XVIII EJIP Andorra 2020

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Book of Abstracts

NOVELTIES IN IBERIAN PALAEONTOLOGY

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Vicente Gilabert Pérez, Eduardo Medrano Aguado, Álvaro García Penas, Fernando A. Ferratges Kwekel, Elisa Laita Florián, Manuel Pérez Pueyo, Raquel Moya Costa, Antonio Alonso Germán, Julia Galán García, Carmen Núñez Lahuerta (Editors).

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Xabier Pereda-Suberbiola. Universidad del País Vasco/Euskal Herriko Unibertsitatea.

Preface

This year, the EJIP is coming of age. A generation of young palaeontologists of the Universidad de Zaragoza is to be thanked for the birth of this congress. Back in 2003, they were taking their first steps in scientific research. The idea of this meeting emerged as a way to share and put in common the work of early-stage researchers, in a more relaxed, less formal environment than traditional conferences. It was held in Ariño (Teruel) and brought together a small group of young and enthusiastic palaeontologists. Almost two decades later, as the current young researchers in palaeontology from the Universidad de Zaragoza, we wanted to pick up the baton from "our elders" (surely, they wouldn't like us calling them that) and bring the EJIP back to Teruel. In this case to Andorra (very close to Ariño), a small town with a mining tradition where lignite extraction has been the basis of the local economy since the beginning of the 20th century.

Unfortunately, the events that took place this year 2020, for which no one was prepared, have prevented the physical celebration of this meeting. As you all already know, the XVIII EJIP will be held virtually. Here we want to thank the colleagues of the "Palaeontological Virtual Congress", who have kindly given us their web platform to host this congress. And we hope that, despite the difficulties, the spirit and original objectives of the EJIP remain alive. Let's create a space in which young researchers in palaeontology can show their work, debate, discuss and learn.

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WORKSHOPS

Cheating in TNT

Organizer /

Miguel Moreno Azanza

In this workshop you will overcome fear of using TNT, the most widely used quantitative phylogeny program in scientific literature. We will work on how to face a new analysis, basic concepts about the construction of matrices, tree search algorithms, interpretation and presentation of results and, above all, a small manual of good practices and common mistakes to avoid when starting to work with cladistic analysis.

Introduction to traditional scientific illustration, applied to palaeontology and palaeoart

Organizers /

Eloy Manzanero

Bogdan Cărpinişan

Fernando A. Ferratges

Raquel Moya Costa

Scientific illustration is a discipline that encompasses a wide range of graphic representation techniques at the service of science. Its usefulness is in his climax thanks to the growing demand for scientific illustration in the media and outreach activities.

The objectives of this workshops are knowing and applying the foundations of scientific illustration: objectivity, pragmatism, didactic character, accuracy, schematism and targeting, among others, all of great relevance to help and enhance better communication, dissemination and representation of studies in palaeontology. This workshop is limited to those aspects of utility for attendees, responding to their specialization in palaeontology. Those points in common of the various definitions proposed for palaeoart that are adaptable to the profile of the assistant are taken into account.

Introduction to geometric morphometrics

Organizers /

Soledad de Esteban-Trivigno

This workshop will be taught by Dr. Soledad De Esteban-Trivigno (Transmitting Science, Spain). It will introduce the participants to the basic concepts of geometric morphometrics. It will consist of some theoretical explanations followed by software demonstrations, which will cover the following points:

- Comparing shapes, what is this about?
- What is a landmark?
- Differences between landmark configurations.
- Let's do it: Translation, rotation and scaling.
- Removing the size factor: centroid size and allometry.
- Generalized least squares superimposition, why using this method?
- Visualization: Thin Plate Spline, lollipop graphics, drawings.
- Capturing the general picture: Principal Component Analysis.

KEYNOTE SPEAKERS

PhD / **Sofia Pereira**

Sofia Pereira has a Geology degree by the Universidade NOVA de Lisboa, with a final year staying at the Universidad Complutense de Madrid. She received her PhD in Stratigraphy and Palaeontology by the Universidade NOVA de Lisboa.

Her main area of research is trilobite palaeontology and Ordovician stratigraphy in the high latitude peri-Gondwana Domain. She is mainly focused in the study of trilobite associations of the Upper Ordovician, analyzing the record of the group in Portugal, Spain, Morocco and the Czech Republic. At the same time, she collaborates with specialists in other groups to reconstruct the communities related to the Boda global warming event and the great late Ordovician extinction.

In a more transversal terms, she investigates the classification and phylogeny of problematic trilobite groups (Illaenidae and Panderiidae), the details of the group's ecology (ecdysis and cryptic behaviors), and more recently she is conducting research regarding Belgium's geographical position during the Ordovician by analyzing trilobite associations.

In Portugal, she has founded a small informal group ("Delgaditos", dedicated to the geologist Nery Delgado) that investigates the Paleozoic stratigraphy of some little-studied Portuguese regions, carrying out prospection works in the Ossa Morena Cambrian (Vila Boim) and the Central-Iberian Paleozoic. A new palaeontological interpretation center connected to this group is currently under construction.

PhD / **Eduardo Puértolas**

Eduardo Puértolas has a degree, a Master and a PhD in Geology by the Universidad de Zaragoza. He was the recipient of a Pre-doctoral Spanish Competitive PhD Grant "FPU". Currently he has a postdoctoral researcher position at the Universidade NOVA de Lisboa (Caparica, Portugal) and he collaborates with the Museu da Lourinhã (Lourinhã, Portugal).

