singapore, Korean Air, JAL, Emirates, and Qatar Airways) fly once a day in and out of IAH. Transportation to and from the downtown area from both airports is available via taxi, shuttle, and MetroBus. Further information on fares and routes from the two airports will be distributed in later circulars.

**The Magnolia Hotel:**  Our current negotiated room rate at The Magnolia hotel is US$179/night (single occupancy). Double- and triple- occupancy will be priced accordingly. This room-rate includes complimentary hot breakfast, a late afternoon happy hour (complimentary beer/wine), a complimentary bedtime cookie buffet, and free internet. A listing of alternative nearby hotels and hostels will be made available to meeting participants, however, in order to meet our hotel commitments, all attendees are strongly encouraged to stay at the host Hotel.

ORGANIZING COMMITTEE
The local Organizing Committee consists of Thomas Demchuk (RPS), Jen O'Keefe (Morehead State U.), Thomas Gentzis (Core Laboratories) and Joe Curiale (Independent). Over the next several months as the technical and social programs are finalized, we will do our best to keep the societies and membership informed of new events, the associated costs, and deadlines. We look forward to a great joint meeting in September of 2016.
Dear AGI Member Society Colleagues

Please help us to create a national policy dialogue around the value of the geosciences as electoral candidates address some of the key issues facing society and our profession today.

We would like to draw your attention to the new 2016 Critical Needs document, Geoscience for America’s Critical Needs: Invitation to a National Policy Dialogue, which identifies policy goals for candidates and policy makers as they prepare for the 2016 election cycle and the transition to a new Administration. The document, prepared by a volunteer Working Group in consultation with AGI’s 51 member societies and organizations, showcases the importance and breadth of the geosciences and presents a consensus view from the geoscience community on nationally significant policy objectives.

You can download the document free from the Critical Needs webpage: www.americangeosciences.org/policy/critical-needs, or contact AGI for printed copies. We hope that the booklet and website will serve as a resource for decision makers and encourage the geoscience community and policy makers to work together to develop strategies to meet America’s critical needs.

We encourage you to share this document with your members and colleagues, and to use it in your conversations with policy makers in the lead-up to the 2016 elections. Over the coming year, we will be reaching out to member societies for help in developing more detailed information and outreach activities on behalf of the geosciences. We welcome your suggestions for action. Please contact me at (703) 379-2480 or mboland@agiweb.org, if you have any questions or if you would like printed copies of the booklet.

We look forward to collaborating with you in 2016 and beyond to highlight the vital role of the geosciences in society.

Sincerely,
Maeve Boland

New TSOP Members

Gordon MacLeod

Dr. MacLeod obtained his B.Sc. hons in applied geology from Univ. of Strathclyde and Ph.D. in geochemistry and mineralogy from Univ. of Glasgow. He has industrial experience with Shell US, Petroleum Development Oman, ExxonMobil Upstream Research and is presently with Chesapeake Energy in Oklahoma City. His research interests include geochemistry, petroleum systems analysis, organic petrography for maturity and organic facies models, and fluid inclusion studies.

Dane Synnott

Mr. Synnott completed his BA at the University of Calgary in History in 2011, followed by a BSc with Distinction in Geology at the University of Calgary in 2015. This included completion of an undergraduate thesis entitled "Correlation between zooclast reflectance and Rock-Eval Tmax in the Upper Ordovician Cape Phillips Formation,"
Nunavut, Canada” in collaboration with the Geological Survey of Canada. Mr. Synnott is currently completing a MSc in Geology at the University of Calgary under Drs. Pedersen, Sanei, and Dewing examining organic petrology of the Second White Specks of the Cretaceous Colorado Group.

Prakash Singh

Prof. P. K. Singh obtained BSc (Hons), MSc (Geology) and PhD (coal petrology and coal geochemistry) degrees from Department of Geology, Banaras Hindu University. He served seven years in industry (National Mineral Development Corporation) as Exploration Geologist and at present serving the Department of Geology as Professor of Geology. Prof. Singh specializes in coal characterization, petroleum source rock characterization and organic maturation including hydrocarbon generation, coal-forming depositional environments and coal utilization, coal upgradation (desulfurization, demineralization, detoxification/removal of toxic trace elements from coal) using geo-biological tools. He is the recipient of the prestigious Dr. H. S. Pareek Award (2013) given by Geological Society of India and Subrata Ghosh Coal Petrology Award (2015-16) given by Mining, Geological & Metallurgical Institute of India; he has over 80 articles in international and National refereed journals.

