

25TH ANNIVERSARY OF
MUSEUM OF AMBER INCLUSIONS
UNIVERSITY OF GDAŃSK



**Fossil Record
in Resins and Sediments**

BOOK OF ABSTRACTS

UNIVERSITY OF GDAŃSK
23-26 MAY, 2023



FossilRRS Conference



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and Sediments**

**25th Anniversary
of Museum of Amber Inclusions
University of Gdańsk**

BOOK OF ABSTRACTS

**University of Gdańsk, Faculty of Biology
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WELCOME

The Museum of Amber Inclusions University of Gdańsk is pleased to invite you to celebrate its 25th anniversary and attend the conference *Fossil Record in Resins and Sediments*, which will be held in Gdańsk, Poland, from 23rd-26th May 2023.

Twenty-five years ago, the natural history collection of amber and inclusions, started from modest beginnings – scientific collection of the Diptera inclusions of Professor Ryszard Szadziewski. What revolutionised the collection was the donation of 50 kg of raw Baltic amber, which completely changed the view on amber, its inclusions and its amber taphocoenosis. The uniqueness of the scientific collection of the Museum of Amber Inclusions is in its positioning within the structures of the University. We are not a collection of specimens, musealia that cannot be touched, but a collection where amber is the basis of scientific discovery and research. Twenty-five years ago, we were at the point when interest in inclusions was developing, and the amber market was growing, and we were present at the Amberif Fair, among the amber workers and collectors, at the centre of the amber (and inclusions) fever. The scientific backbone of the Museum is its collection, research facilities and friends among scientists. The flesh is a collaboration with amber workers, collectors and enthusiasts of amber and inclusions. The blood is the circulation of information, data, ideas, and opinions.

New technologies allow us to look more and more closely into worlds hidden millions of years ago in the solidifying drops of resins. It is the 21st century and we are discovering new pages written in the books of amber, its inclusions and its deposits, but also in the stone books of palaeontology. We will not be able to answer more and more questions on our own – cooperation, exchange of information and experience of geologists, palaeontologists and biologists is needed.

The Conference, which is being held at the University of Gdańsk and supported by the Ministry of Education and Science, will offer an outstanding scientific programme thanks to the participants. It is an opportunity to share the current state of knowledge, new working hypotheses, to debate new findings and new tools, to discuss and find new interpretations of existing data and opinions.

It is with great pleasure that we invite all of you in the spring of 2023 to this Conference, we encourage scientific openness, warm discussions, collaboration, and a shared reading of palaeobiology in fossil resins and sediments. We trust that your stay in Gdańsk – the World Capital of Amber and Museum of Amber Inclusions will be a memorable opportunity for both professional and personal satisfaction.

HONORARY PATRONAGE



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ABSTRACTS



MIOCENE FOSSIL RESINS - WHAT THEY CAN SAY ON MODERN-DAY CLIMATIC CRISIS

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The Miocene was the first geological epoch of the Neogene period, extending from about 23.03 to 5.333 million years ago (Ma). It was a period in which the climate cooled slowly but still had a global warming interval, relative to the present day. Miocene climate was dynamic: long early and late glaciation periods included a ~2 million year-long greenhouse period in c. 17-15 Ma – the Middle Miocene Climatic Optimum (MMCO). The MMCO represented one of the major warming periods in the Cenozoic and was accompanied by a positive increase in stable carbon isotopes. The geological record indicates that mid-latitude temperatures were about 5-6°C higher than today during MMCO¹. This magnitude of warming corresponds to the warming projected for the next century.

The continents' configurations and the mountains' topography were shifting towards modern conditions, and many floristic and faunal elements were recognisable as contemporary.

The period of MMCO was also the period of production and accumulation of resins, which fossilised and deposited, are currently recognised as Dominican amber, Mexican amber, Zhangpu amber, Sumatra/Borneo amber or Ethiopian amber, to mention some. In most cases, these resins contain various types of inclusions, of which the best elaborated are arthropods. Inclusions in fossil resins often serve as proxies in studying changes in the palaeobiotas. However, what is preserved is not always an outright representation of the ecosystem, and interpretation of the findings may pose some difficulties². Amber trap is selective, and taxonomic and biotic images recorded in samples are skewed³. But being aware of this bias, amber inclusions are still an excellent and enormous source of palaeobiological and palaeoclimatological information.