During his thesis, he focused his research on the systematics, phylogeny, palaeobiogeography and extinction patterns of Crocodylomorpha in the Cretaceous of Europe, with special emphasis on Spanish taxa. Within this line of research, he has participated in the description of three new species of eusuchian crocodilomorphs from the Upper Cretaceous that served to clarify the phylogeny and origin of modern crocodilians.

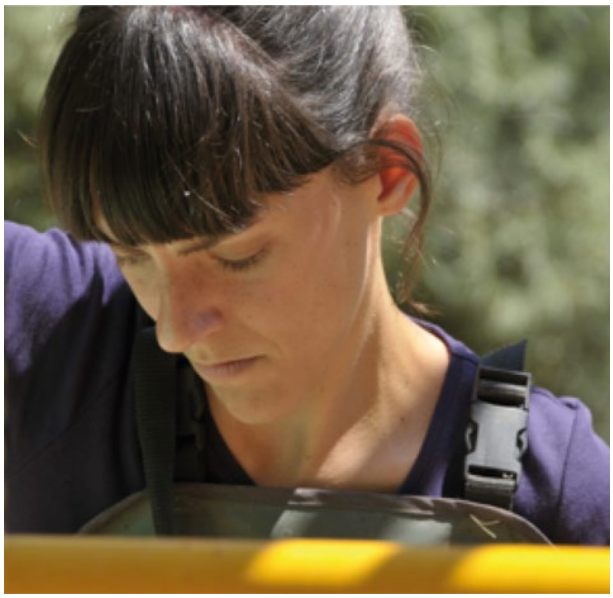
Now he is continuing his research work in Portugal with a postdoctoral position, carrying on this line of research with the description of a new eusuchian crocodilomorph of the Portuguese Cenomanian as well as the study of the neosuchians of the end of the Jurassic.

He is currently developing his research in three lines of work carried out at the Universidade NOVA de Lisboa by collaborating with the Aragosaurus-IUCA Group of the Universidad de Zaragoza: 1) studying the palaeobiodiversity of the continental vertebrates of the Jurassic and Cretaceous in Iberia; 2) studying the Mesozoic and Cenozoic palaeobiodiversity of Crocodylomorpha in the Iberian Peninsula and 3) studying the Cretaceous/Paleogene boundary extinction at the Iberian Peninsula.

PhD / **Daniel DeMiguel**

Daniel DeMiguel has a degree in Geology by the Universidad de Zaragoza and a PhD in Sciences by the same institution. He was awarded a pre-doctoral Spanish competitive PhD Grant "FPU" at the Museo Nacional de Ciencias Naturales de Madrid (CSIC), he has worked at the Institut Català de Paleontologia Miquel Crusafont (ICP) with several postdoctoral contracts (including a "Juan de la Cierva" Contract), and he is currently an ARAID permanent researcher at the Universidad de Zaragoza.

Daniel DeMiguel´s research focuses on several fields of Vertebrate Palaeontology encompassing a variety of problems related to the palaeobiological and climatic evolution of the Neogene-Quaternary Earth. He applies proxies of dietary reconstruction and craniodental morphology to reconstruct major climatic events and trace the evolution of mammals across episodes of climate instability, with the final aim to offer new understanding about why and how they react to environmental changes and address projections for the future warming Earth. He also works on the interplay between form and function using a combination of traditional and pioneer state-of-the-art techniques; specially by using the 3D Finite Element Analysis (FEA).



PhD / **Sandra Bañuls**

Sandra obtained a PhD summa cum laude from the Università degli Studi di Ferrara in 2017. Her PhD thesis was framed within the “Erasmus Mundus in Quaternary and prehistory” Programme in co-tutelage with the Muséum National d’Histoire Naturelle of Paris.

Her thesis focused on the analysis of the anthropic effects on landscape by analyzing the populations of small mammals during the late Pleistocene-Holocene transit in the western Mediterranean area of influence. It was a key period in the history of our species, from both a climatic and a cultural evolution points of view.

Sandra works as a postdoctoral researcher at the Institut Català de Paleoecologia Humana i Evolució Social (IPHES), within the group of Palaeontology included in the project “Prehistoric Socioecology and cultural changes”, funded by the Generalitat de Catalunya. She currently has a Juan de la Cierva Contract, which is within the State Program for the Promotion of Talent and its Employability in R + D + i of the Ministry of Science and Innovation. Within the framework of this contract, she is carrying out a new line of palaeoenvironment research through the analysis of dental micro- and meso-wear in rodents, recorded at sites with evidence of occupation by the latest hunter-gatherer societies in the northeast of the Iberian Peninsula.

ABSTRACTS

Session:
PALEOZOIC

The genus *Serrodiscus* (Trilobita) in the upper Marianian (early Cambrian) from northern Huelva province, SW Spain

Luis Collantes Ruiz[1], Eduardo Mayoral Alfaro[1,2], Rodolfo Gozalo Gutiérrez[3]*

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The presence of the genus *Serrodiscus* in the early Cambrian rocks from the province of Huelva has been previously remarked by preceding authors. Nowadays, the genus *Serrodiscus* is noted as the first trilobite genus with global distribution in the early Cambrian oceanic platform environments, so its FAD is currently considered for the definition of the base of Cambrian Stage 4. Therefore, its presence in the Marianian rocks from northern Huelva could strengthen the correlation with another early Cambrian localities worldwide.