Najibatul Adibah

Ms. Adibah received her BSc in Geological Engineering from Gadjah Mada University, Indonesia, in 2015. Her BSc research thesis was titled “Evaluation of potential shale of Nanggulan Formation, Yogyakarta, Indonesia as source rock based on geochemistry and organic petrology characteristics”. Her current research interests focus on the influence of depositional environment, volcanic activity, and orogenesis to organic carbon content and thermal maturity of Nanggulan shale.

Winda Novianti

Ms. Novianti received her BSc in Geological Engineering from Gadjah Mada University, Indonesia. Her BSc research thesis evaluated source rocks of the Talang Akar formation, South Sumatra Basin, using organic petrography and geochemistry methods. Her current research interests include petroleum geochemistry and unconventional energy.
John Castaño Honorary Membership Award
Call for nominations
2016

*Deadline: May 31, 2016*

TSOP members are invited to nominate the scientist of your choice for the 2016 John Castaño Honorary Membership Award, The Society for Organic Petrology's highest honor (www.tsop.org/honmem.htm). The award acknowledges distinction in a scientific discipline of significance to the Society, in recognition of contributions in research, service to TSOP, or education. The John Castaño Honorary Membership Award conveys life membership in the Society. It is named in honor of John Castaño, one of our most active Houston-based founding members. John served as inaugural Vice-President, and later, as President of TSOP. He was an organizer of three TSOP meetings in the Houston area, and was made an Honorary Member in 1995. John served TSOP in many capacities until his death in 1997; a memorial article was published in the June 1997 issue of the TSOP Newsletter.

If you would like to nominate a candidate for the 2016 Castaño Honorary Membership Award, please submit a letter of recommendation and a brief vita of the nominee to:

**Dr. Thomas Gentzis**
Chair of the Committee
c/o Core Laboratories,
6316 Windfern Road,
Houston, TX 77040, USA
Tel: 713-328-2556
Email: thomas.gentzis@corelab.com

*Nominations must be received by May 31, 2016.*

It is strongly suggested that supporting letters of recommendation from colleagues and other scientists accompany the nomination package. Emphasis should be placed on the significance of the nominee's research and contributions.

Nominations will be reviewed by the Castaño Award Committee and results will be announced at the Annual Meeting to be held in Houston in September 2016. The selection process is confidential and nominees do not have to be former or current TSOP members.

The committee evaluates research, service and educational impact based on the following criteria:

- Research contributions include work that demonstrates a high degree of originality and serves to advance the science of organic petrology or related disciplines. Nominees must possess a sustained international record of professional publication and achievement.
- Nominees recommended for service must demonstrate significance contributions to TSOP (the Society) in a leadership role. Their service must have enabled the Society to stimulate interest and promote innovative research in coal geology. Contributions include educational activities, administrative duties, or the development of the Society.
- Nominees recommended for education must demonstrate a high degree of dedication and significant impact as a teacher of organic petrology or related disciplines.

**Dr. Thomas Gentzis**
TSOP Vice-President and
Chair of the John Castaño Honorary Membership Selection Committee

Spackman Award 2014

**Brief summary of the research resulting from the grant for publication in the TSOP Newsletter**

**Carl Peters**
Spackman Award Winner 2014

**End-of-Grant Summary**

**Project Outline:**
Life originated between 3800-2500 million years ago (Archean Eon), but little direct evidence such as fossils have been found yet. Finding fossils in Archean rocks is difficult since most have been destroyed. Exceptionally, Australia holds still intact rocks from that time. In my research project I found organic matter (oil in fluid inclusions and solid bitumens) which was captured in carbonate veins of 2700 million year old rocks. The veins were
analysed to find fossils of molecular size, so-called biomarkers. I have found traces of an ancient environment that could support life, hence highlighting the importance of this project to understanding the origin of life.

**How The Spackman Award Contributed to This Project:**
The Spackman Award allowed me to analyse stable isotopes of vein carbonates. In order to describe how the carbonate veins, which contain organic matter, may have originated, oxygen and carbon stable isotopes were measured using isotope-ratio mass spectrometry (IRMS). The stable isotope data provided insights to a bigger picture of the assessed Archean rocks, as some carbonate veins have characteristics of hydrothermal fluids, whereas others formed from diagenetic organo-acidic rich fluids. These results ultimately allowed me to discuss the origin and relative timing of the detected biomarkers.

