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ABSTRACT BOOK

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The Geoscience paradigm:
resources, risks and future perspectives

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COVER IMAGE:

Pillow-lavas and pillow-breccias covered by red-green radiolarian cherts and reddish marly limestones (Middle-Upper Jurassic) in the Timpa delle Murge ophiolitic sequence (Pollino Massif, Basilicata) (Photo courtesy of G. Prosser).

An insight in Baltic amber: determining the origin and the nature of the inclusions trapped in the natural organic gem

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Amber is a fossilized resin ancient trees (coniferous and deciduous), which underwent the process of fossilization in various epochs and depositional environments and which has been used for a long time as a source of paleobiologic information via the preservation of paleobiota. However, the resin does not just trap organisms but amber can also preserve vapour phases of various composition. They may represent ancient air trapped at the time the original resin was exuded from its host tree but may also indicate modern air (Berner & Landis, 1987). Roedder (1984) also suggested that the trapped air might be mixed with volatile components of the amber. The processes used to prepare the samples, such as grinding and polishing, may force the entrapment of inclusions that have nothing in common to the original entrapment, therefore, post-processing water, impurities or alteration materials need to be described and differentiated from the naturally entrapped inclusions. In this study, Baltic amber Eocene in age is investigated. Numerous samples of raw (not processes) and non-raw (processed) material are used with the aim to investigate, through a multidisciplinary approach, the nature of the inclusions and to determine their origin. The samples vary in size and weight (from 1 to 5 grams) and have been all selected according to their inclusions appearance. They consist of air bubbles, liquid and solid phases (e.g. marcasite) as well as spores. Previous studies (Jiang et al., 2022) demonstrate that resin and amber are not always closed systems. Fluids (e.g. sediment pore water, diagenetic fluid and ground water) at different burial stages have chances to interact with amber throughout its geological history and affect the preservational quality and morphological fidelity of its organic inclusions. There are indeed numerous problems with preservation of original compositions in the amber matrix and therefore experiments considering any man-made inclusions are also carried out. Data from light microscopy, scanning electron microscopy (SEM), energy-dispersive and wavelength-dispersive X-ray spectroscopy (EDX and WDX), X-ray micro-computed tomography (Micro-CT) and Raman spectroscopy will be presented.

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