Keywords: *Serrodiscus*, Marianian, Cambrian Series 2 - Stage 4, Sierra de Aracena y Picos de Aroche Natural Park, Ossa-Morena zone.

The upper Lochkovian (Lower Devonian) palaeoichtyofauna of the Nogueras Formation (Iberian Range): paleoecological applications

*Héctor Barrera Lahoz[1]**

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The Lower Devonian Nogueras Formation is characterised by its fossiliferous richness, especially in fossil vertebrates. Many studies have provided important palaeobiological, palaeobiogeografical and palaeoecological information. We pretend to carry out a study of this palaeoichthyofauna through a sampling of several selected layers and a taxonomical study. Also a palaeoecological approximation of one of the sampled layers will be performed in order to support the sedimentological data in the palaeoenvironmental reconstruction. The fossil fish assemblage is mainly composed of acanthodians, also other groups like chondrichthyans and placoderms appear in the assemblage. The palaeontological data, along with the sedimentary data, suggest an environment of shallow marine shelf and protected.

Keywords: acanthodians, chondrichthyans, placoderms, marine shelf.

Paleoenvironmental and depositional context of the first record of fossil fishes in the Lower Devonian of Minorca

*Cristian Timoner[1]**

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An outcrop of the Lower Devonian of Minorca have been studied. It is a turbidite complex with a large record of allochtonous fauna of which different taxa have paleoenvironmental interest. From this record, a hypothetical paleoenvironmental system is inferred on a marine carbonate platform. The first record of Devonian vertebrates of Minorca is of particular interest, due to is remarkable evolutionary implications.

Keywords: Menorca, Lower Devonic, turbidites, reefs, Acanthodians.

Session:
MESOZOIC

Mollusca (Ammonoidea, Gastropoda, Bivalvia) from the Upper Ladinian (Middle Triassic) of the island of Mallorca (Balearic Islands, western Mediterranean): preliminary data

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A group of fossil molluscs with silicified presevation from the Muschelkalk facies (Middle Triassic) of the southwest of Serra de Tramuntana (Mallorca, Western Mediterranean), is studied. Due to the biostratigraphical significance of its ammonoids, Upper Ladinian is characterized for the first time on the island. In a similar way, the biogeographical context of the area during this interval is analyzed using the ammonoid, gastropoda and bivalvia records in a preliminary approach.

Keywords: Ladinian, ammonoid, bivalve, gastropod, Mallorca.

Using computed tomography for the apparatus reconstruction of *Pseudofurnishius murcianus* Van den Boogaard (Middle Triassic)

Cástor Armañanzas-Alpuente[1], Tea Kolar-Jurkovšek[2], Bogdan Jurkovšek[2], Philip C. J. Donoghue[3], Carlos Martínez-Pérez[3, 4]*

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The study of conodont clusters and bedding plane assemblages provide useful information about the composition of the conodont apparatus. However, they have been vaguely used due to their fragility and difficult manipulation, which complicates the description of their elements. Currently, the development of non-destructive techniques such as the high-resolution tomographic microscopy has allowed the study of these conodont associations in detail. In this work, the reconstruction of the apparatus of the species *Pseudofurnishius murcianus* (Middle Triassic) has been achieved by means of the study of several exceptionally preserved clusters and bedding plane assemblages found in the locality of Prikrnica (Slovenia). Using Synchrotron X—Ray tomography microscope (Paul Scherrer Institute, Switzerland), the analysis of the 3D models derived from the tomographic data suggests that the apparatus of *P. murcianus* is an octomembrate type, thus confirming the apparatus composition stability within the order Ozarkodinida.

Keywords: Conodont apparatus, Tomographic microscopy, Middle Triassic, Slovenia.

Paleohistological approach to the ornithopod dinosaurs from La Cantalera-1 (Blesa Formation, Barremian, Teruel)

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The work has focused on making a paleohistological approach to the remains of different ornithopod dinosaurs found at the La Cantalera-1 site located in the lower part of the Blesa Formation (Lower Barremiense) in Teruel.

The study has been carried out by observing thin section with petrographic microscopy.

With the results obtained, it is concluded that the ornithopod fossils studied never reached advanced ontogenetic stages, therefore the whole structure of the population is not conserved and the adult individuals are missing. These results are consistent with previous proposals that suggest Cantalera-1 was a sporadic feeding area for these dinosaurs.

Keywords: Paleohistological approach, ornithopod, ontogenetic stage, La Cantalera.

Revisiting fish mass mortality in Las Hoyas (upper Barremian, La Huérguina Formation, Cuenca)

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Over 100 juvenile teleosts found in two mass mortality slabs are perfect examples of exceptionally preserved fossils from the Las Hoyas Konservat-Lagerstätten, for they are articulated and preserve soft tissues, such as the body outline and the eye. The analysis of the distribution, direction and sense of the fishes in these slabs, as well as a set of taphonomical features (curvature, gasping mouth and tetany of fins) suggest that their mass death was likely not due to hypersalinity but to anoxic or hypoxic conditions or the presence of toxins in the water.

Keywords: Konservat-Lagerstätten, mass mortality, teleosts, Las Hoyas, taphonomy.