---

**Spackman Award 2015 Summary**

**Effects of biogeochemical processes on the preservation of Proterozoic microbial mats**

Ashley Manning-Berg, University of Tennessee

Our understanding of the Earth’s Precambrian record derives primarily from the chemical analysis of marine sedimentary rocks. More recently, biomarkers associated with preserved organic matter have been used to highlight changes in Earth’s early biosphere (Summons et al., 1999; Brocks et al., 2005; Blumenberg et al., 2012). Biomarkers have also been used to decipher both the diversity of microbial communities and physiologic processes active in ancient environments (Schopf et al., 2005, 2010). Well-preserved mats, however, are rare. Most preserved organic material reflects a combination of changes in microbial composition during maturation and taphonomic degradation.

The record of preserved organic matter is also complicated by both early and late-stage diagenesis. Analytical techniques such as Fourier-transform infrared spectroscopy (FTIR) and Raman spectroscopy have been used to characterize carbonaceous material preserved in Precambrian rocks and to determine the origin of carbon and kerogen. Such vibrational spectroscopy has been used primarily on well-preserved fossils, in order to correlate optical morphology to chemical composition (Schopf et al., 2002, 2005; Marshall et al., 2005). This study focuses on determining the extent to which preserved geochemical signals, specifically the molecular structure and geochemical maturity of the kerogen, are affected by taphonomic and diagenetic processes.

The Angmaat Formation (Turner, 2009), Bylot Supergroup, Arctic Canada records late Mesoproterozoic strata deposited within an intertidal to supratidal microbial flat (Kah and Knoll, 1996). Early diagenetic silica records microbial growth and decomposition across a range of environments from episodically exposed to persistently submerged, which controlled the distribution of mat-building and mat-dwelling populations. Angmaat cherts record four distinct microfossil assemblages (Knoll et al., 2012) that are preserved across a range of taphonomic states, from pristine mats silicified during active growth, to highly degraded and compacted mats that represent preservation during later stages of biological decomposition. Secondary silicification events also overprint original silicification, resulting in markedly poorer morphological preservation.

Preservation of distinct taphonomic and diagenetic events provides a unique opportunity to map changes in organic matter to associated biochemistry, and to distinguish chemical change associated with biological taphonomy from that associated with secondary diagenetic processes. An integrated petrologic and geochemical study of the Angmaat Formation chert will test for correlation between taphonomic state to depositional environment, changes in the structure of the organic matter (via FTIR and Raman spectroscopy), and to the composition of extracted organic material (via H/C and N/C ratios and biomarkers). Data will ultimately help distinguish the degree to which biological information is lost or retained during preservation and further our ability to interpret biogeochemical signals retrieved from lithologies where original mat structures are not preserved.
Figure 1. Taphonomic preservation of microbial mats preserved in Angmaat Formation chert. Petrographic analysis indicates that each mat type is preserved across a range of taphonomic states. Filament-dominated mats (A) display sheath shrinkage, collapse, and breakages, and within cement-dominated mats, are often preserved as cumulate masses of EPS. Coccolid-dominated mats (B) are more likely to be well-preserved. Taphonomic variability is most apparent in filament-dominated mats, as compression produces dense laminae with few distinguishable microfossils (C). Differential collapse of coccoids (D) and loss of differentiation within multiple sheathes is common in coccolid clusters within coccolid-dominated mats, or degraded filament mats (E) (adapted from Knoll et al., 2013).

Petrographic analysis will be used to categorize mat communities in terms of taxonomy, taphonomic alteration, and style of silicification. Each sample will be categorized into one of the mat communities established by Knoll et al (2013). Taphonomic state will be evaluated with a modified point counting technique where several hundred microfossils per thin section will be assigned a taphonomic grade of good, fair, or poor (Bartley, 1996; Bartley et al., 2000), and plotted on a ternary plot (Kowaleski et al., 1995). Mats dominated by filamentous microfossils will be evaluated by sheath preservation, and coccolid microfossils will be evaluated by cell morphology.

Evidence for either a single stage of silicification (primary chert), or multiple silicification events (diagenetic chert), with also be correlated to changes in microfossil preservation. Because early diagenetic is expected to reflect an evaporative, marginal marine environment (Kah et al., 1999, 2001), and secondary chert is expected to reflect hydrothermal fluid flow (Sherlock et al., 2004; Turner et al., 2011), environments of silicification will be evaluated using paired δ¹⁸O and δD (Knauth and Epstein, 1976), a technique capable of constraining crystallization temperatures when the δ¹⁸O value of the formation fluid is not known (Knauth and Epstein, 1976; Hren et al., 2009).

Defining the crystallization temperatures of the chert will provide information on the depositional environment of the microbial mats and identify the effects of increased temperatures on fossil preservation. Petrography will also provide an initial-screening for thermal maturity based on changes in kerogen color (Peters et al., 1977; Schiffbauer et al., 2012). Other indicators such as the carbon isotope composition, and H/C and N/C ratios of extracted bulk organic matter will provide measurement of the overall effects of thermal alteration on organic matter composition.

