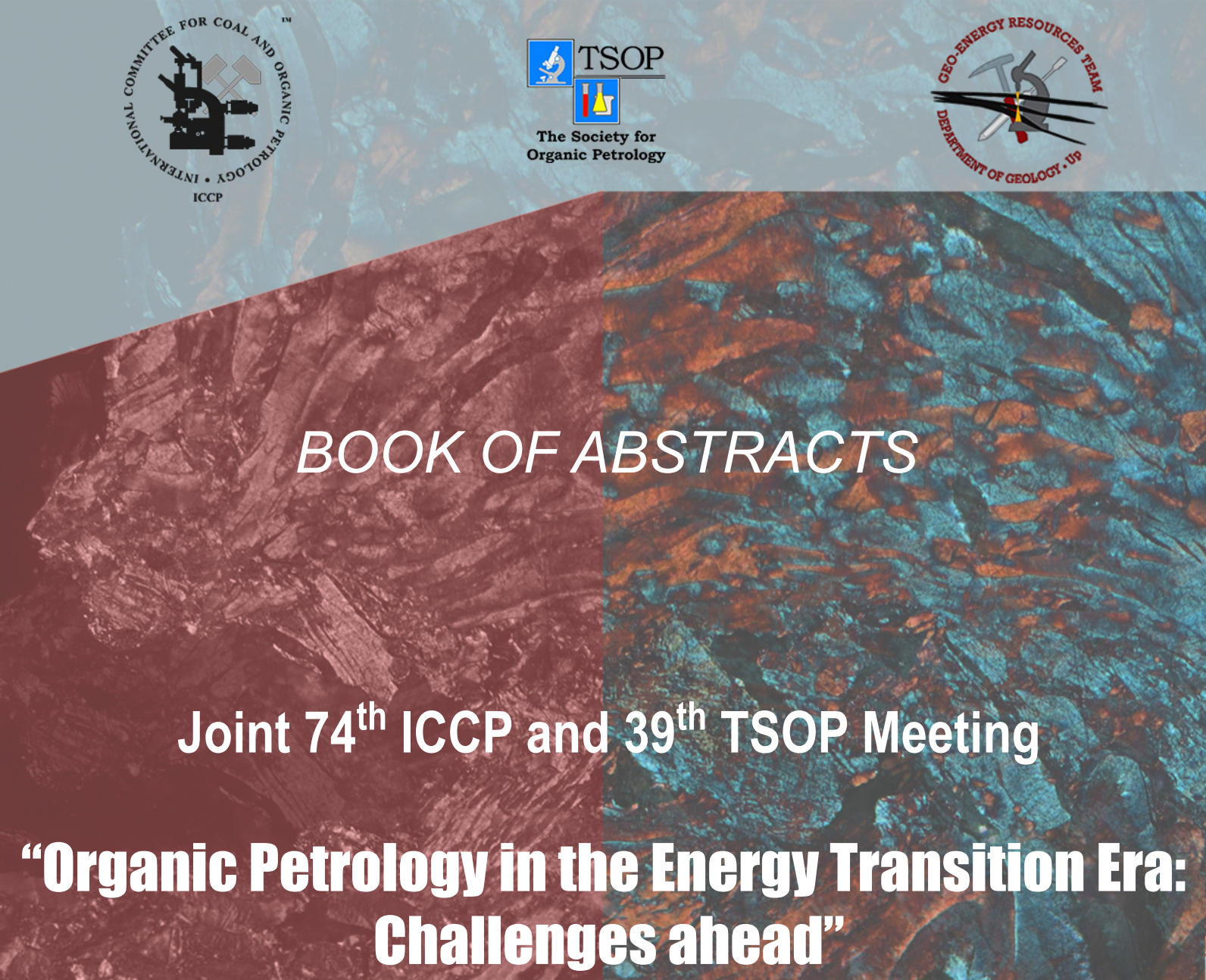

BOOK OF ABSTRACTS

Joint 74th ICCP and 39th TSOP Meeting

"Organic Petrology in the Energy Transition Era: Challenges ahead"

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Dear Colleagues,

we both welcome you to the Joint 74th ICCP and 39th TSOP Meeting taking place in our University here in Patras!