Abelisaurid dinosaurs from the Upper Cretaceous Laño site (Iberian Peninsula)

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The upper Campanian Laño vertebrate site (north of Iberian Peninsula) has yielded several remains that belong to a mid- to large-sized abelisaurid theropod. This material consists of isolated teeth, a caudal vertebrae and a pair of femora. Some of these remains are described here for the first time. Abelisaurid remains have been found in the Cretaceous deposits of Europe, especially in the Campanian and Maastrichtian deposits of the Ibero-Armorican Domain. Further studies of the material may, therefore, shed light on the relationship of the Laño abelisaurid with other European taxa.

Keywords: Abelisauridae, teeth, vertebra, femur, Late Cretaceous.

First approach to the paleohistology of the sauropod *Galvesaurus* (Kimmeridgian, Galve, Spain)

Celia Jurado[1], Blanca Bauluz[1], José Ignacio Canudo[1, 2]*

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In this work a paleohistological analysis have been performed to a sauropod specimen from the Upper Jurassic of the Galve subbasin, in Maestrazgo basin (Teruel). Histological observations of several skeletal remains were made. These observations were made from the thin sections in an optical microscope and they have allowed to determine the ontogenetic stage of *Galvesaurus* at the time of its death: it was an adult specimen. Moreover, some ontogenetic observations were made.

Keywords: Paleohistology, *Galvesaurus*, Jurassic, Galve subbasin, ontogeny.

First approach to the paleohistology of the hadrosaur dinosaurs from Blasi 2A (Tremp Formation, Maastrichtian, Huesca)

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In this work, a paleohistological approach of hadrosaurid dinosaur bones of Blasi 2A site in Arén (Huesca) is carried out. This site is located in the Tremp Formation and was formed in transitional facies. The grey marl of the site contains disarticulated dinosaur bones and a diverse microfossil assemblage. Some of the microfossils found indicate that the site was formed underwater, although no direct evidence of marine influence has been found.

In order to study the histology of the hadrosaurids by means of optical microscopy, six bone remains have been selected: two ribs, two femurs and two vertebrae. The histologic characteristics will determine the ontogenetic stage of the remains at the moment of the death. The data indicate that three of the individuals were adult, two were subadult specimens, and only one was a juvenile individual.

Keywords: Paleohistology, hadrosaurids, Tremp Formation, paleoecology.

First approach for a taphonomic key for fossil eggs and eggshells accumulations using optic microscopy: the case of Blasi-2B (Upper Cretaceous, Spain)

Carmen Núñez-Lahuerta[1,2,3], Miguel Moreno-Azanza[1,2,3], Manuel Pérez-Pueyo[3]*

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Taphonomic analysis are crucial for interpreting fossil accumulations. Taphonomic studies of eggshell remains have been faced by several authors, but a general methodology is lacking. The goal of this work is to elaborate a key for the taphonomic descriptions based on previously described and new characters that can be applied to every type of site (including nests, clutches, eggs or eggshell fragments). Eleven variables observable with optic microscopy have been selected, based on the size, the shape, the state of conservation and the presence of different types of marks. The key has been applied to the Upper Maastrichtian eggshell remains of Blasi-2B, revealing an attritional origin of the accumulation. More characters will be added to the key in the future (including different techniques). The application of this key will shed light on the relationships between facies and egg assemblages, leading to the understanding of the paleobiology of the nesting taxa.

Keywords: Taphonomy, Upper Maastrichtian, *Pseudogeckoolithus*, Theropoda, Eggshells.

Current knowledge of Late Jurassic ornithopod dinosaurs from Europe

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The ornithopod skeletal fossil record from the Upper Jurassic of Europe is scarcer and more fragmentary than in North America, but showing a similar diversity. In Europe, most of the knowledge about this group of dinosaurs comes from finding in Portugal, Spain, UK, France, and Germany. In this work we concisely review the main discoveries in these regions. As result, we determined that Late Jurassic European ornithopod faunas were mainly composed by dryosaurids, non-styracosternan ankylopollexians, and perhaps other derived species.

Keywords: Diversity, Dinosauria, Ornithopoda, Europe, Late Jurassic.

Ornithopod palaeobiodiversity in the Barranco del Hocino-1 site, from the upper Barremian in the Oliete subbasin (Teruel, Spain)

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Barranco del Hocino-1 is a vertebrate fossil site located near Estercuel, Teruel province, Spain. Geologically, this site is located in the Oliete subbasin (Maestrazgo basin), in the upper sequence (upper Barremian) of the Blesa Formation. The site shows a diverse fossil assemblage of tetrapods. 29 isolated Ornithopoda teeth belonging to 4 morphotypes have been found. A first approach shows that these teeth belong to at least two different ornithopod taxa (Ornithopoda indet., Styracosterna indet.), but some features of the specimens such as hard wearing, resorption effects and preservation of the fossils complicate their taxonomic assignment. The results are congruent with the known ornithopod record of the Barremian in the Maestrazgo basin.

Keywords: Lower Cretaceous, teeth, Dinosauria, Styracosterna, resorption.

Rudists bioconstructions in the north edge of the Central System (Segovia)

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The rudists lithosomes found in the Ituero y Lama and the Montejo formations, respectively at the localities Espirdo and Bernuy de Porreros (Segovia province) increase the paleontological record of these sessile forms, which inhabited the shallow marine platforms installed and developed in the Iberian Basin, among other Tethys basins, during the Late Cretaceous. These bioconstructions are classified as matrix-supported reefs and attributed to cluster reefs subcategory. Furthermore, they provide new information on the lithological characteristics of bioconstructions and their evolution and development in the face of environmental conditions.