Raman spectroscopy with confocal laser scanning microscopy and complimentary FTIR (Olcott Marshall and Marshall, 2015) will be used to determine chemical changes within kerogen.
associated with observed morphological changes (Schopf et al., 2005, 2007; Schopf and Kudryavtsev, 2009) and to correlate molecular functional groups to specific microfossils across preserved taphonomic states (Igisu et al., 2011; Mastandrea et al., 2011). Both methods are non-destructive and non-intrusive analytical techniques capable of determining the mass of the bonded atoms, the bond strengths, and geometry of a molecule (Olcott Marshall and Marshall, 2015).

These molecular and structural characteristics of preserved kerogen can be mapped in association with the morphology of organic-walled microfossils described during petrology (Schopf et al., 2005, 2007, 2010; Schopf and Kudryavtsev, 2009). Vibrational spectroscopy techniques have been successfully used to correlate optical morphology to chemical composition on well-preserved Precambrian fossils (Schopf et al., 2002, 2005; Marshall et al., 2005); however, recent studies have yet to target microbial communities through natural taphonomic decomposition. Data obtained from Raman and FTIR spectroscopy will define the structure associated with microfossil taphonomy, identify minerals associated with changing metabolisms within the mat, and reflect biochemical changes during mat decomposition.

Ultimately, subsamples of chert will be analyzed via gas chromatography mass spectrometry (GC-MS) to evaluate preserved biomarkers and lipid signatures. Biomarkers are recalcitrant lipids that are converted into hydrocarbons that can be used as proxies for different biogeochemical and physiological processes in the modern and ancient environments (Summons et al., 1999; Summons and Lincoln, 2012; Blumenberg et al., 2012). GCMS is the principle method used to evaluate biomarkers (Peters and Moldowan, 1993). Biomarkers expressed in the Angmaat Formation are expected to vary according to dominant microfossil type (coccoid vs. filament) and their taphonomic state (as secondary mat communities begin to be expressed).

We are currently in possession of a small collection of black chert targeted during a previous field season, which allows preliminary analyses to be performed. Petrologic evaluation of taphonomy and silicification are currently ongoing, and spectroscopy will begin this summer. One field season is planned to augment the current sample collection to provide additional materials for destructive geochemical analyses. Additional chert will be collected without a color bias to better evaluate the full range of microfossil preservation and the extent that secondary silicification played a role in the preservation of these microfossils. Ultimately, this combination of petrologic and geochemical techniques will help define the relationships among preserved organic signatures, taphonomic processes, and environments of diagenesis.

Spackman Award 2015 Summary
Geochemical and maceral composition of the Illinois Basin slurry ponds: Economic implications via the OHD process
Amberly Tobin, Southern Illinois University

The focus of this research is to determine the geochemical and maceral make up of coal waste ponds in order to assess their economic potential. Coal beneficiation plants wash and prepare coal for the coal combustion process and during this stage large amounts of waste are produced and deposited in what are called coal waste or coal slurry ponds. The primary focus of this research is to try to find a way to not only fix this problem of large amounts of coal waste accumulation but to find a possible economic use for this problem.

A promising solution to this problem is called Oxidative Hydrothermal Dissolution (OHD); OHD is a technique developed and patented at Southern Illinois University by Drs. Ken Anderson and John Crelling. It is essentially a coal liquefaction process that takes solid coal and turns it into a soluble liquid, the soluble liquid product can be used as chemical feedstocks to make such things as plastics. The maceral composition and geochemistry of slurry ponds fed from coal beneficiation plants of both old and newer technology will be assessed.

Coal beneficiation plants fed by older washing technology should contain a higher percent of carbon and larger sizes of coal particles than those slurry ponds fed by newer technologically advanced
coal beneficiation plants. Preliminary OHD experiments have been performed on slurry pond samples and results have shown that the products produced were very similar to that of raw coal, meaning that this process shows promise that coal slurries can successfully be economically useful.