After 1993 in Chania and 2005 again in Patras, it is now the third time in ICCP's history that the annual meeting is held in Greece, whereas for the TSOP members this is the first gathering in our country; and this time in a Joint Meeting aiming to enhance the interaction among the members of the Organic Petrology community. During this event we do hope to continue keeping the tradition of both ICCP and TSOP, namely the international exchange of scientific information directly or indirectly related to Organic Petrlogy and the fruitful discussions in a friendly atmosphere.

The Joint Meeting has the very modern and demanding title: ***'Organic Petrology in the Energy Transition Era: Challenges ahead'****. The recent political decisions concerning the decarbonization of the energy sector in Europe, as well as the war between Ukraine and Russia have severely affected the global energy market differentiating the energy mix of many countries towards the increase of the renewables' share, the abandonment of coal exploitation, and the volatilization of the oil and gas prices. All these definitely affect our scientific discipline and the organic petrologists as well, despite the fact that in several emerging economies coal still plays and will continue playing an important role in covering the energy demand. Subjects dealing with a wide spectrum of applications of coal and, in general, organic matter like in fertilizer manufacturing, energy storage, biocarbon utilization etc., are nowadays gaining interest beyond the traditional uses such as the petroleum exploration, the cement and steel manufacturing, the gasification, and even the primary power generation. It is our duty to explore new application fields of Organic Petrology and to stay tuned with the forthcoming developments. These subjects will be addressed in the presentations and discussions during the Meeting.*

At this point, we would like to express our gratitude to all the contributors to the success of the Meeting: the members of both the Organizing and the Scientific Committee, our sponsors, the graduates of our Department of Geology for their assistance and, of course, the speakers, the poster presenters and you all who have traveled from many countries to participate in the meeting.

Wishing you to enjoy all the activities scheduled in the frame of our Joint Meeting, as well as the stay in Patras,

Kimon Christanis *Stavros Kalaitzidis*

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The behaviour of Kolubara and Kostolac lignite during devolatilisation process: A petrographical approach

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The devolatilization process is the initial step in the coal combustion. Devolatilization research was performed on a wire-mesh reactor in inert gas, at the atmospheric pressure. Two different sets of feed coal samples of various particle diameters (0.50<x<1.00 mm; 0.25<x<0.50 mm; 0.1<x<0.25 mm; x<0.1 mm) from the Kolubara and Kostolac mines were used for research. Lignite samples were spread in a thin layer a few particles thick, over electrically heated stainless steel wire mesh and rapidly heated at four different temperature stages (300ºC, 500ºC, 700ºC, 900ºC). Maceral analysis and rank deternination were performed on 32 combustion residues and 8 lignite samples following the classification developed by ICCP for lignite, bituminous coal and coal chars.

Huminite reflectance (0.27-0.28% Rr) confirms the low rank of all the coal samples. Residues of all particle diameters, devolatilized at 300°C and 500°C, showed very small changes in the reflectance value and still lignite rank. A significant increase in reflectance is observed in residues of all particle diameters, devolatilized at 700°C and 900°C. Measured vitrinite reflectance confirms the High (at 700°C) and the Medium volatile bituminous rank (at 900°C).

Lignite samples showed a relatively high content of huminite (64.7-77.6 vol.%), a low inertinite (3.1-7.2 vol.%) and a low liptinite content in the Kostolac (3.0-6.2 vol.%) and a slightly higher liptinite content in the Kolubara samples (4.2-11.3 vol.%). The mineral matter content ranges from 12.2 to 23.8 vol.%. The solid residue heated at 300°C and 500°C shows a slight decrease in huminite and liptinite contents and a slight increase of altered coal, which corresponds to vitrinite macerals. The major increase of vitrinite macerals was at 700°C, while char content is the highest in residues heated at 900°C. The content of liptinite is lower than in the raw coal, while inertinite displayed a low decrease with temperature change. FTIR spectral data for both Kolubara and Kostolac coal samples reveals a decrease in water, aliphatic- and oxygen-containing structures with increase in combustion temperatures from 300 to 700°C. The absence of aliphatic and oxygen-containing structures, breakdown of clay mineral component and negligible amount of water is detected in samples devolatilized at 900°C where aromatic structures dominate.

The maceral analyses of coal and devolatilized residues, as well as other experimental research (TGA, FTIR) provide information of the large changes of huminite and liptinite macerals at the higher temperatures and the decrease of volatiles with the increase of the devolatilization temperature in all samples from both basins.