Keywords: Rudists, bioconstructions, carbonate platform, Santonian-Campanian, Iberian Basin.

Eggshell association of the Late Maastrichtian (Late Cretaceous) at Blasi 2B fossil site: a scrambled of vertebrate diversity

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Upper Cretaceous outcrops of the South-Central Pyrenees in north-eastern Spain show a rich palaeontological record of eggs and eggshells of vertebrates, in particular dinosaurs. The fossil site of Blasi 2B (Arén, Huesca) is added to the oological record of the Late Maastrichtian, with an association of at least five ootypes of dinosaur eggshells (one Spheroolithidae and four Prismatoolithidae), two Krokoolithidae and one Testudoolithidae. Blasi 2B represents one of the most diverse Maastrichtian eggshell sites of the Southern Pyrenees, and remarks the presence of a diverse theropod dinosaur fauna during the Late Maastrichtian in the Ibero-Armorican Island, with at least 4 ootaxa recognised.

Keywords: South-Central Pyrenees, Tremp Fm, Chron C30n, Prismatoolithidae, Spheroolithidae.

Session:
CENOZOIC

Planktic foraminiferal response to the earliest Danian paleoenvironmental and paleoclimatic events at Caravaca (Murcia)

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The recovery of ecosystems after the Cretaceous/Paleogene (K/Pg) boundary mass extinction is still highly debated. In order to assess the environmental and climate changes over the first 260 ka of the Danian, we carried out a quantitative study of the planktic foraminiferal assemblages and biometric measurements in three selected planktic foraminiferal species. A rapid evolution of very simple planktic foraminiferal species occurred during the first 32 ka, reoccupying the empty niches after the K/Pg extinction. An increase in the size of the measured species is recorded across the study section, mainly during episodes of environmental stability (probably cooling). The increase in their size halted during the two *Chiloguembelitria* acmes identified, which mark ecological stress episodes. Our results suggest that the environmental perturbations in the most superficial layer of the water column were driven by Deccan volcanic forcing.

Keywords: Deccan volcanism, K/Pg boundary, Biometry, Acme.

Spatio-temporal variations in the diversity of decapod crustaceans during the Eocene in the Jaca-Pamplona Basin (South-central Pyrenees)

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The well exposed outcrops in the Huesca province (Spain) provide an exceptional example of decapod crustacean stratigraphical occurrences from the middle-upper Eocene (Bartonian-Priabonian) in a mixed carbonate-siliciclastic system. The Arguis Formation (Jaca Basin, South-central Pyrenees) including the studied decapods shows a wide spectrum of environments, ranging from shallow marine reef complexes to prodelta/outer platform deeper conditions as a result of a progradation of the sedimentary environments to the west due to the diachronic Pyrenean tectosedimentary evolution during this period with the related activity of synsedimentary folds. More than 500 specimens of decapod crustaceans have been collected from different lithofacies in 7 different localities. Preliminary results show that major peaks in diversity are correlated with very specific taphonomic conditions in the proximal prodelta environments. Decapod assemblages also show an unequal distribution in different environments. All this provides a unique opportunity to study the distribution over space and time of a single invertebrate group in a relatively small area in order to understand the control factors for such distribution.

Keywords: Eocene, decapod crustaceans, reefs, paleoenvironment, paleoecology.

The Eocene vertebrate fossil record of the Ainsa Basin (Huesca, Spain): new sirenian fossil sites in the Sobrarbe Deltaic Complex

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In the last years, the previously unknown Eocene macrovertebrate fossil record of the Ainsa Basin (Southern Pyrenees Basin, Huesca, Spain) has been improved. It is composed by pleurodiran and cryptodiran testudines and the basal sirenian *Sobrarbesiren cardieli*. In 2018, a survey campaign was conducted to search for new Eocene sirenian fossil sites in the Ainsa Basin. Thirty-three new sites with macrovertebrate fossils were found increasing to a total of forty the number of fossiliferous points in this basin. They are mainly concentrated in the deltaic plain facies of the Sobrarbe Fm. (middle Lutetian) but the fossil record covers a temporal range from the upper Ypresian? to the late Lutetian-Bartonian. Principally, the recovered fossils are testudines, sirenians and scarce crocodiles, but also a lophiodontid perissodactyl and other still indeterminated mammals evindencing that the Ainsa Basin is a very important area to study Eocene mammals and specially sirenians.

Keywords: Sirenia, Testudines, Lophiodontids, Lutetian, Southern Pyrenees.

The Quaternary Soricids (Eulipotyphla, Mammalia) fossil record of the Iberian Peninsula

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Soricids (Eulipotyphla, Mammalia) are tiny mammals usually thriving in humid environments, with some differences among the genera. This work is a review of the Quaternary sites of the Iberian Peninsula where soricids have been identified. The sites have been represented geographically with the genera present. We observe that the Early Pleistocene has the most diverse record. The paleobiodiversity of soricids decreases dramatically in the transition to the Middle Pleistocene. During the Late Pleistocene there is an increase in the number of studied sites than in previous ages. During the Holocene the absence of *Sorex* in the warmest and dryest part of the Iberian Peninsula becomes significant, as nowadays.

Keywords: Diversity, Holocene, Climatology, Environment, Extinction.