---

**Do Comet Hydrocarbons have Biogenic Origins?**

Dr Prasanta K. Mukhopadhyay has had research on hydrocarbons in comets featured in an article in the November 2015 issue of the AAPG Explorer magazine. You can read about this interesting research at the following link:

[Do Comets Hydrocarbons Have Biogenic Origins?](#)

---

**SUMMARY OF MEETING**

32nd Annual Meeting of The Society for Organic Petrology, Yogyakarta, Indonesia

*Hydrocarbons in the Tropics: On the Edge*

*Tim A Moore, Cipher Consulting, Brisbane, Australia*

*D. Hendra Amijaya, Gadjah Mada University, Yogyakarta, Indonesia*

The rains were light, the land didn’t shake and the volcanoes slept. It was hot though. But the idyllic settings of the Hotel Hyatt in Yogyakarta gave us shade to relax in, a cool pool to swim in, fresh fruit to revive us, and friendly smiles to make us happy. Oh, and then there was the conference! …

First, let’s get the numbers out of the way:

- Twenty-two students attended, 11 from Indonesia and 11 from overseas.
- The conference was endorsed by the Indonesian Association of Geologists, Perhapi – the Association of Indonesian Mining Professionals and Gadjah Mada University
- We had four Keynote speakers: Prof. Eddy Subroto, Dr Bukin Dauley, Dr Romeo Flores and Mr Mike Friederich.
- There were two short courses, one on fundamentals of organic petrology and the other on assessment of unconventional resources.
- There were 8 sponsors consisting of Chevron, P.T. Geoservices, Cipher Consulting Ltd., ERC Pty Ltd., Core Laboratories, Austar Gas Pty Ltd., Resolutionz consulting ltd., and GGR Consulting Team

The first conference activity was an informal field trip to Borobudur Temple followed by a visit to a small, traditionally run family-owned batik factory. Borobudur Temple is over 1200 yrs old and was only ‘re-discovered’ less than a hundred years ago. It is the largest Buddhist temple in the Southern Hemisphere. It was a hot day, but all 45 participants braved the humidity and heat. First, we walked up a nearby hill and received an excellent summary of the geology from Dr Didit Hadi Bariaanto and Wartono Rahardjo. Then we all climbed up the 35 m on the temple itself - through various levels of enlightenment and remembering to always move around in a clockwise manner. After the hard climb, we returned to the buses (temporarily losing some of the participants!) and drove to a shady restaurant for a refreshing lunch. The end of the day was capped off with some retail therapy in the store part of the batik factory. The tour, by the way, was lead by Ibu Astri Anggara (it is her family who owns the batik factory and shop), who, perhaps not so coincidentally, is in the background of the photograph on the cover of this year’s TSOP Abstracts & Programme. She is also the wife of Dr Ferian Anggara, one of the members of the Organising Committee.

The next day (21 September) was down to work. We had two concurrent workshops. The first was run by Dr Walter Pickel (of Organic Petrology
Services, Australia) and covered the fundamentals of organic petrology. The course was well attended with over 25 participants. The second workshop was given by John Hattner and Dan Paul Smith, both from Dallas, Texas, USA (from Netherland Sewell & Associates Inc (NSAI)). Their workshop covered the assessment of unconventional hydrocarbons, such as coalbed methane and shale gas. This course was also well attended with 12 participants. After the long day of workshops, we all retreated to Bogey’s Terrace (named after the golf term, not the actor) for drinks, nibbles and welcoming the rest of the participants and their partners. A little bit later the students snuck away for a pre-arranged function facilitated by Danielle Kondla (TSOP Student representative) and Dr Ferian Anggara at a local Javanese café with music and much talk. The Outgoing Council Meeting was also held after the Ice Breaker, with some of the Committee attending either through Skype or Face Time.

The first day of the technical sessions (22nd September) started with an opening ceremony. Outgoing TSOP President Judith Potter and Dean at Gadjah Mada University Prof Panut Mulyono rung the gong and said a few words. This was followed by the morning’s plenary session with Keynote speakers Prof. Eddy Subroto and Dr Bukin Dauley. Sessions for the rest of the day included talks on ‘Shale Reservoirs’, ‘Coal Combustion & Beneficiation’, ‘Shale Evaluation Techniques’, ‘Coal Petrology & Geochemistry’, ‘Porosity & Saturation: Unconventional Reservoirs’ and ‘Coal Geochemistry’. The Organising Committee wish to thank our sessions chairs for this day and they are: Romey Flores, Hermes Panggabean, Xibo Wang, Walter Pickel, Hamed Sanei, Chairul Nas, Leslie Ruppert and Colin Ward.

The conference dinner was held at the Prambana Garden Resto, near the 9th-century Prambana Hindu temple. As we ate a wonderful Javanese buffet, we enjoyed the illuminated highlights of Prambana in the background. In the temple compound itself there are a series of stone structures, the tallest of which is 47 m from base to top. After our meal we took a short stroll to an open-air theatre where we watched an ancient Hindu play performed by the Ramayana Ballet. The dancers, the fireworks and the 1200-year-old Prambana temple highlighted in the background made for a memorable evening.