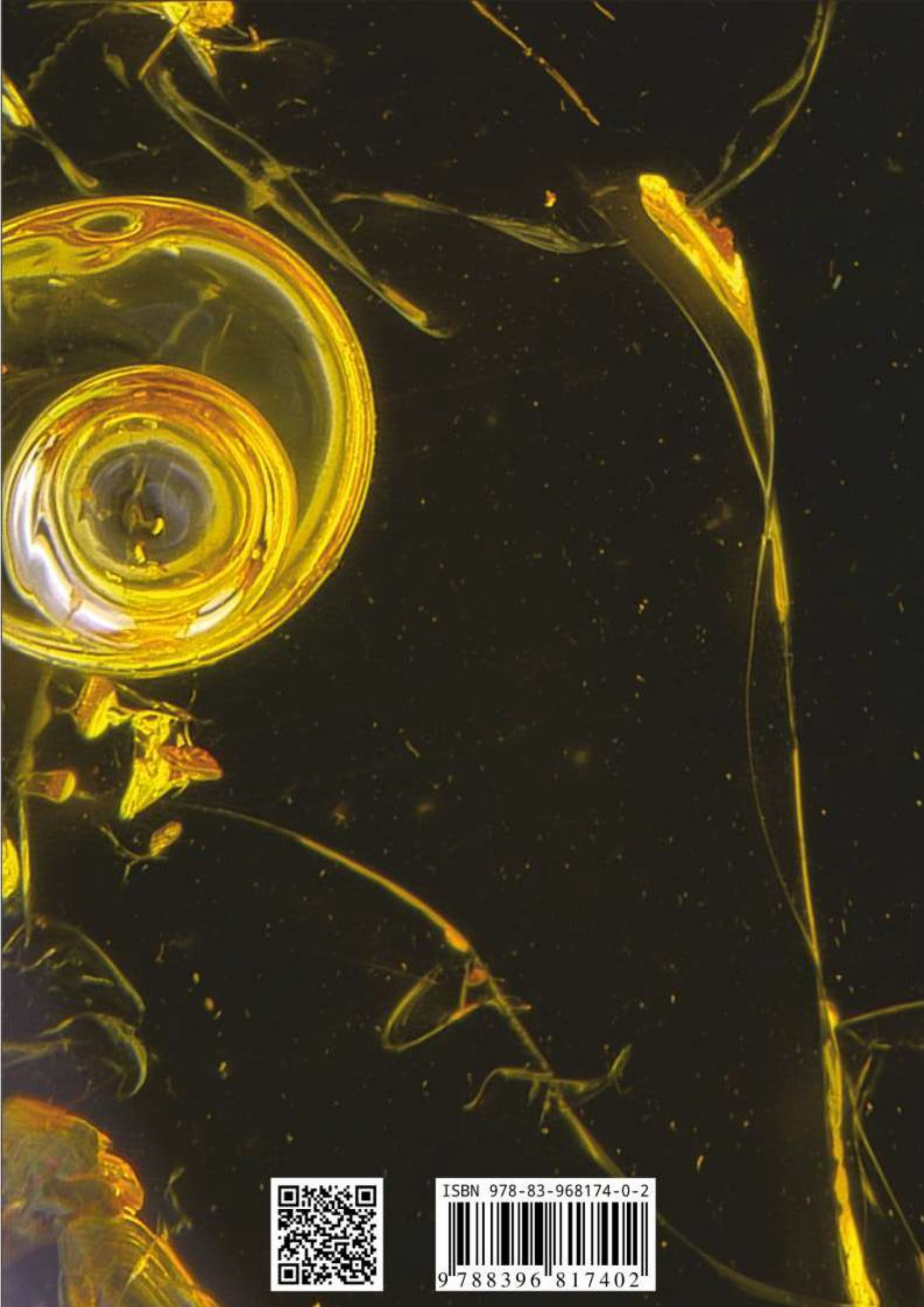
Arthropod inclusions in Dominican amber and Mexican amber are relatively well known, and with all reservations, these could be compared with their recent counterparts, representing groups recorded as fossils. The presence of particular arthropods, present in the areas during the MMCO, entombed in fossil resins of the *Hymenaea*, but now absent, compared with distributional and ecological patterns offered by their recent relatives, can bring essential conclusions. Interesting results were already signalled from the Fotan group deposits, where adpressions of plants and amber rich in inclusions co-occur⁴. The record shows that the mid-Miocene rainforest in China was more widespread than previously estimated. Recent discoveries of Miocene resins in India and Vietnam, new data on resins and their deposits from Indonesia, Brunei and the Philippines should shed light on the biotic and climatic changes during the MMCO in south-eastern Asia. The resins were identified as derived from Dipterocarpaceae, which must have been supported by a warm, tropical climate. Tropical Asia is well-known and unique for the importance, and Neogene diversity of the Dipterocarpaceae, and its forests are composed of species primarily in this family. Amber from the early Miocene of Ethiopia is a new and invaluable source of data, the first results present a variable

and rich set of inclusions. Recent palaeobotanical discoveries suggest the presence of legume dominant wet tropical forest at the time of amber formation in the northwestern plateau of Ethiopia⁵. Ethiopian amber is derived from a kind of legume tree, *Hymenaea* or a close relative, and recent palaeobotanical data could be a valuable reference to the reconstruction and interpretation of the amber forest of Ethiopia. Miocene ambers originate from areas grown by megathermal wet forests, species-rich, but sometimes with a dominance of a single canopy species. Differences in regional evolutionary histories are implied by biogeography: most of Africa's monodominance-forming species are Amherstieae-tribe legumes; monodominance in Neotropical forests occur among diverse taxonomic groups, often legumes, but rarely Amherstieae, and monodominance in Southeast Asian forests occurs mostly among Dipterocarpaceae species. Megathermal rainforests are recognised as evolutionary museums for biodiversity, amber and its inclusions can give a word on their largely unknown histories, shaped under conditions of global warming during MMCO. Understanding these past events, palaeohabitas and their functioning at MMCO times are crucial to understanding the current global climatic changes.

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