Grotte de Sylvie 1: a new Late Pleistocene site into the Réseau Lachambre (Têt Valley, Eastern Pyrenees). Initial study on a hyaena natal den

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A new Pleistocene hyena den, located into the Réseau Lachambre karstic complex (Têt Valley; Eastern Pyrenees), is here presented. Sylvie 1 is an accessory cavity of the former network with a documented large mammal assemblage putatively corresponding to the Late Pleistocene and mainly dominated by *Crocuta spelaea*. The majority of the studied bones shows cracks, punctures and gnaw marks as a consequence of hyena activity. A brief overview of the taphonomy of the documented remains and the morphometric comparisons with the dentognathic apparatus of the European *Crocuta* fossil record enables us to identify Sylvie 1 as a *Crocuta spelaea* natal den from Late Pleistocene.

Keywords: Quaternary, carnivores, Hyaenidae, *Crocuta*, Occitania.

The small-mammal assemblage from Koskobilo (Olazti, Navarre). Biochronological, paleoecological and taphonomic notes

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Despite the complex origin of the remains of the Koskobilo (Olazti, Navarre), the uniqueness of some of the species of large mammals recovered and its location in the northern Iberian region with few Middle Pleistocene records, warrants the description and contextualization of the remains found there. A total of 91 small-mammal remains were recovered. Among the 9 species identified, it is worth mentioning the remains of *Marmota marmota* and *Castor fiber*, both relatively scarce in fossil contexts during the Pleistocene. The origin of the small-mammal assemblage is unclear, but some predation signs are identified. Despite the fact that some of the large-mammal species are of Middle Pleistocene age, the small-mammal species point to an Upper Pleistocene chronology, as well as happens with other larger species of mammals. The nebulous origin of the assemblage limits the paleocological interpretation, but the presence of alpine-subalpine meadows is described, associated to cold and wet climate.

Keywords: Upper Pleistocene, Northern Iberia, vertebrates, Taxonomy, Archaeology.

Quantitative classification of metapodial bones of *Ursus spelaeus* and *Ursus arctos* from Northwestern Iberia using multivariate statistics

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Cave and browns bears lived sympatrically during the Late Pleistocene in Northwestern Iberia. Their bones have been easily identified qualitatively, but new evidences regarding the hybridization of both species made a quantitative approach necessary, in order to detect hybrids with intermediate morphologies. In this work we use measurements of 273 metapodials of both species to classify them in one of the two with multivariate statistics. We found that it was indeed possible to differentiate them through their metapodials, as previous studies have shown, but we also found that metatarsals discriminate both species better than metacarpals, unlike previous studies with multivariate morphometrics. Only one specimen of the 273 analyzed, which was qualitatively classified as *U. spelaeus*, is consistently placed as *U. arctos*. Our results open the gates for finding putative hybrids in the future with this method and allow us to better classify previously known material.

Keywords: *Ursus spelaeus*, *Ursus arctos*, metapodial bones, multivariate statistics, Pleistocene.

When the barn-owl feasted on bats, an approach to taphonomic analysis

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Small vertebrates are a key proxy for paleoenvironmental and paleoclimatic reconstruction, but a previous taphonomic analysis of the paleontological assemblage is needed before facing this kind of approach. Works concerning taphonomy of preyed small vertebrates are abundant in the literature, but chiropters are not usually included as they are only rarely predated. Here we analysed the content of two bar nowl (*Tyto alba*) pellets that exclusively contained bat remains. Our aim is to assess the effects of digestion inflicted by this predator on certain bat skeletal elements, specifically mandibles and lower teeth. All bat remains were assigned to *Pipistrellus* sp. They mostly presented slight alteration of the mandible and non-altered enamel, which is an expected result based on previous literature concerning this type of predator. Nevertheless, a few specific specimens showed much more intense alteration. This is most probably due to predator-related factors, although a higher degree of age-related tooth-wear in a specific bat cannot be dismissed.

Keywords: Taphonomy, Chiroptera, *Tyto alba*, pellet, digestion.

Evolutionary consequences of colour perception of *Sapajus apella* (Primates, Platyrrhini)

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This study aims to understand the evolutionary implications of the intraespecific diversity in color vision in plathyrrine primates, which is determined by the middle- and long-distance opsin encoding gene. The locus responsible for trichromatic vision is found on the X chromosome, thus only heterozygous female individuals show this trait. For the study, a sample of seven *Sapajus apella* was used. All the male individuals used for the study had dichromatic vision, while some females had dichromatic vision and some others trichromatic. Behavioural studies were carried out to understand the different behaviours between the dichromatic and trichromatic individuals. While trichromatic specimens spent more time in foraging (focusing in red and orange foods), dichromatic ones spent more time in social activities. These differences are proposed to be the result of the contrasting strategies taken by dichromatic and trichromatic individuals in order to increase their food resources and chances of survival.

Keywords: Adaptation, Dichromatism, Trichromatism, Platyrrhini, foraging.

The subfamily Gerbillinae as arid climate indicator

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During the Mediterranean Salinity Crisis, a great faunal exchange between North Africa and the south of the Iberian Peninsula took place. In this context, several fossil sites from Southern and Eastern Iberian Peninsula record the presence of immigrant rodents belonging to the subfamily Gerbillinae, which currently inhabit regions of Africa and Asia. Under the hypothesis that the climatic and environmental requirements of gerbils are similar to those of extinct fossil species, this study focuses on the environmental characterization of these species. Using GIS tools to determine the characteristic environmental conditions where this subfamily inhabits nowadays, we observe that most species of the subfamily Gerbillinae live whithin biomes under arid and warm conditions, such as those assumed for the end of the Miocene on the basis of the study of other proxy indicators.