The second day of the technical sessions (23rd September) again started out with two Keynote speakers: Mr Mike Friederich and Dr Romeo Flores. The 31 posters on display throughout both days of the technical sessions were visited by most, probably all, of the participants during coffee breaks and snack times. The posters detailed research topics such as coal swelling, thermal alteration of coal, paleo-mire characteristics, isotopic composition of coal, graptolite-derived organic matter, as well as shale petrography and geochemistry. The oral sessions for the second day addressed aspects of ‘Sedimentology, Plants & Hydrocarbons’, ‘Coalbed Methane’, and Unconventional Reservoirs’. Our session chairs for the day are thanked and they were Peter Warwick, Shifeng Dai, Arndt Schimmelmann, Bukin Dauley and Maria Mastalerz.

At lunchtime we returned to Bogey’s Terrace where the TSOP annual general meeting was held. Then before the official closing of the conference later that afternoon, awards were given out. The Furthest Travelled Award went to Dr Astrid Blandon from the National University of Colombia. Thanks Astrid for coming all that way and bringing two of you students with you. We enjoyed your presentations and your company at the conference and in the field!

There is no better way to judge the health of an organisation than to look at the quantity and quality of students who come to its annual meetings. Based on this metric alone, TSOP is in fantastic shape. This year’s meeting drew eleven students from across Indonesia plus two more Indonesian students who were studying abroad (in Australia). This highlights the exceptional participation from the host country. We also had nine other students travel great distances from Australia, China, Canada, and Colombia. On behalf of the 2015 TSOP Annual Meeting Organising Committee we wish to send a special thank you to all the students and hope to see you again in future meetings.

The Best Student Oral Presentation was awarded to Rita Susilawati (University of Queensland, Brisbane Australia & Geological
Agency of Indonesia) for the talk “Stable isotopic composition of gas produced during methanogen culturing experiments associated with coal” with co-authors S.D. Golding, J.S. Esterle, T.E. Mares and K.A. Baublys. There was a tie for the Best Student Poster Presentation and so the award was given both to N. Qadaryati (Universitas Gadjah Mada, Yogyakarta, Indonesia) for the poster “Vitrinite reflectance indicatrix of post-coalification tectonic deformed Balikpapan Formation coals in Sangatta, East Kalimantan” with co-author H. Amijaya and W. Novianti (Universitas Gadjah Mada, Yogyakarta, Indonesia) for the poster “Characterization of geochemistry and brittleness of the Talang Akar Shale, South Sumatra Basin, as an unconventional hydrocarbon resource” with co-authors A.Z. Al Ansori, A. Di Stefano, J. Jyalita and D.H. Amijaya.

Last, but not in any way least, the Organising Committee would like to extend a very special thank you to all the students from Gadjah Mada University who helped at the registration desk, with setting up computers and equipment and generally making everything run smoothly. We could not have done it without you.

The post-conference field trip left the following morning (24th September; and evidently quite early for some participants! – see summary by Dr Sandra Rodrigues). A humorous and informative narrative of that field trip is given in the next newsletter article.

Finally, the Organising Committee wishes to convey its immense thanks to the many members of the TSOP Council during the period from 2012 to the present for support of this meeting. Our goal was to introduce TSOP members to the geology of Indonesia and to introduce Indonesian researchers and students to TSOP. We feel this aspiration has been more than met.
Figure 3: Walter Pickel leading one of the workshops.

Figure 4: Outgoing TSOP President Judith Potter and Dean Panut Mulyono opening the conference.

Figure 5: TSOP participants at the poster session.

Figure 6: Attentive participants on the first day of technical sessions.

Figure 7: Maria Mastalerz and Thomas Gentzis at the conference dinner.
Figure 8: The Ramayana Ballet doing an ancient Hindu opera with the 1200 year old Prambana temple in the background.

Figure 9: Aretha Christie with costumed dancers of the Ramayana Ballet.

Figure 10: Mike Friederich giving a keynote speech on SE Asian sedimentary basins.

Figure 11: Best Student Poster Award (tie) go to W. Novianti and N. Qadaryati as presented by Incoming TSOP President Shifeng Dai.

Field Trip to Ancient & Modern Coal/Organic-Rich Depositional Systems, East Kalimantan (Borneo), Indonesia
Sandra Rodrigues, The University of Queensland, Brisbane, Australia

Other than getting up at 5 am many mornings (thanks to our field trip leaders: Tim Moore, Hendra Amijaya and Chairul Nasl) the field trip was amazing; extremely well organized down to every small detail.

Where can I start? .... Well... as said we got up really (really, really....) early to fly to Balikpapan (on the east coast of Borneo) and while our bags were shipped to the hotel we started our journey through the Miocene coal-bearing sediments. The transportation consisted of three small buses that were surprisingly comfortable, even for big guys like ‘Max’ Sion Pretorious, The University of Queensland.
After leaving the airport we headed north, into a geological province of East Kalimantan known as the Samarinda Anticlinorium because of its many anticlines and synclines. Actually, the field trip was a kaleidoscope of many different kinds of transportation – it seems like we only missed out on wind surfing! – which, considering the crocodiles and snakes might have involved extra safety measures and/or the loss of some participants. That first day, after leaving the Balikpapan airport, we visited four outcrops of the Pulaubalang Formation; these sediments are thought to represent a transitional sedimentary environment between the underlying marine Pamaluan Formation and the overlying fluvial-deltaic Balikpapan Formation. This transitional formation is composed of coals that are sulphur-rich.

Beside the coal characteristics observed in the field, sedimentary structures were also visible such as cross stratification and burrows in the sandstones (Fig. 2b) among others features.
Our field observations were supported by explanations from Professor Chairul Nas (Trisakti University; Fig. 3) who knew the area very well, and Dr Peter Warwick (USGS; Fig 4a) and Dr Greg Smith (Curtin University; Fig 4b) both of whom have a strong background in sedimentology, making time travel through the Miocene even more exciting. And oh yeah…Tim also helped a little bit too….

Figure 3 - Professor Chairul Nas (on the left) giving an overview of the coal deposits.

Figure 4a - Dr Peter Warwick looking at the sedimentologic variations within the Pulaubalang Formation.

After a very well deserved rest that night, on the second day we journeyed to the Mahakam River delta itself …. And oh boy, that was fun (Fig. 5a). We got to hang out all day in boats drinking cocktails and topping up our suntans …. NOT! Actually we collected river sediment samples (Fig. 5b) and even drilled a core into one of the distributary bars that sits about 8 km in front of the Mahakam delta (Fig. 5c), in the open sea (the Makassar Straits, actually).

Figure 4b - Dr Greg Smith and Prof Colin Ward exploring the Miocene coal-bearing sequences.

Figure 5 – Second day: on the Mahakam River delta. a) Sion and Tim enjoying the boat ride
On the way back to Samarinda from the delta complex, we stopped in one of the many shrimp farms that exist along the river to log the core under the guidance of Dr Andang Bachtiar (National Energy Council, Indonesia; Fig. 5d). In the core we noted changes in sedimentation related to more fluvial and/or tidal influences, checked grain size differences, described biogenic structures, and viewed marine fauna that all end up in a delta front month bar. It was quite an exciting day through a modern hydrocarbon producing environments. And when we thought that it could not get any better, on the third day the field trip leaders took us to one of the large freshwater lakes within the Kutai Basin - Lake Semayang. The Kutai Lakes are about 200 km inland (as the river meanders) from the coast.

At the small village of Kota Bangun we loaded up into eight Long Boats (Fig.6a) and, at first, headed down the Mahakam River for a kilometer or two and then we turned westward into a tributary called the Pela River; in less than a kilometer this short river stretch then opened up into Lake Semayang. As the name implies, the boats are long (Fig.6a), but also quite thin and a little tippy, so one just needed to lie down and enjoy the ride and watch out for the rather rare freshwater dolphins until reaching our destination (about 45 min). At Semayang village we were well received by the head of the village and the locals (Fig. 6b). During the rainy season (December – May) this “floating” village can be fully
surrounded by water. The freshwater lakes of the Kutai Basin are also surrounded by peat deposits, which, on average, are 7 meters thick. Although this area is known for its peat, very few studies have been conducted.

On the fourth and final day, we visited the Bukit Baiduri Energy Coal Mine (Fig. 7a). In this mine the Balikpapan and Pulaubalang Formations are being excavated. It was quite amazing to be able to walk around the pit area and actually touch the coal in the highwall (Fig. 7b), and what a beautiful bright coal it was!

The vitrain bands are so thick, and the attrital layers so bright, that it was hard, at first, to distinguish any banding in the coal. Pyrite and resin nodules were also observed. The extensive highwall areas allowed us to clearly see coarsening upward sequences between the coal zones.

After three and half long days of hard work, we finally had some rest during the afternoon and the field trip leaders took us for a bit sightseeing.