Keywords: Mediterranean Salinity Crisis, Gerbillinae, terrestrial biomes.

Comparison of the rib bone density in Homo sapiens and *Pan troglodytes*: implications for the interpretation of the *Australopithecus africanus* ribcage

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Like many other anatomical structures, the rib cage has changed its morphology and configuration throughout primate evolutionary history. The evaluation of the bone density at an intraspecific level is informative about the function of the upper and lower thorax, whereas the variation of the midshaft rib bone section at an interspecific level could also explain potential biomechanical changes during evolution. We assessed this issue through the study of the internal rib microstructure via microCT of three ribs from *Australopithecus africanus* Sts-14 and the complete set of ribs of ten modern humans and ten chimpanzees. Our results show that the rib bone section differs both at intraspecific and interspecific levels. Thus, the most robust ribs (1 and 11-12) have strong muscle insertions in the three studied taxa, which could give them resistance to mechanical stress. In addition, the ribs with the highest mineral percentage are those belonging to *Pan troglodytes* and *Australopithecus africanus*, which are very similar to each other. This similarity could hypothetically imply strong loadings on their ribs, but also similar rib or even thorax morphologies. Future research should study the covariation between costal bone density and rib morphology.

Keywords: Biomechanics, rib cross section, thorax morphology, compartmentalization index, MicroCT.

Session:
MUSEUM AND HERITAGE

Developing a paleontology/geology-themed tour within the Natural Park of Serra de Mariola (Alicante, Spain)

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The protection of all Geological Heritage relies heavily on the collaboration of the local population. In order to raise awareness and interest about this heritage in both locals and tourists, it's advisable to inform about its relevance and appeal in a way that can be enjoyed by a wider audience. One of such methods is establishing educational tours within the area of interest. The aim of this study was to develop an educational tour focused on the continental Neogene fossil sites of 'Barranc de Gormaget' within the 'Parc Natural de la Serra de Mariola' (Alcoi, Comunidad Valenciana). This process included the drafting of summarized and accessible texts and its inclusion on several informative panels based on the lay out established by Autonomic law. Finally, it was necessary to establish a suitable path for the expository tour and to choose a strategic placement for each of the informative panels contained therein.

Keywords: Heritage, geoturism, informative panels, Neogene.

The enhancement of the palaeontological heritage from the Mio-Pliocene vertebrate sites from the Gormaget ravine (Alcoi Basin)

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The outcrop of the Tertiary aged materials (Miocene?-Pliocene) along the Gormaget ravine, with well known paleontological mammal sites (i.g. Alcoy-Barranco, Alcoy-N, Alcoy-4B, Alcoy-2, Alcoi Barranc Sud, Alcoi Forn, Alcoi Cristian and Alcoy Mina) constitues a complex of high paleontological value wich remains under recognized within the protected Sierra de Mariola Natural Park where is situated. Based on the natural protected areas laws of the Valencian Community (Spain), the aim of this work is to propose the establishment of a protected Municipal Natural Site along the Gormaget ravine (municipalities of Alcoi and Cocentaina, Alicante). In this work we implemented a georreferenced database suitable for producing a series of maps using GIS tools in order to elaborate technical documents included in the Decreto 15/2016 of the Valencian government on natural municipal protected areas (parajes naturales municipales) from the Valencian Community.

Keywords: Small mammals, large mammals, cartography, scientific dissemination, protection.

First analysis of the environmental conditions monitoring at the laboratory of the Enciso Paleontological Center (La Rioja, Spain)

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The Paleontological Center of Enciso (La Rioja, Spain) has a laboratory with a great collection of all kind of rocks and fossils. Stands out the rest of an almost complete, articulated rhino of 3.2 million years ago, found in 2014, near the locality of Muro de Aguas (La Rioja, Spain). In order to analyze the environmental properties of the laboratory and ensure the collection, it has been monitored the temperature and the relative humidity with a data logger. The data logger has been configured to take data each 30 minutes. The data collected goes from July 24th, 2019 to January 15th, 2020, but it's still working at the present. The monitorization results will contribute to make some conditioning actions, helping to a long term preservation of the collection, for the use and enjoyment of both visitors and researchers.

Keywords: Conservation, enviromental conditions, temperature, relative humidity.

What does a reef like you do in a place like this? Paleontological route on La Torre (Alpuente, Valencia, Spain)

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Alpuente is a small municipality from Valencia with a great palaeontological heritage. This municipality has tried to develop a strong cultural-based tourism,by using paleontology as basis by giving a diverse and rich offer on cultural activities for the general public. In this work we present the newest activity to be developed, a paleontological route at La Torre, one of the northernmost villages in the region. On this new route, two alternatives will be offered, a simple one which will show the fossil richness of the Higueruelas Formation, and a second one showing the forefront of a coral reef extending almost 100 meters. This new paleontological route could become a great touristic attraction, helping the development of the local population.

Keywords: Didactics, geoheritage, education, rural development, paleontological tourism.