On the way back to Balikpapan we stopped at the Borneo Orangutan Survivor Centre (http://orangutan.or.id) to see the orangutans (Fig. 8a) and feed the sun bears (Fig. 8b). We also adopted an orangutan for one month, contributing to this noble cause. After arriving back in Balikpapan we made a quick stop at the traditional markets where we could buy local crafts and – for not so faint of heart – try the street food!
volunteered to help keep the meeting organized, helping with countless tasks before, during, and after each event. Following the conference icebreaker, the student cohort changed venues to experience a local café for some food, refreshments, and socializing.

Everyone seemed to enjoy themselves and it was a great chance to get to know each other. The foreign students (myself included!) were happy to have lots of advising from the Indonesian students on which delicious beverages and foods to try. Soon after we arrived, a band began to entertain us with live music, which really added to the enjoyment of the evening. A few of the TSOP students even joined in on vocals and guitar! We managed to snap a few group photos before the highly jet-lagged international students headed back to the hotel, but the function continued well into the evening.

Thanks to TSOP for generously funding this function and to Pak Ferian Anggara and Pak Hendra Amijaya for organizing it. I hope to see everyone again soon at future TSOP meetings.

Danielle Kondla
Student Affairs Committee
UK CAER Receives Federal Rare Earth Element Research Funding

When Jim Hower published papers in the late 1990s and early 2000s about rare earth concentrations at Kentucky coal mines, it was almost as a novelty. Dr. Hower, a petrologist at UK’s Center for Applied Energy Research (CAER), thought discovering a high concentration of rare earth elements in coal seams in southern and eastern Kentucky was interesting, no doubt, but he didn't think it would amount to much in terms of research and development.

Read the rest of this great press release at the University of Kentucky website:

UK CAER Receives Federal Rare Earth Element Research Funding

________________________
CALENDAR OF EVENTS

www.tsop.org/cal.htm

2016


June 19-22: AAPG 2016 Annual Convention & Exhibition, Calgary, Alberta, Canada. See the web site: AAPG 2016 Annual Convention


August 8-12: International Pittsburgh Coal Conference, Cape Town, South Africa. See details at: http://www.engineering.pitt.edu/pcc/

August 27 – September 4: 35TH INTERNATIONAL GEOLOGICAL CONGRESS, Cape Town, South Africa. See website for details: http://www.35igc.org/

September 18-23: Joint Meeting of TSOP-AASP-ICCP in Houston, Texas, USA. This will be the 33rd Annual Meeting of TSOP. Stay tuned for further details!

September 23-28: Geological Society of America Annual Meeting, Denver, Colorado, USA. GSA Annual Meeting

October 16-19: Mudstone Diagenesis, an SEPM-AAPG Research Conference. Santa Fe, New Mexico, USA. Theme: Implications for Exploration and Development of Unconventional Reservoirs. Deadline for Abstracts February 15, 2016. See flyer and website for details: Mudstone Conference Website

Please send in meeting, short course and special event announcements to the Editor!

For more geology event information see AGI’s GeoCalendar at: www.americangeosciences.org/calendar
Implications for Exploration and Development of Unconventional Reservoirs

LOCATION: Hilton Santa Fe Historic Plaza
Sante Fe, New Mexico
Date: October 16-19, 2016

This conference will promote the exchange of new ideas among the leading experts from industry, academia, and government on the controls and impacts of inorganic and organic diagenesis on mudstone hydrocarbon generation, reservoir properties and seal quality.

- Call for Abstracts – December 1, 2015
- Deadline for Abstracts – February 15, 2016
- Registration opens June, 2016

MAJOR THEMES

- Starting Materials: recent sediments and thermally immature rocks
- Mechanical Diagenesis: compaction, fluid expulsion and fracturing
- Inorganic Chemical Diagenesis: porosity and mechanical property evolution
- Organic Diagenesis: organic matter-rock interactions during petroleum generation
- Tools and Techniques: new advances and limitations
- Organic Matter: bridging the gap between optical & electron microscopic observations

CONVENERS
Wayne Camp (Andarko), Neil Fishman (Hess), Paul Hackley (USGS), Kitty Milliken (BEG—UT Austin) & Joe Macquaker (ExxonMobil)
Email: wayne.camp@anadarko.com
2015 Indonesia TSOP Annual Meeting Photos
All photos courtesy of Shifeng Dai

Castano Award Presentation for Jack Crelling. Jingle accepted the award on behalf of Jack

Distinguished Service Award presented to Jingle

Distinguished Service Award presented to Hamed Sanei
Ice Breaker at Annual Meeting

More Ice Breaker fun

Pre-meeting field trip group photo at Borobudur Temple