An update on the professional palaeontology in Aragón from the experience of Athmos Sostenibilidad

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During the year 2019 Aragon has built more than 1300 MW of Eolic energy. This situation presented a great employment opportunity to palaeontologists due to the great soil movements associated to this works. Even though the control and monitoring of civil works is a common job in palaeontology, there is no protocol stablished for the different situations in which the technicians could be involved. In present work we present these issues detected during the control and monitoring works carried out by Forestalia Sustainability Department. After the experience on 7 wind farms and 4 evacuation lines, Forestalia Sustainability technicians detected an urgent need to stablish a formal protocol for the supervision and monitoring of the palaeontological heritage for this type of projects that involve huge amounts of soil movements.

Keywords: Control and Monitoring, Civil work, Wind farms, Renewable Energy, Protocol.

Musealisation processes as assets for science communication environments. A case study: The Enciso Palaeontological Centre versus The Natural History Museum of the Valencian University

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The musealisation processes carried out at the Enciso Palaeontological Centre and the Natural History Museum of the University of Valencia have proved modern institutions which allow palaeontological (and scientific) heritage to be available to society, and for teaching purposes. Starting from these centres and traditional units, past reforms turned the two entities into musealisation reference points. Their characteristics seem to place both cases in the modern museum spectrum. However, when it comes to attracting an experiential audience, we propose to carry out a future, more critical or political approach, which allows the creation of alternative discourses based on the knowledge of palaeontological heritage.

Keywords: Musealisation, New Museology, Critical Museology, Palaeontological heritage, Interdisciplinarity.

Recovery of paleontological heritage: cataloging and enhancement of a paleontological donation

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The "Network of Museums and Museum Collections of Paleontology of the Valencian Community" (PaleoredCV) is an association that integrates all the representatives and custodians of the Valencian paleontological heritage created with the aim of join efforts in the study, management, dissemination, protection and enhancement of the valencian paleontological heritage. In this context, the present work shows the collaboration between the Natural History Museum of the University of Valencia (MUVHN) and El Carmen Natural Sciences Museum of Onda (Castellón), for the identification, cataloging and enhance of a paleontological collection recently donated to the El Carmen Museum. In total, 2268 specimens have been inventoried, highlighting the presence of Mesozoic marine invertebrates in a good state of preservation probably belonging to nearby areas It is important to highlight that beyond the relative scientific importance of the collection, the recovery of this paleontological heritage can be useful as an educational and exhibition resource.

Keywords: Paleontological collection, Museo de Ciencias Naturales el Carmen de Onda, PaleoredCV, fossils of Maestrazgo.

Session:

DISSEMINATION, PALAEOILLUSTRATION, GENERAL PALAEONTOLOGY

Communication of paleontological information of a fossil site using paleoart. Baños del Flaco, VI Región, Chile, Titonian, Upper Jurassic

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Scientific illustration involves aesthetic and communicative activities that can be fundamental to expressing scientific data. This work shows the paleoartistic metodology used to communicate the paleontological engage of Baños del Flaco Formation, VI Región, Chile; in order to benefit the research projects from Social Science Institute of O´Higgins University, Rancagua, Chile.

Keywords: Dinosauria, illustration, reconstruction, assemblage, media.

EVOLUTIONARY - Would you be able to survive an extinction?: An activity for the dissemination and education of Palaeontology

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Science dissemination is currently an ongoing process, and new methodologies are arising to bring it closer to increasingly diverse audiences. In order to disseminate paleontological knowledge, a game named 'Evolutionary' was created to introduce the concept of Evolution to a teenage public. The game includes a board, designed as a phylogenetic tree geochronologically calibrated on which the main geological events are represented, and theoretical content questions along with practical dynamic tasks engaging paleontological material as well as mini-games. This activity was performed in November 2019 during *XIX Semana de la Ciencia e Innovación de Madrid* with 14-16 age-old students, showing positive results. Finally, the activity is expected to be included in further events.

Keywords: Dissemination, palaeontology, evolution, teenagers, didactic resources.

Science “for dummies”. Dissemination of Paleontology in the school environment

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Science and its applications are increasingly closer to the students, however, disciplines such as Geology or Paleontology still require greater dissemination among students, since their knowledge is limited to one or two teaching subjects in specific subjects (‘Natural Sciences’ in First Education and ‘Biology and Geology’ in High School Education), or is acquired on their own out of school hours, by hobby or curiosity.

In this work, a description of the informative activities developed in 13 schools and institutes of the autonomous community of Aragon through the “11 de febrero” initiative will be presented, to publicize both Paleontology and the women who work in it, and tear down stereotypes preconceived by the new generations.

Keywords: Scientific dissemination, women in Paleontology, schools, institutes, “11 de febrero”.

Studying the present, understanding the past

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Actuopaleontology is an essential discipline to understand the fossil record. It uses the present as a key to understand the past. Actualistic paleontology has been largely used in a vast array of paleontological fields such as ichnology, paleoart or functional morphology. Given its relevance in current and past paleontological studies, here we examine the advantages of this discipline, focusing in four recent works. In them, the study of contemporary groups allows us to know better if it is possible: to know how reliable is amber when studying extinct arthropods communities; to make trophic inferences about extinct elasmobranchs by dental microwear analysis; to reconstruct the morphology of certain fishes depending on its ecological niche or to find the type of flight in extinct birds considering their humerus morphology.

Keywords: Actuopaleontology, amber, dental microwear, birds, placoderms.